FRACKING FIASCO

THE **BANKS** THAT FUELED THE U.S. **SHALE BUST**

RAINFOREST ACTION NETWORK

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PHOTO: Real Window Creative / shutterstock

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PHOTO: Sarah Craig / Faces of Fracking

INTRODUCTION

In October 1930, the Texas town of Kilgore was the epicenter of one of the state's periodic oil booms. People leaped off trains and into town "like fleas off a dead dog." The drillers threw up derricks in the center of town, and even tore down the First National Bank and drilled right through its terrazzo floor.[1]

Wildcatters destroying a bank in their frenzy to suck oil out of the ground is a remarkably apt metaphor for what the U.S. fracking industry has done to its financiers in recent years, and in particular since the start of the coronavirus pandemic. Hydraulic fracturing, or fracking — injecting high-pressure liquids into tight shale to extract oil and gas — combined with horizontal drilling has led to a boom in oil and gas production in the U.S. The industry has not only had a terrible impact on the climate and the health and well-being of local communities, it has also burned up billions of dollars in investors' cash. And now that the fracking bubble has burst with a rash of bankruptcies, there is widespread unemployment and economic distress across the "shale patch."[2]

Regional banks in states like Oklahoma and Texas that have bet heavily on lending to the frackers over the past decade may find themselves in trouble.[3] Yet the megabanks that this report shows are by far the most responsible for generating the fracking sector's staggering debts seem likely to be able to walk away from the wreckage intact, given their huge and diversified balance sheets. The lesson for the future is that banks will need to be forced by regulators, shareholders and the public to consider the climate impact of their business activities so that they do not facilitate yet another oil boom when the current pandemic is past.

PHOTOS: FracTracker Alliance, fractracker.org/photos; European Space Agency / NASA; Billy Hathorn / Wikipedia Commons

Piling Up Debt

From January 1 to August 31 of 2020, 36 North American exploration and production (E&P) companies, mostly working in the fracking sector, filed for Chapter 11 bankruptcy with a cumulative debt of over $50 billion.[4] Consultancy Rystad Energy expects another 150 North American E&P companies to go belly up by the end of 2022 if oil prices continue to hover around $40 a barrel.[5] The total amount of debt at risk from these potential bankruptcies is $128 billion. Moreover, including companies providing services to the E&P companies greatly increases the debt at risk — and 37 such oilfield services companies have already gone bankrupt this year.[6]

While the pandemic has caused pain across all parts of the economy, the impact on the fracking industry and its lenders and investors has been particularly severe. When Wells Fargo announced a $2.4 billion loss for the second quarter of 2020, its first quarterly loss since 2008, it blamed losses on its loans to the oil and gas sector.[7] This report shows that Wells Fargo is the biggest banker of U.S. frackers since the Paris Climate Agreement was adopted at the end of 2015; the bank provided $49 billion in financing to around 50 U.S. fracking-focused E&P companies from 2016 through August 2020,[8] more than a fifth of the total bank financing for these fracking companies since Paris.

Moreover, this report shows banks have continued financing the fracking industry through the years despite numerous warnings that the sector was financially unsustainable — on top of the well-documented environmental, health and climate impacts of fracking.

Banks' own profits are not the only thing impacted by their poor due diligence in evaluating the viability of fracking companies. Investors throughout the economy — including the pension and retirement funds that many workers and middle-class families depend upon — feel the hurt when the frackers' stocks and bonds, introduced to the markets through banks' underwriting activities, turn out to be lemons. Of the $224 billion in financing to top U.S. fracking companies since the start of 2016, 39% came in the form of underwriting issuances of bonds and equity, where banks earn fees from bringing the bonds or shares to market, typically without taking on any of the risk.[9]

A Machine to Destroy Capital

Fracking is highly capital intensive. It costs a lot of money to drill new wells, and the wells are rapidly depleted, so frackers constantly need to raise new money to keep drilling. If oil prices were high enough that the frackers could make enough profit to pay for their new wells themselves, their business model might work. But since the fracking boom took off in the late 2000s, oil prices have rarely been sufficiently high, so the industry has in effect operated as a Ponzi scheme, where the frackers pay off old loans with new loans rather than with profits.[10]

From 2010 to 2020, large publicly traded U.S. producers poured a total of $1.18 trillion into drilling and pumping oil and gas, mostly in fracking. But they made only $819 billion in cash from their oil operations — a combined loss of $361 billion.[11]

Prominent analysts have warned for years that the fracking industry is a machine to destroy capital.[12] Yet banks have consistently ignored this message, as well as pleas from communities and environmentalists about the industry's terrible impacts. Why the banks chose to ignore these messages is a story of short-term greed drowning out long-term rationality.

As financial journalist Bethany McLean has pointed out, the now-bankrupt Chesapeake Energy paid banks more than $1.1 billion in underwriting fees between 2000 and 2012.[13] It was no secret that Chesapeake was reliant on constant infusions of new debt to support its leases of new acreage and drilling — and its executives' lavish lifestyles. "I have never seen a more shameful document" than the Chesapeake annual statement to shareholders, one investor wrote to the company's board in 2009. "If I could reduce it to one page, I would frame and hang it on my office wall as a near perfect illustration of the complete collapse of appropriate corporate governance."[14] But to the banks supporting Chesapeake's unsustainable excesses, the fracking company was just another source of lucrative fees, so the infusions kept coming.

Ending the Boom and Bust Cycle

The fallout of the coronavirus pandemic has shone a spotlight on the fracking industry's financial failures — as well as the failure of its bankers to properly assess risk. But the sector's financial non-sustainability was already obvious before the new coronavirus went global.

Our analysis for this report shows a significant change from 2017 onwards in the mix of the funding streams from banks for frackers (see page 12). The proportion of financing from loans soared in 2018 and 2019, while that from new debt and equity tumbled. The explanation for this pattern would seem to be that, as financial journalists started to report at this time, investors were finally waking up to the basic flaws in the industry's debt-soaked business model and its inability to turn a profit.

"Today our dilemma is that as a sector, we have destroyed a lot of trust in the investment community over the last decade," Lee Tillman, chairman and CEO of Marathon Oil, said during a panel on shale drilling at an industry conference in March 2019.[15] Yet the banks somehow ignored the signals from investors, including the seemingly obvious warning that their own underwriting business with the frackers had dropped off, and they continued to shower the sector with loans.

The result of this unrestrained lending was that by the third quarter of 2019, fully 91% of defaulted U.S. corporate debt was issued by oil and gas companies.[16] The fracking companies analyzed in this report have $120 billion in debt set to mature from 2021 to 2025.[17] As shown below, a small number of big banks are largely responsible for creating this mountain of debt, much of which now seems unlikely to ever be repaid.

The history of the oil industry is one of repeated booms and busts. Every time both oilmen and bankers swear the next time will be different. It never is.

But this time it must be different. The planet cannot afford any more oil booms. Thankfully, public disgust with the fossil fuel industry and the rapid growth of the clean energy economy mean the seemingly endless demand growth that pulled the industry out of previous doldrums appears to have crested. Ensuring that oil does not boom again will require banks to act on their supposed concern for climate change and refuse to fund a new round of fracking expansion. At the same time, regulators and shareholders must act to force banks in the right direction, for the sake of our communities and climate.


