



CARBON ASSET RISK: **A Review of Progress and Opportunities**





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About Ceres:

Ceres is a nonprofit organization mobilizing business and investor leadership on climate change, water scarcity and other global sustainability challenges. Ceres directs the Investor Network on Climate Risk (INCR), a network of institutional investors with collective assets totaling more than \$13 trillion. Ceres also directs Business for Innovative Climate and Energy Policy (BICEP), an advocacy coalition of dozens of companies committed to working with policy makers to pass meaningful energy and climate legislation. For more information, visit www.ceres.org or follow on Twitter @CeresNews.

EXECUTIVE SUMMARY

The concept of carbon asset risk – that the world’s fossil fuel companies hold at least three times more oil, gas and coal reserves than can realistically be burned in order to avoid potentially catastrophic climate warming – has risen to the forefront as Wall Street analysts, investors, regulators and governments increasingly recognize carbon asset risk as an actionable, systemic financial risk that must be brought under control. Fossil fuel majors are largely ignoring global trends that are fundamentally changing demand for their products—rising costs of producing unconventional fossil fuel reserves, falling costs for renewable energy and efficiency advances that are cutting into coal and oil demand growth.

In September 2013, Ceres and the Carbon Tracker Initiative launched the Carbon Asset Risk (“CAR”) Initiative with support from the Global Investor Coalition. The CAR Initiative was launched as 75 investors representing \$3.5 trillion in assets called on 45 of the world’s largest fossil fuel companies to come clean on the risks of stranded assets.

This report chronicles major shifts in the financial landscape since the CAR effort began. Some of these changes can be linked directly to actions or progress achieved through the CAR Initiative or its many collaborative partners, while others are more indicative of the increased relevance of the carbon asset risk framing around wasted capital, stranded assets and unburnable carbon.

Five key changes highlight the momentum the Carbon Asset Risk Initiative has directly spurred or helped accelerate:

1. Oil, gas, coal and electric utility companies have disclosed new, actionable information.

In response to investor requests, more than 20 companies have provided detailed information about how they view their exposure to carbon asset risks, including: whether they put an internal price on carbon emissions; what screening prices they use for sanctioning new extraction projects; whether they assess impacts from a low-carbon global scenario where global temperature increases are limited to 2 degrees; and how they plan for climate-related physical impacts.

The quality of these first-ever disclosures varies, but overall they have changed the conversation and are beginning to generate important changes in the business models for major fossil fuel firms. These disclosures have provided valuable information for investors and advocates – information that has been used to challenge faulty demand assumptions and create new awareness about the risks and uncertainty of investing in fossil fuels. The increased disclosures have also spurred internal changes at companies. For example, former coal giants like BHP Billiton and Exxaro have affirmed the consensus on climate science and the need to reduce greenhouse gas emissions, while Total has made major investments in solar and Statoil has created a new renewable energy division focused on offshore wind.

2. The fossil fuel monolith is fracturing.

Growing “unburnable carbon” concerns in the investor community have forced fissures in the fossil fuel industry. The big six European oil companies are breaking with U.S. oil and coal companies. While Shell, Statoil and BP supported shareholder resolutions on climate change, each of which passed with 98.9%, 99.95% and 98.3% support, respectively, Chevron and Exxon continued to fight tooth and nail against shareholder resolutions that raised climate concerns. Shell, BP, Total, Eni, Statoil and BG Group have all abandoned any semblance of an alliance with coal by writing an open letter to the United Nations extolling the climate benefits of natural gas over coal and calling for a global price on carbon pollution.

3. Mainstream acceptance of carbon asset risk continues to grow.

From an analysis being commissioned by the Bank of England on the risks of stranded carbon assets to the G-20's request for a rigorous review by the international Financial Stability Board (FSB) of the global economic risks posed by the threat of stranded assets, it's clear that regulators and analysts are more aware of these risks than ever before and are beginning to act accordingly. Meanwhile, dozens of the world's largest investors are pushing the world's finance ministers to take action.