PHOTO: Christopher Halloran / shutterstock

Banking **U.S. FRACKING**

PHOTO: Bruce Gordon / Ecoflight

This analysis quantifies financing provided to U.S.-focused frackers: companies with over 40% of their production over the last decade in U.S. shale, and where that U.S. shale production was over 100 million barrels. For the full list of fracking companies included, see the methodology section.

This assessment does not represent financing for the full scope of the fracking industry, as it does not cover midstream companies, such as those operating pipeline and liquefied natural gas (LNG) terminals. Nor does it include the integrated oil companies that are large and growing players in U.S. fracking, but for whom fracking makes up a smaller portion of overall production (such as ExxonMobil, ConocoPhillips, Chevron, etc.). Rather, this report focuses on the E&P companies riding the U.S. fracking boom and bust cycle to the detriment of communities and the climate.

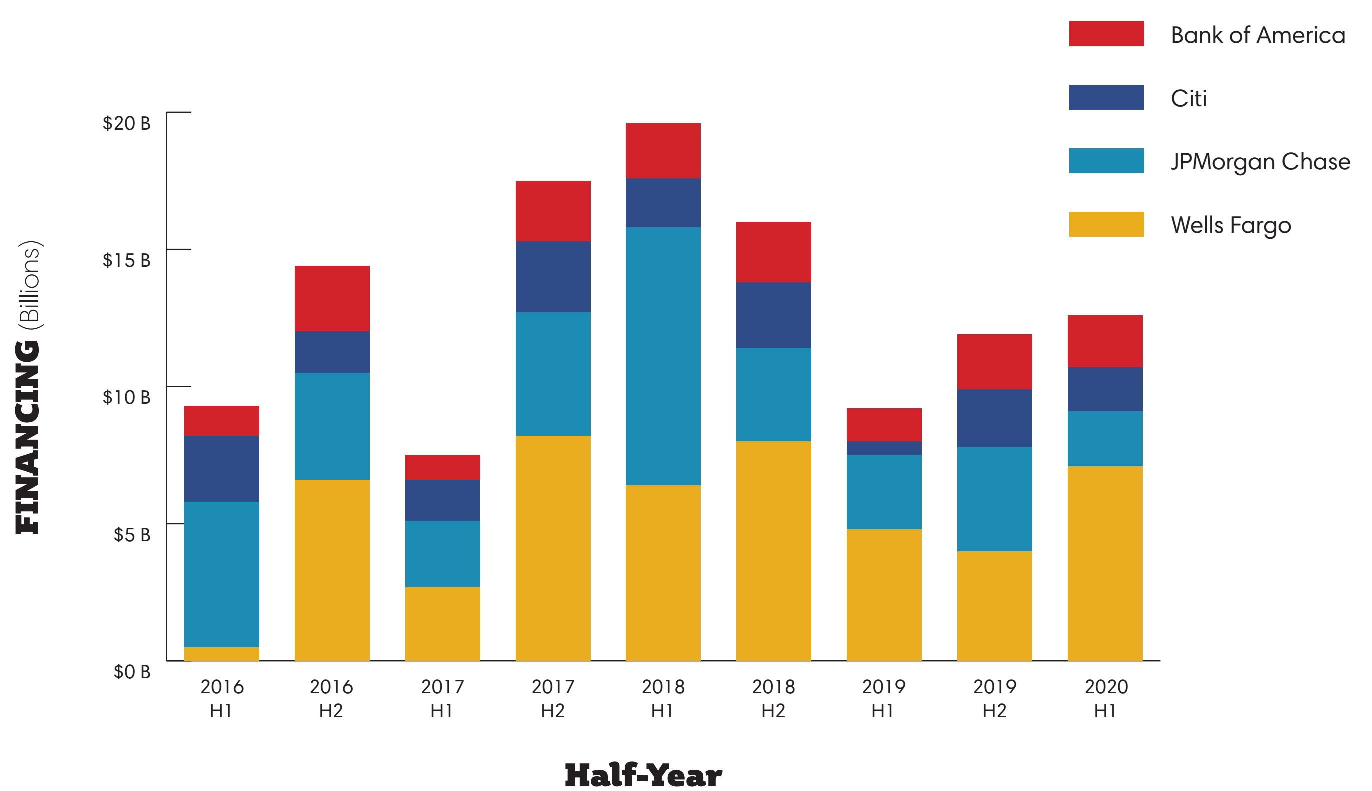
Wells Fargo and **JPMorgan Chase** have consistently been the biggest bankers of U.S. fracking, together providing almost 40% of financing since the Paris Agreement was adopted (38.6%). These banks have combined with **Citi** and **Bank of America** to provide over half of U.S. fracking financing since Paris (53.5%).

LENDING & UNDERWRITING *for U.S. Frackers*

RANK	BANK	FINANCING SINCE PARIS (1/1/16 - 8/31/20)	% OF TOTAL FINANCING SINCE PARIS
1	WELLS FARGO	$48.96 BILLION	21.8%
2	JPMORGAN CHASE	$37.79 BILLION	16.8%
3	CITI	$16.73 BILLION	7.4%
4	BANK OF AMERICA	$16.65 BILLION	7.4%
5	CREDIT SUISSE	$13.91 BILLION	6.2%
6	GOLDMAN SACHS	$11.58 BILLION	5.2%
7	BANK OF MONTREAL	$10.69 BILLION	4.8%
8	MUFG	$7.91 BILLION	3.5%
9	MIZUHO	$7.20 BILLION	3.2%
10	RBC	$7.19 BILLION	3.2%
11	SCOTIABANK	$6.42 BILLION	2.9%
12	BARCLAYS	$5.43 BILLION	2.4%
13	MORGAN STANLEY	$4.92 BILLION	2.2%
14	CIBC	$4.56 BILLION	2.0%
15	PNC	$4.39 BILLION	2.0%
TOTAL FROM TOP 15 BANKS		**$204.33 BILLION**	**91.0%**
TOTAL FROM ALL BANKS		**$224.65 BILLION**	**100.0%**

Wells Fargo and **JPMorgan Chase** have together provided almost **40% of financing for top U.S. frackers** since the **Paris Agreement** was adopted.

U.S. BANKS DOMINATE FINANCING *for* U.S. FRACKERS *since Paris*



Many of the frackers covered in this report have proven time and time again to be bad actors. Chesapeake Energy has been the poster child, with a history of lavish spending on mineral rights and drilling rigs while generating torrents of red ink along the way. The company declared bankruptcy in June 2020; Japanese megabank **MUFG** is leading the financing package that will facilitate Chesapeake's exit from bankruptcy.[18] Meanwhile, Chesapeake is one of **Citi's** top clients from this analysis, and a top client of **Wells Fargo's** is also currently undergoing bankruptcy proceedings.