In what was perhaps the biggest indication of the tables turning on fossil fuels, the world's largest importer and largest exporter of oil have both gone on record in ways that completely undercut the bullish energy scenarios the oil industry uses to justify its business decisions. First, the head of Sinopec said that China's demand for diesel fuel could peak as early as 2017, and demand for gasoline could peak by 2025. Second, Saudi Arabia's oil minister predicted that Saudi Arabia itself would wean itself off of oil by 2040 or 2050, replacing it largely with renewable energy.

4. Clean energy breakthroughs have severed the link between carbon intensity and economic growth.

Advances in renewable energy and technologies that integrate them into the electric grid are moving faster than anyone expected. In fact, solar power is now cheaper in parts of the world than fossil fuel power and UBS just predicted that solar will replace nuclear and coal and become the "default technology of the future to generate and supply electricity." Furthermore, extreme weather events from droughts to flooding to heat waves and wildfires weigh in favor of more distributed energy systems built around renewables and energy storage, to promote resilience. Tesla's new battery, for example, beat the sales record of Apple's iPhone in its first week, and big data and efficiency along with major technology advances for electric vehicles and driverless cars are completely at odds with demand forecasts that underlie the investment decisions of fossil fuel companies. Companies like Exxon and Chevron are betting that the next 100 years will look a lot like the last 100 years even though the facts stack up against that.

5. Investors are turning up the pressure on boards to be accountable on carbon asset risk.

Ceres is working with INCR members to ramp up the pressure on boards members at fossil fuel firms. Nearly three-dozen fossil fuel companies faced resolutions this year focused on "proxy access," or the right of major investors to independently nominate directors to the boards. Despite management opposition, resolutions received majority voting support at numerous companies, including oil companies Chevron, Anadarko, Apache, Cimarex, ConocoPhillips, EQT, Hess, Marathon, Murphy Oil and Range Resources; coal company Alpha Resources; and utilities AES, American Electric Power, DTE, Duke, First Energy and PPL. Shareholders also forced boards and CEOs to address their failure to adequately manage carbon asset risks by pushing resolutions aimed at adding board members with expertise on climate issues and directly challenging continued capital expenditures on high-risk fossil fuel extraction projects.



SECTION I

INTRODUCTION

For more than 150 years since oil and coal were first extracted in the United States, the primary concern has been whether we could find enough fossil fuels to feed the engines of industry and society.¹ Trillions of dollars and untold human capital have been expended to find and exploit fossil fuel reserves throughout the world, and billions have been spent to gauge when and what to expect once the world hits peak oil and coal.² Quite simply, for the bulk of industrialized societies' collective memory, the fear underlying the energy policies crafted in halls of state and boardrooms has been that we would run out of oil, gas and coal or not be able to access it cheaply enough.³

In the past few years, that paradigm has been turned upside down by three previously unimaginable tectonic shifts: (1) hydraulic fracturing and other technological innovations have re-drawn the map of exploitable reserves and produced a glut of relatively cheap oil and natural gas;⁴ (2) in response to the growing evidence of the economic and human toll being exacted by climate change, an unprecedented number of governments, companies, and public citizens are pushing to keep the bulk of global reserves of oil, gas and coal underground in order to preserve a livable planet while still expanding economic growth and quality of life;⁵ and (3) technological advances in clean energy solutions have rapidly driven down the costs of solar, wind, energy storage and microgrids that will pave the way for a new type of global energy system.⁶

1 Daniel Yergin, *The Prize: The Epic Quest for Oil, Money & Power at 770-71* (2011); Ida Tarbell, *The History of the Standard Oil Company*, at 30-33 (Halcyon Edition 2009).

2 Russell Gold, "Why Peak Oil Predictions Haven't Come True," *Wall Street Journal* (Sept. 29, 2014) available at <http://www.wsj.com/articles/why-peak-oil-predictions-haven-t-come-true-1411937788>.

3 Id.; Yergin at 770-71.

4 Edward Morse, "Welcome to the Revolution: Why Shale is the Next Shale," *Foreign Affairs* (May/June 2014) available at <https://www.foreignaffairs.com/articles/2014-04-17/welcome-revolution>; Russell Gold, *The Boom: How Fracking Ignited the American Energy Revolution and Changed the World* (2015).