TOP RECIPIENTS *of* FINANCING *per* BANK *Since Paris*

WELLS FARGO	JPMORGAN CHASE	CITI	BANK OF AMERICA
Parsley Energy	Antero Resources	Marathon Oil	Concho Resources
Diamondback Energy	Newfield Exploration (now owned by Ovintiv)	Noble Energy	Pioneer Natural Resources
* Extraction Oil and Gas	Southwestern Energy	* Chesapeake Energy	Southwestern Energy

* = Currently in bankruptcy proceedings

Financing by Asset Class

BY ASSET CLASS: BANK FINANCING *Since Paris for* TOP U.S. FRACKERS

ASSET CLASS	FINANCING VOLUME	% OF TOTAL	NOTE
Lending	$136.85 Billion	61%	54% of lending by volume was reserve-based.
Bond underwriting	$58.02 Billion	26%	72% of bonds by volume were issued non-investment grade.
Equity underwriting	$29.77 Billion	13%	78% of equity underwriting by volume occurred in 2016.
TOTAL	**$224.65 BILLION**		

Loans

Just under two-thirds of the financing measured was lending, with over half of that in the form of Reserve-Based Lending (RBL). In contrast, only 20% of global loans to oil and gas E&P companies over the same time period were reserve-based.[19]

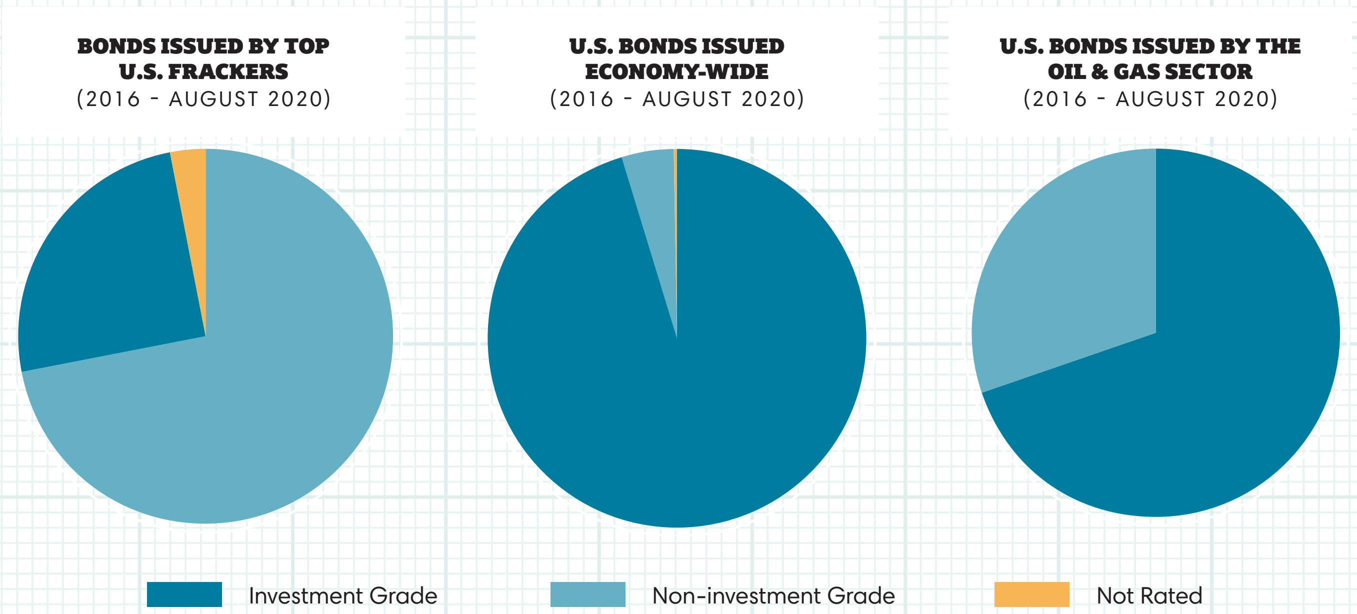
With RBL, the size of the loan depends on an assessment of the value of certain oil and gas assets put up as collateral. The loan is paid back using proceeds from sales of oil and gas produced on those assets. Given the often low credit ratings of small-to-midsize shale companies, RBL "has been particularly instrumental in providing the sector with access to low-cost bank debt financings, allowing the rise and expansion of numerous small and midsize players in shale," as a Columbia University paper put it.[20] In other words, this is the debt that allows companies rated as below investment grade to finance unsustainable, unprofitable expansion.

Generally, as the price of oil or gas goes down, so does the value of the reserves securing reserve-based loans, in which case the company's borrowing base under a given facility will be downsized. That means that in a situation like that of recent months — in April 2020 the West Texas Intermediate (WTI) crude oil price briefly dropped below zero — dramatic drops in the oil price can make these billions in reserve-based lending a destabilizing factor for companies and the sector at large.

72% **of the top U.S. frackers' bonds**, underwritten by big banks, were issued **below investment grade**.

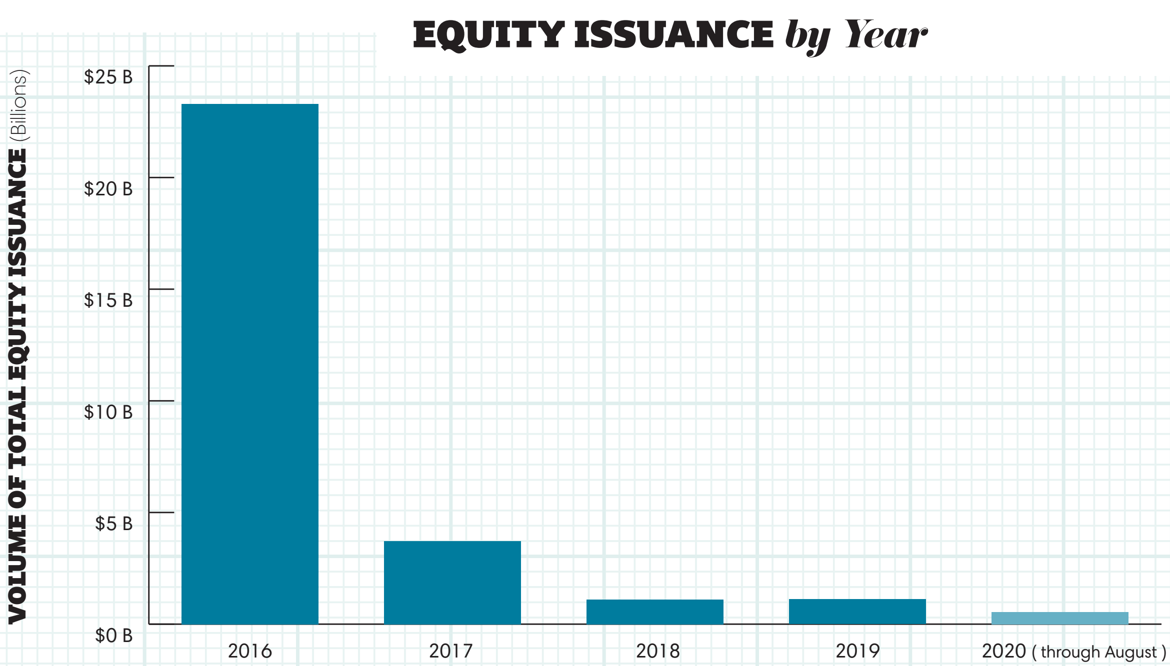
Bonds

For the quarter of the financing that came in the form of bonds, nearly three-quarters (72%) were rated as junk when issued, with a credit rating of Ba1 or lower. By comparison, over the same time period, only 17% of U.S. corporate bonds issued economy-wide were non-investment grade. Even among the oil and gas sector at large, only 30% of U.S. bonds issued since Paris were non-investment grade — so fracking companies were a severely risky outlier[21]



Equity

In 2016, as these drillers were emerging from the oil price crash of the two previous years, the companies analyzed issued $23 billion in additional shares to repay debt, fund mergers and acquisitions, and continue fracking.[22] Equity issuances have dropped sharply since then.