5 Suzanne Goldenberg, "Lima Climate Change talks reach global warming agreement" *The Guardian* (Dec. 14, 2014) available at <http://www.theguardian.com/environment/2014/dec/14/lima-climate-change-talks-reach-agreement>; Mark Landler, "U.S. and China Reach Climate Accord after Months of Talks" *New York Times* (Nov. 11, 2014) available at http://www.nytimes.com/2014/11/12/world/asia/china-us-xi-obama-apec.html?_r=0; Mindy Lubber, "Changing the Business Climate in 2015" (April 14, 2015) available at <http://www.ceres.org/press/blog-posts/changing-the-business-climate-in-2015>; More than 1,300 companies have signed Ceres' Climate Declaration available at <http://www.ceres.org/declaration>. Suzanne Jacobs, "CEOs to World Leaders: Get Off Your Asses and Fix Climate Change," *Grist* (Apr. 17, 2015) available at <http://grist.org/climate-energy/ceos-to-world-leaders-get-off-your-asses-and-fix-climate-change/>.

6 Dickon Pinner and Matt Rogers, "Solar Power Comes of Age," *Foreign Affairs*, Vol. 94, No. 2 (March/April 2015); Steven Levine "Battery Powered: The Promise of Energy Storage," *Foreign Affairs*, Vol. 94, No. 2 (March/April 2015).



Photo by Billy Wilson, flickr.com

These fundamental shifts in the supply of and demand for fossil fuels are changing the face of energy throughout the world, but the companies who are closest to these trends seem unprepared to recognize that such a dramatic change demands adjustments to their business models. This is the crux of what the Carbon Asset Risk Initiative is working to address: the tension between the fact that companies are deploying ever increasing amounts of capital to find and develop fossil fuel reserves and sanction high cost projects even as the value of those reserves becomes less stable. As the world shifts from a carbon-driven energy base to one that relies on solar, wind, energy storage, and an ever shrinking proportion of the cheapest and least carbon-intensive fossil fuels, the companies that fail to foresee and plan for this shift will be forced to choose between winding down or facing bankruptcy.⁷

The fossil fuel companies whose current business models depend on extending the era of fossil fuels beyond the next decade are clinging to the side of the cliff seeking purchase rather than engineering a new path upward. Investors have mobilized around the world to spur these companies to do the hard work of assessing their current exposure to carbon asset risk and mapping a new course. This report seeks to catalogue the beginnings of the Carbon Asset Risk Initiative and its progress to date, explain the causes for and the relevance of the oil price shock and some of the structural challenges facing coal, and identify the greatest opportunities for the next round of investor advocacy.

⁷ Ashim Paun, "Stranded Assets: What's Next," HSBC (Apr. 16, 2015) available at http://www.businessgreen.com/digital_assets/8779/hsbc_Stranded_assets_what_next.pdf; Carbon Tracker Initiative, *Unburnable Carbon 2013: Wasted capital and stranded assets*; Ben Caldecott, *Stranded Assets and Scenarios*, Discussion Paper, January 2014, Stranded Assets Programme, Smith School of Enterprise and Economics, Oxford University available at <http://www.smithschool.ox.ac.uk/research-programmes/stranded-assets/Stranded%20Assets%20and%20Scenarios%20-%20Discussion%20Paper.pdf>; Kepler Cheuvreux, "Stranded Assets, Fossilized Revenues: USD \$28trn of fossil fuel revenues at risk in 450ppm world," (Apr. 2014) available at http://www.keplercheuvreux.com/pdf/research/EG_EG_253208.pdf;

INCR MEMBERS' PUSH FOR CLIMATE RISK DISCLOSURE IN SEC FILINGS

Since its inception in 2003, members of Ceres' Investor Network on Climate Risk (INCR) have urged the Securities and Exchange Commission (SEC) to improve disclosure of climate change risks in companies' annual financial filings. In 2007, investors representing \$1.2 trillion in assets sent a formal petition to the SEC, asking for interpretive release clarifying that material climate-related information must be included in corporate disclosures. Over 100 investors worldwide representing \$7.6 trillion in assets have written to the SEC in support of the petition.