Investors & Banks Diverge

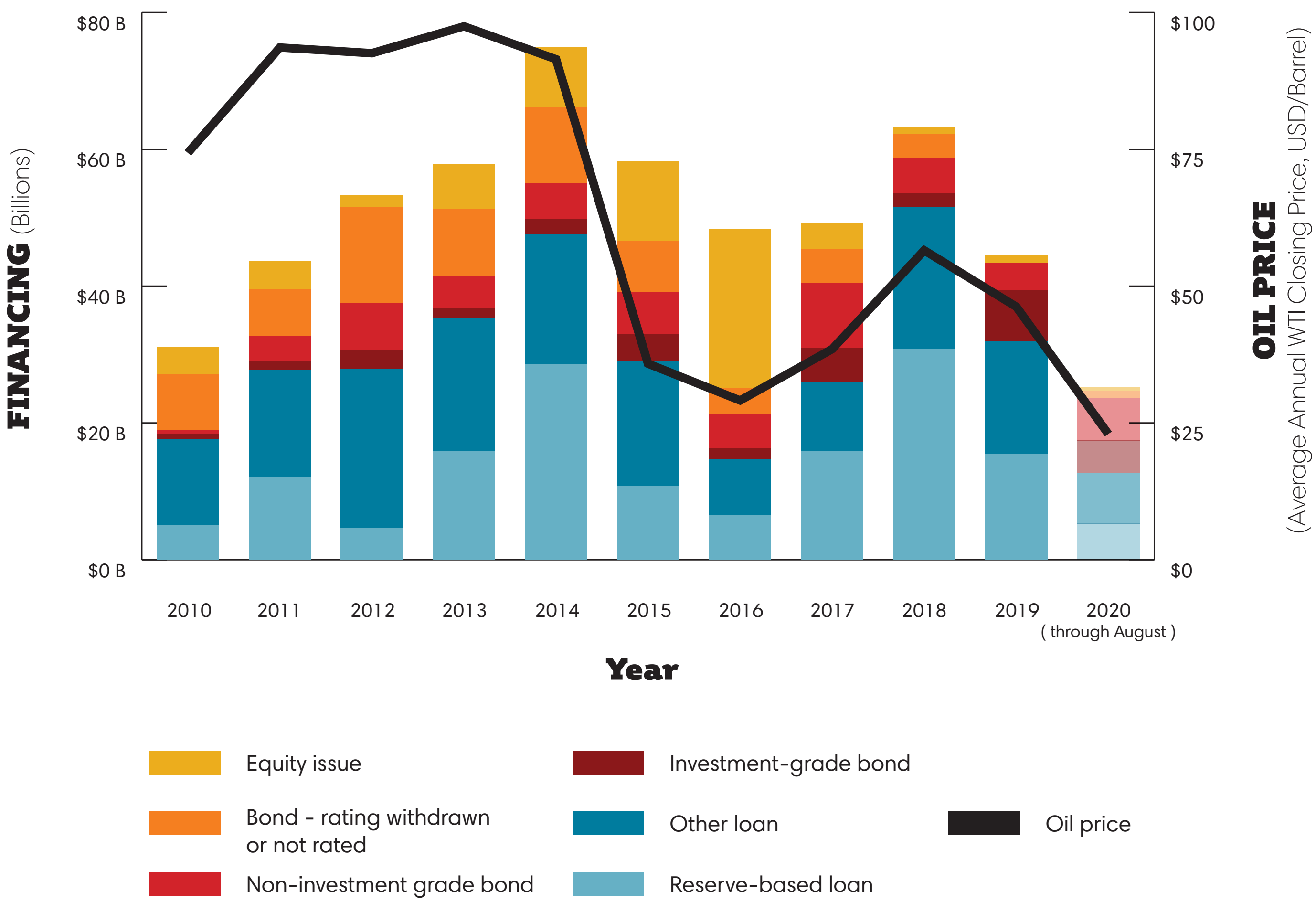
A close look at the mix of bank financing for U.S. frackers over the past decade shows that after 2016 the proportion of loans in the funding stack increases markedly (see the charts on the following page). At the same time, the proportion of funding from bond issuances decreases notably over the next two years, and in particular, issuance of equity collapses. The first eight months of 2020 show a remarkable rebound in the proportion of bond issuances, to their highest-ever percentage, though it remains to be seen how the year will close out, and it is unclear how this may be linked to the pandemic-related disruption of the sector and its financing, including various government bailout programs.

While it must have been obvious to the banks' underwriting arms that investors were becoming extremely wary of buying new debt and equity from the frackers, the banks' lending divisions were ignoring the flashing red lights and continuing to shower the sector with new loans.

After 2016, as investors soured on fracking companies, **banks continued to shower the sector with loans**.

PHOTO: BanksPhotos / istock

FINANCING *for* U.S. FRACKERS *since* 2010[23]



FINANCING *by* ASSET CLASS *Since 2010*

YEAR	BONDS	EQUITY	LOANS
2010	31%	13%	57%
2011	27%	10%	63%
2012	45%	3%	52%
2013	28%	11%	61%
2014	25%	12%	63%
2015	30%	20%	50%
2016	22%	48%	30%
2017	40%	8%	53%
2018	17%	2%	81%
2019	14%	3%	83%
2020 (through August)	48%	2%	50%

Bondholders

This report has focused on bank financing for U.S. fracking-focused oil and gas E&P companies, with bond issuance over time providing an example of banks' continued support for fracking despite the industry's troubles.

Bonds of U.S. fracking-focused extraction companies pose clear risks to their holders as well. As of August 31, 2020, the 20 top holders of the bonds currently trading that were issued since 2010 by companies analyzed in this report are as follows.[24] These asset managers — who together hold more than half of such bonds — are not only driving the climate crisis through their investment in fracking companies, but also putting asset owners' capital in risky securities.

TOP HOLDERS OF BONDS *Issued by U.S. Frackers*

RANK	ASSET MANAGER	AMOUNT HELD (AS OF 8/31/20)	% OF TOTAL HELD
1	BLACKROCK	$3.00 BILLION	8.35%
2	VANGUARD GROUP	$1.95 BILLION	5.40%
3	PRUDENTIAL FINANCIAL INC	$1.80 BILLION	5.00%
4	ALLIANZ SE	$1.26 BILLION	3.49%
5	JPMORGAN CHASE & CO	$1.18 BILLION	3.27%
6	CAPITAL GROUP COMPANIES INC	$1.14 BILLION	3.18%
7	NATIXIS SA	$957 MILLION	2.66%
8	LORD ABBETT & CO LLC	$907 MILLION	2.52%
9	FMR LLC	$887 MILLION	2.46%
10	FRANKLIN RESOURCES	$767 MILLION	2.13%
11	WESTERN ASSET MANAGEMENT CO	$661 MILLION	1.84%
12	NEW YORK LIFE GROUP	$487 MILLION	1.35%
13	MANULIFE FINANCIAL CORP	$471 MILLION	1.31%
14	METLIFE INVESTMENT ADVISORS LLC	$411 MILLION	1.14%
15	STATE STREET CORP	$407 MILLION	1.13%
16	HANWHA ASSET MANAGEMENT CO LTD	$400 MILLION	1.11%
17	TIAA-CREF	$389 MILLION	1.08%
18	ALLIANCE BERNSTEIN	$381 MILLION	1.06%
19	WELLINGTON MANAGEMENT GROUP LLP	$373 MILLION	1.04%
20	PRINCIPAL FINANCIAL GROUP INC	$357 MILLION	0.99%

Risks & IMPACTS

The Better Path Coalition traveled to Harrisburg, Pennsylvania in January 2019 to call for legislators to protect their environmental rights from the fracking industry.
PHOTO: Maya van Rossum

Community Health

The fracking boom has come at terrible cost to the public health of frontline communities and to the climate. For example, in the Appalachian Basin — the largest fossil gas basin in the U.S.[25] — evidence emerged in 2019 of a shocking community health impact potentially connected to the Marcellus shale play. The *Pittsburgh Post-Gazette* reported that 27 cases of Ewing's sarcoma, a rare childhood bone cancer, had been diagnosed from 2008 to 2018 in four counties near Pittsburgh with widespread fracking extraction — more than three times the expected rate. Washington County, which has the most fracking wells of any county in Pennsylvania, had a single school district with six of those cases, as well as ten more current students with other forms of cancer.[26] Pennsylvania was initially dismissive of these clear community health concerns, but after sustained organizing, the state announced a three-year, $3.9-million study into possible links between fracking and Ewing's sarcoma.[27] Range Resources, whose top banker since Paris is **JPMorgan Chase**, is the fracking company with the most fracking permits in Washington County.[28] Studies have also shown links between fracking and preterm birth, high-risk pregnancy and exacerbation of asthma.[29]

Climate

Fracking is at the heart of the fossil fuel industry's planned expansion of oil and gas extraction, making it one of the world's leading threats to the climate. Burning all oil, gas and coal reserves already in production would exhaust a 2° Celsius carbon budget, while burning in-production oil and gas alone would take us past 1.5°C.[30] Powered by fracking, the U.S. is projected to account for 60% of global growth in oil and gas extraction by 2030, and could exhaust nearly 50% of the world's oil and gas budget by that time.[31] The fracking companies analyzed in this report continue to plan for aggressive expansion of their production: they are cumulatively projected to produce the equivalent of 119 billion barrels of oil in U.S. shale through 2050, over four times as much as their production from 2010 to 2019.[32]

Moreover, estimates indicate that as much as 12% of total fracked gas extracted could leak over the lifecycle from extraction to use. This leakage of unburned methane can make fracked gas even more harmful to the climate than coal.[33]

Infrastructure

Beyond extraction, midstream infrastructure for fracked oil and gas such as pipelines and LNG terminals also cause grave impacts. Pipeline and Hazardous Materials Safety Administration numbers show almost 300 "significant incidents" — including explosions and fatal accidents — each year.[34] Fracked-gas export and import terminals threaten local communities, Indigenous rights, local ecosystems and the climate, as exemplified by the three fracked-gas export terminals proposed in the Rio Grande Valley of Texas, which would export fracked gas largely from the Permian Basin in Texas and New Mexico.[35]

Janice Blanock of Washington County, mother of Luke Blanock who died of Ewing Sarcoma at the age of 19 in 2016, confronts the Governor of Pennsylvania to tell her family's story, at a press conference organized by the Better Path Coalition, Physicians for Social Responsibility, and the Center for Coalfield Justice.
PHOTOS: Karen Feridun

Financial

As well as impacting climate and communities, fracking poses serious risks to financial companies supporting it. Fracking-focused companies are increasingly clear financial risks, as this report has shown. Fracking also poses climate acute transition risk: in response to health and climate impacts, cities across the country and entire states — New York, Maryland, Vermont, Oregon and Washington — have enacted fracking bans or moratoria.[36] Parts of Virginia and Florida may be next, and this trend promises to continue.[37] These prohibitions will be at the leading edge of a broad, and likely abrupt, policy response moving away from fossil fuels, threatening to crater the value of fracking companies.

Recommendations

PHOTO: Moms Clean Air Force

The coronavirus pandemic has served as a stress test for the entire fossil fuel industry — one which it is failing. Nowhere is that more clear than among U.S. fracking-focused oil and gas extraction companies. But it has been obvious for a decade that the sector is extremely risky, as well as having terrible — and growing — impacts on community health, environmental justice and the climate. Despite the clear risk, banks have backed the U.S. fracking sector every step of the way, as this report has shown.

Banks must urgently cut ties with this troubled sector, and key stakeholders should hold banks accountable to their climate commitments and push for stronger action.

Banks should:

- As key steps toward aligning policies and practices with the 1.5°C aim of the Paris Agreement:[38]
    - Prohibit all finance for fracked oil and gas extraction and infrastructure projects, and companies expanding fracked oil and gas extraction and infrastructure.
    - Commit to phase out all financing for all companies with fracking operations.
- Immediately end support for clients implicated in abuses of community health.
- Refrain from taking ownership stakes in troubled fracking companies in which they hold debt.
- In fracking company bankruptcy proceedings in which they have a stake, ensure that worker and environmental obligations take precedence over creditor obligations.

Investors and asset managers should:

- Engage with banks to establish a fracking policy per the guidelines above, as one step toward aligning the banks' policies and practices with the 1.5°C aim of the Paris Agreement.
- Divest from the fracking companies analyzed in this report.[39]
- Pressure oil majors and other companies involved in fracking to withdraw from the sector, including through divestment.

Lawmakers and regulators should:

- Condition recovery programs to ensure financial companies receiving public money must commit to phase out fossil financing, while ensuring a just transition to a zero-carbon economy.
- Reform bankruptcy law to ensure banks and other creditors take their proper place in line: fossil fuel companies entering bankruptcy must pay lifetime benefits to workers, restore environmental damage and discharge any regulatory obligations before resolving other claims.
- Repeal the authority for banks to own commodity companies that explore, drill, refine, transport or export fossil fuels, specifically including such fossil fuels as crude oil, fracked gas and coal, or physical assets like oil refineries, pipelines, tankers, power plants and coal mines and trade commodities.
- Incorporate climate risk into prudential regulatory and supervisory frameworks, including mandating climate risk and impact disclosures and stress testing for financial institutions and the financial system as a whole, as well as issuing regulations to address and mitigate those risks and impacts.[40]

Methodology

Financing Scope

This analysis aggregates financing provided to the shale E&P companies in scope (see below) from all banks worldwide since the Paris Agreement was adopted: between January 1, 2016, and August 31, 2020, inclusive. Some pieces of the analysis look back to January 1, 2010.

Financing includes lending, as well as the underwriting of debt and equity issuances. Transaction data were sourced from Bloomberg Finance L.P., where the value of a transaction is split between leading banks.[41] Bondholding data were also sourced from Bloomberg Finance L.P. All amounts in this report are expressed in U.S. dollars unless otherwise indicated.

Companies Included

This analysis quantifies financing provided to U.S.-focused frackers: companies with over 40% of their production over the last decade in U.S. shale, and where that U.S. shale production was over 100 million barrels. Production information was sourced from Rystad Energy in July and August 2020, and aggregates production based on the historical company as it existed at the time of production. Thus, 51 historical companies are included; since some have since been acquired by others on the list, this amounts to 48 current companies.

HISTORICAL COMPANY	TICKER OR CURRENT OWNERSHIP	U.S. SHALE PRODUCTION, 2010-2019 (MILLION BOE)	% OF TOTAL PRODUCTION FROM U.S. SHALE, 2010-2019	EXPANSION: PROJECTED PRODUCTION OF U.S. SHALE, 2020-2050 (MILLION BOE)
AETHON ENERGY	PRIVATE COMPANY	139.89	68%	1,016.16
ALTA RESOURCES DEVELOPMENT	PRIVATE COMPANY	103.3	100%	1,145.57
ANTERO RESOURCES	AR	906.28	100%	5,497.44
ASCENT RESOURCES	PRIVATE COMPANY	355.2	100%	
CABOT OIL AND GAS	COG	931.27	94%	2,477.23
CARRIZO OIL AND GAS	ACQUIRED BY CALLON PETROLEUM	161.93	100%	
CHESAPEAKE	CHKAQ	2,397.97	95%	6,063.60
CHIEF OIL & GAS	PRIVATE COMPANY	236.28	100%	1,358.64
CIMAREX ENERGY	XEC	490.71	74%	5,821.20
CNX RESOURCES CORPORATION	CNX	384.05	67%	4,648.62
COMSTOCK RESOURCES	CRK	180.88	87%	5,945.18

CHAPTER 11 BANKRUPTCY STATUS	**COMPANY CREDIT RATING** (MOODY'S LONG TERM RATING AS OF 9/14/20)	**TOTAL BANK FINANCING SINCE PARIS,** 2016-AUGUST 2020 (B = BILLION)	**TOP BANKS SINCE PARIS,** 2016-AUGUST 2020 (B = BILLION, M = MILLION)
	B3	$4.40 B	JPMORGAN CHASE: $3.260 B CITI: $541 M CREDIT SUISSE: $460 M
		$7.17 B	BANK OF MONTREAL, BARCLAYS, CREDIT SUISSE, GOLDMAN SACHS, GROUPE BPCE/NATIXIS, JPMORGAN CHASE: $1.196 B EACH
		$2.51 B	BANK OF AMERICA: $1.087 B JPMORGAN CHASE: $1.087 B CITI: $337 M
		$3.62 B	CITI: $1.281 B WELLS FARGO: $1.172 B CAPITAL ONE: $983 M
FILED JUNE 2020	WITHDRAWN	$15.63 B	WELLS FARGO: $2.630 B GOLDMAN SACHS: $2.146 B BANK OF MONTREAL: $1.855 B
	Baa3	$2.50 B	JPMORGAN CHASE: $838 M WELLS FARGO: $838 M MUFG: $213 M US BANCORP: $213 M
	B1	$6.83 B	MUFG: $1.907 B CREDIT SUISSE: $1.476 B JPMORGAN CHASE: $1.476 B
	B3	$4.72 B	BANK OF MONTREAL: $2.619 B BANK OF AMERICA: $419 M WELLS FARGO: $365 M

HISTORICAL COMPANY	TICKER OR CURRENT OWNERSHIP	U.S. SHALE PRODUCTION, 2010-2019 (MILLION BOE)	% OF TOTAL PRODUCTION FROM U.S. SHALE, 2010-2019	EXPANSION: PROJECTED PRODUCTION OF U.S. SHALE, 2020-2050 (MILLION BOE)
CONCHO RESOURCES	CXO	532.39	92%	5,695.59
CONTINENTAL RESOURCES	DLR	777.91	92%	3,238.19
DEVON ENERGY	DVN	1,467.66	69%	5,626.98
DIAMONDBACK ENERGY	FANG	256.98	95%	3,703.23
ENERGEN	ACQUIRED BY DIAMONDBACK ENERGY	139.28	63%	
ENERPLUS CORPORATION	ERF	158.34	50%	423.46
ENERVEST	PRIVATE EQUITY	429.7	72%	5.25
EOG RESOURCES	EOG	1,773.28	78%	8,310.38
EP ENERGY	EPEGQ	319.84	74%	31.99
EQT CORPORATION	EQT	1,157.96	93%	7,118.20
EXCO RESOURCES	EXCE	232.78	89%	15.81

CHAPTER 11 BANKRUPTCY STATUS	COMPANY CREDIT RATING (MOODY'S LONG TERM RATING AS OF 9/14/20)	TOTAL BANK FINANCING SINCE PARIS, 2016-AUGUST 2020 (B = BILLION)	TOP BANKS SINCE PARIS, 2016-AUGUST 2020 (B = BILLION, M = MILLION)
	Baa3	$7.85B	BANK OF AMERICA: $2.314 B JPMORGAN CHASE: $1.714 B WELLS FARGO: $1.262 B
	Ba1	$2.50 B	BANK OF AMERICA: $542 M MIZUHO: $542 M MUFG: $542 M
	Ba1	$7.34 B	GOLDMAN SACHS: $1.488 B BANK OF AMERICA, CITI, JPMORGAN CHASE, MIZUHO, RBC, SCOTIABANK, WELLS FARGO: $836 M EACH
	Ba1	$18.96 B	WELLS FARGO: $9.648 B CREDIT SUISSE: $2.728 B JPMORGAN CHASE: $2.120 B
		$1.63 B	CREDIT SUISSE: $384 M BANK OF AMERICA, BBVA, JPMORGAN CHASE, REGIONS FINANCIAL CORPORATION, WELLS FARGO: $250 M EACH
		$3.18 B	CIBC: $3.000 B BANK OF MONTREAL: $89 M RBC: $89 M
PUBLICLY TRADED SUBSIDIARY FILED MARCH 2018, EMERGED JUNE 2018		$0.35 B	JPMORGAN CHASE: $173 M WELLS FARGO: $173 M
	A3	$4.50 B	CIBC, CITI, JPMORGAN CHASE, SCOTIABANK, WELLS FARGO: $600 M EACH
FILED OCTOBER 2019		$4.03 B	CREDIT SUISSE: $1.415 B JPMORGAN CHASE: $730 M CITI: $415 M
	Ba3	$10.00 B	JPMORGAN CHASE: $1.307 B BANK OF AMERICA: $1.103 B WELLS FARGO: $1.103 B
FILED JANUARY 2018, EMERGED JULY 2019		$0.33 B	BANK OF MONTREAL, JOHNSON RICE, KEYCORP, RAYMOND JAMES, RBC, TRUIST SECURITIES: $54 M EACH

HISTORICAL COMPANY	TICKER OR CURRENT OWNERSHIP	U.S. SHALE PRODUCTION, 2010-2019 (MILLION BOE)	% OF TOTAL PRODUCTION FROM U.S. SHALE, 2010-2019	EXPANSION: PROJECTED PRODUCTION OF U.S. SHALE, 2020-2050 (MILLION BOE)
EXTRACTION OIL & GAS	XOGAQ	112.66	98%	743.09
GEOSOUTHERN ENERGY CORPORATION	PRIVATE COMPANY	136.63	100%	834.24
GULFPORT ENERGY	GPOR	356.07	95%	1,655.46
INDIGO MINERALS	PRIVATE COMPANY	105.31	72%	2,241.63
LAREDO PETROLEUM	LPI	177.38	98%	1,139.41
LEWIS ENERGY GROUP	PRIVATE COMPANY	162.21	59%	98.8
MARATHON OIL	MRO	736.48	42%	2,740.79
MATADOR RESOURCES	MTDR	109.66	95%	861.13
MESQUITE ENERGY	PRIVATE COMPANY	158.94	100%	58.38
MEWBOURNE OIL COMPANY	PRIVATE COMPANY	325.94	94%	1,312.84
MONTAGE RESOURCES CORPORATION	MR	109.46	99%	834.08

CHAPTER 11 BANKRUPTCY STATUS	**COMPANY CREDIT RATING** (MOODY'S LONG TERM RATING AS OF 9/14/20)	**TOTAL BANK FINANCING SINCE PARIS,** 2016-AUGUST 2020 (B = BILLION)	**TOP BANKS SINCE PARIS,** 2016-AUGUST 2020 (B = BILLION, M = MILLION)
FILED JUNE 2020		$5.48 B	WELLS FARGO: $3.429 B BARCLAYS: $512 M GOLDMAN SACHS: $512 M
	Caa1	$6.84 B	SCOTIABANK: $2.135 B KEYCORP: $1.596 B PNC: $1.494 B
		$0.38 B	BANK OF AMERICA: $188 M WELLS FARGO: $188 M
	B1	$1.28 B	BANK OF MONTREAL: $247 M WELLS FARGO: $247 M GOLDMAN SACHS: $207 M
		$1.50 B	BBVA, CAPITAL ONE, CITI, MUFG, WELLS FARGO: $300 M
	Baa3	$12.36 B	CITI, JPMORGAN CHASE, MORGAN STANLEY: $2.488 B EACH
	B2	$2.41 B	RBC: $778 M SCOTIABANK: $559 M BANK OF MONTREAL: $346 M
FILED AUGUST 2019, EMERGED JUNE 2020		$1.64 B	TRUIST SECURITIES: $357 M CITI: $262 M JPMORGAN CHASE: $262 M
	B2	$1.13 B	BANK OF MONTREAL: $699 M KEYCORP: $199 M CAPITAL ONE: $167 M

HISTORICAL COMPANY	TICKER OR CURRENT OWNERSHIP	U.S. SHALE PRODUCTION, 2010-2019 (MILLION BOE)	% OF TOTAL PRODUCTION FROM U.S. SHALE, 2010-2019	EXPANSION: PROJECTED PRODUCTION OF U.S. SHALE, 2020-2050 (MILLION BOE)
NATIONAL FUEL GAS	NFG	214.88	84%	4,150.20
NEWFIELD EXPLORATION	ACQUIRED BY OVINTIV	460.84	67%	
NOBLE ENERGY	NBL	609.38	47%	4,371.97
OASIS PETROLEUM	OAS	202.57	100%	1,027.90
PARSLEY ENERGY	PE	171.72	100%	3,482.32
PDC ENERGY	PDCE	194.69	91%	722.1
PIONEER NATURAL RESOURCES	PXD	592.03	66%	5,007.64
QEP RESOURCES	QEP	334.89	57%	1,018.19
RANGE RESOURCES	RRC	722.39	81%	5,079.07
RICE ENERGY	ACQUIRED BY EQT CORPORATION	204.08	100%	
ROSETTA RESOURCES	ACQUIRED BY NOBLE ENERGY	113.36	97%	

CHAPTER 11 BANKRUPTCY STATUS	**COMPANY CREDIT RATING** (MOODY'S LONG TERM RATING AS OF 9/14/20)	**TOTAL BANK FINANCING SINCE PARIS,** 2016-AUGUST 2020 (B = BILLION)	**TOP BANKS SINCE PARIS,** 2016-AUGUST 2020 (B = BILLION, M = MILLION)
	Baa3	$2.72 B	BANK OF AMERICA: $724 M JPMORGAN CHASE: $624 M WELLS FARGO: $454 M
	Ba1	$6.80 B	JPMORGAN CHASE: $3.067 B CIBC, CITI, RBC, TD: $800 M EACH
	Baa3	$9.65 B	CITI, MIZUHO: $1.783 B EACH BANK OF AMERICA, DNB, JPMORGAN CHASE: $1.171 B EACH
	B3	$3.91 B	WELLS FARGO: $2.242 B GOLDMAN SACHS: $568 M JPMORGAN CHASE: $415 M
		$20.69 B	WELLS FARGO: $15.561 B CREDIT SUISSE: $1.891 B MORGAN STANLEY: $656 M
	Ba2	$3.63 B	JPMORGAN CHASE: $2.115 B BANK OF AMERICA: $565 M BANK OF MONTREAL, WELLS FARGO: $414 M EACH
	Baa2	$7.22 B	BANK OF AMERICA: $1.766 B WELLS FARGO: $1.362 B JPMORGAN CHASE: $1.264 B
	B2	$2.55 B	DEUTSCHE BANK: $575 M BANK OF MONTREAL, JPMORGAN CHASE, WELLS FARGO: $385 M EACH
	B2	$3.25 B	JPMORGAN CHASE: $2.535 B BANK OF AMERICA, BANK OF MONTREAL, CITI, WELLS FARGO: $135 M EACH
		$3.33 B	WELLS FARGO: $1.887 B BARCLAYS: $887 M GOLDMAN SACHS: $561 M

HISTORICAL COMPANY	TICKER OR CURRENT OWNERSHIP	U.S. SHALE PRODUCTION, 2010-2019 (MILLION BOE)	% OF TOTAL PRODUCTION FROM U.S. SHALE, 2010-2019	EXPANSION: PROJECTED PRODUCTION OF U.S. SHALE, 2020-2050 (MILLION BOE)
SABLE PERMIAN RESOURCES	PRIVATE COMPANY	147.62	100%	563.7
SANDRIDGE ENERGY	SD	164.57	67%	10.95
SM ENERGY	SM	469.7	95%	1,798.95
SOUTHWESTERN ENERGY	SWN	1,508.73	98%	6,951.76
TEMPLAR ENERGY	ACQUIRED BY PRESIDIO PETROLEUM	112.18	100%	
VINE OIL & GAS	PRIVATE COMPANY	157.3	100%	3,375.31
WHITING PETROLEUM	WLL	389.32	87%	857.36

CHAPTER 11 BANKRUPTCY STATUS	COMPANY CREDIT RATING (MOODY'S LONG TERM RATING AS OF 9/14/20)	TOTAL BANK FINANCING SINCE PARIS, 2016-AUGUST 2020 (B = BILLION)	TOP BANKS SINCE PARIS, 2016-AUGUST 2020 (B = BILLION, M = MILLION)
FILED JUNE 2020		$1.85 B	JPMORGAN CHASE: $611 M BANK OF AMERICA: $461 M BANK OF MONTREAL, BARCLAYS, CAPITAL ONE, CREDIT SUISSE, RBC, TD: $111 M EACH
FILED MAY 2016, EMERGED OCTOBER 2016		$1.63 B	RBC: $1.175 B BARCLAYS, GROUPE BPCE/NATIXIS, TRUIST SECURITIES: $150 M EACH
	Caa1	$3.42 B	WELLS FARGO: $1.661 B BANK OF AMERICA: $386 B JPMORGAN CHASE: $386 B
	Ba2	$9.25 B	JPMORGAN CHASE: $2.968 B BANK OF AMERICA: $1.409 B CITI: $1.034 B
FILED MAY 2020			
	Caa3	$0.91 B	CREDIT SUISSE, GROUPE BPCE/NATIXIS, HSBC, MORGAN STANLEY, SOCIÉTÉ GÉNÉRALE: $160 M EACH
FILED APRIL 2020		$2.75 B	JPMORGAN CHASE: $2.000 B EACH BANK OF AMERICA, CITI, WELLS FARGO: $250 M EACH

ENDNOTES

1. Bernard F. Clark, Jr., Oil Capital: *The History of American Oil, Wildcatters, Independents and Their Bankers*. 2016, p. 62.

2. See e.g. Pamela Boykoff and John Defterios, "Slumping energy prices translate to layoffs and bankruptcies for Texas oil country," CNN Business, 10 September 2020; Carrie McKean, "This 'Big Oil' Bust Is Killing My Town," *New York Times*, 30 April 2020; Peter Eavis, "Fracking Once Lifted Pennsylvania. Now It Could Be a Drag," *New York Times*, 31 March 2020.

3. Philip van Doorn, "You should avoid shares of these banks with too much oil and gas exposure," *MarketWatch*, 11 March 2020.

4. "Oil Patch Bankruptcy Monitor," Haynes and Boone, LLP, 31 August 2020.

5. "Even at $40 WTI, about 150 more North American E&Ps will need Chapter 11 protection by end-2022," Rystad Energy, 21 August 2020.

6. 37 North American oilfield services companies with nearly $34 billion in debt filed for bankruptcy from January 1 through August 31, 2020. "Oilfield Services Bankruptcy Tracker," Haynes and Boone, LLP, 31 August 2020.

7. Matt Ott, "Wells Fargo loses $2.4 billion in 2Q, first loss since 2008," *The Washington Post*, 14 July 2020.

8. This research analyzed financing for 51 historical companies. Since some have since been acquired by others on the list, it amounts to 48 current companies. See the methodology section for details.

9. Banks may take on some risk of the changing value of these stocks and bonds if their own asset management arms buy up some of the securities.

10. See, for instance, Bethany McLean, *Saudi America: The Truth About Fracking and How It's Changing the World*, Columbia Global Reports, 2018.

11. Collin Eaton and Rebecca Elliott, "Coronavirus Threatens to Hobble the U.S. Shale-Oil Boom for Years," The Wall Street Journal, 24 May 2020.

12. See, for instance, McLean (2018).

13. McLean (2018), p. 46

14. Ben Casselman, "Chesapeake Holders Denounce CEO's Pay," The Wall Street Journal, 28 April 2009.

15. Tom DiChristopher, "Shale oil drillers gave stock shareholders what they wanted, then investors punished them anyway," CNBC, 14 March 2019.

16. "Research Announcement: Moody's – Energy defaults are on the rise again, clouded economic outlook calls for a higher US speculative-grade default rate," Moody's, 31 October 2019.

17. Analysis of all active bonds and loans included in this dataset. Researched using Bloomberg Finance L.P.

18. Jonathan Randles, "Chesapeake Energy to Start Tapping $925 Million Bankruptcy Loan,"*The Wall Street Journal*, 29 June 2020.

19. By volume. Proportion of lending in the form of RBL from the data analyzed for this report was compared to the official Bloomberg league table of global loans, narrowed to include only companies classified as oil and gas E&P companies according to the Bloomberg Industry Classification Standard.

20. Amir Azar, "Reserve Base Lending and the Outlook for Shale Oil and Gas Finance," Columbia | SIPA Center on Global Energy Policy, May 2017, p. 4.

21. By volume. Ratings of active bonds from the data analyzed for this report were compared to the proportion of high yield and investment grade ratings (as of transaction date) in the official Bloomberg league table of U.S. corporate bonds (debt and preferred securities issued by corporate and financial issuers, denominated in US Dollars, with market of issue as "Domestic MTN", "Global", "Private Placement", "US Domestic", or "Yankee").

22. $22.6 billion in additional share offerings, plus one IPO of $728 million.

23. Oil prices from: "Crude Oil Prices - 70 Year Historical Chart," Macrotrends.

24. Bloomberg Finance L.P.

25. Kelly Trout and Lorne Stockman, "Drilling Towards Disaster: Why U.S. Oil and Gas Expansion is Incompatible With Climate Limits," Oil Change International, January 2019, p. 28.

26. David Templeton and Don Hopey, "CDC, state officials investigating multiple cases of rare cancer in southwestern Pa.," *Pittsburgh Post-Gazette*, 28 March 2019; David Templeton and Don Hopey, "Are the 27 cases of Ewing sarcoma near Pittsburgh a cluster?," *Pittsburgh Post-Gazette*, 14 May 2019.

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28. Based on an analysis of permits issued since 2004, according to the Pennsylvania Department of Environmental Protection's Permits Issued Detail Report, available at https://www.dep.pa.gov/DataandTools/Reports/Oil%20and%20Gas%20Reports/Pages/default.aspx. Analyzed by Karen Feridun, founder of Berks Gas Truth.

29. "Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking (Unconventional Gas and Oil Extraction)," Sixth Edition, Concerned Health Professionals of NY and Physicians for Social Responsibility, June 2019, p. 343; Irena Gorski and Brian S. Schwartz, "Environmental Health Concerns From Unconventional Natural Gas Development," Oxford Research Encyclopedia, Global Public Health, February 2019.

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34. Justin Nobel, "The Hidden Risk in the Fracking Boom: Are pipeline safety regulations keeping pace with the flood of natural gas?" *Rolling Stone*, 20 February 2019.

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39. Asset managers in particular should exclude the fracking companies analyzed in this report from bond index funds, mutual funds, and exchange-traded funds (ETFs).

40. For additional recommendations for lawmakers and regulators, see "Building Climate-Resilient Finance in the Recovery: Guidelines for Lawmakers and Regulators," Stop the Money Pipeline, April 2020.

41. The Bloomberg Terminal is an industry-standard provider of financial data available by subscription; see https://www.bloomberg.com/professional/solution/bloomberg-terminal/. Financial research was done using the Bloomberg Terminal's league table function, which aggregates "creditable" transactions and assigns each leading bank a credit of the deal based on their role, according to the Bloomberg Finance L.P. League Table Standards and Guidelines.

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