The SEC responded in February 2010 by issuing disclosure guidance that said climate change and related regulations lead to risks and opportunities for companies in a variety of sectors, and those issues, when material, must be disclosed in SEC filings. New initiatives from investors, Ceres and Carbon Tracker (see p. 13) to improve carbon asset risk disclosure in SEC filings build on the 2010 guidance by asking for reporting on the huge shifts (see p. 1) forcing oil and gas, electric power and coal companies to re-examine their business models.

THE CARBON ASSET RISK INITIATIVE

The concept of stranded assets and the regulatory risks that lead to them isn't new,⁸ but the application of this concept to the carbon emissions embedded in the reserves held by fossil fuel companies and the assets held by electric utilities really didn't take hold of the public imagination until Carbon Tracker Initiative published "Unburnable Carbon – Are the world's financial markets carrying a carbon bubble?" in 2011.⁹ Ignited in part by the fresh remembrance of the crash of world markets in 2008 as a result of the "housing bubble" and fanned by the growing grassroots climate movement, the momentum for exploring and mitigating carbon asset risk caught fire in mid-2013, and by September of that year, over 75 investors representing \$3 trillion in assets were ready to take action. These investors, many with decades of experience in shareholder activism, issued letters to 45 of the world's largest oil, gas, coal and electric utility companies calling on them to assess and disclose the potential exposure they faced to carbon asset risk.¹⁰ This investor letter, organized by Ceres and supported through collaboration with the Carbon Tracker Initiative and the Global Investor Coalition, was the first step of the Carbon Asset Risk (CAR) Initiative. The goals of the CAR Initiative were ambitious but straightforward:

1. To prevent shareholder capital from being wasted on developing high-carbon and high-cost fossil fuel reserves that are "unburnable" if the world is to avoid catastrophic climate change or may prove uneconomic if prices decline; and
2. To drive fossil fuel companies to acknowledge and plan for the escalating physical impacts of climate change such as higher temperatures, rising seas and stronger storms.

8 The concept of stranded assets is most often associated with the regulation of public utilities and gained more widespread use during the de-regulation of the electricity sector of the United States. Alfred Kahn, "Can Regulation and Competition Co-Exist?: Solutions to the Stranded Cost Problem and Other Conundra," *Elec. Journal*, 7 (8) (1994); R.J. Michaels, "Unused and useless: the strange economics of stranded investment." *Elec. Journal* 7(8) (1994); A. Lawrence Kolbe & William B. Tye, "Compensation for the risk of Stranded costs," *Energy Policy*, 24:12, 1025-50 (1996); Notice of Proposed Rulemaking: Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, 67 Fed. Energy Reg. Comm'n ¶ 61,394 (Jun. 29, 1994).

9 Carbon Tracker Initiative, "Unburnable Carbon: Are the world's financial markets carrying a carbon bubble?" (Nov. 2011) available at <http://www.carbontracker.org/library/#carbon-bubble>.

10 Copies of individual initial letters to oil, gas, coal, and electric utilities available at www.ceres.org/carbonassetrisk.

Achieving these goals entails pursuing multiple strategies and engaging companies from several angles. Among the strategies is a strong push for better disclosure and analysis by companies of the kinds of information that would help both companies and investors to assess the scope of carbon asset risk that each particular company faces. By persuading companies to begin conducting analyses that “stress-tested” their portfolios against a greater range of scenarios, including the IEA’s 450 ppm or 2 degree scenario, investors sought to bring to light the very real risks that companies were taking on by chasing ever costlier projects on the assumption that oil and coal prices would remain high and/or that demand reductions in developed countries would be more than made up for by demand increases in developing countries. Disclosure has proven to be a valuable tool in and of itself, but has not been the only focus. Investors have also sought to move companies by filing shareholder resolutions and calling on companies to change their practices in very concrete ways ranging from setting science-based greenhouse gas reduction targets, to reporting on and reducing methane emissions, to changing board governance, to returning capital to investors.

THE INITIAL CAR LETTER AND RESPONSES

Investors sent their initial letter to the following companies on September 9, 2013:

OIL AND GAS	COAL
Anadarko Petroleum Corp.	Alpha Natural Resources
Apache Corp.	Anglo American plc
BG Group	Arch Coal
BP	BHP Billiton
Canadian Natural Resources	China Shenhua Energy Co Ltd
Chesapeake Energy	CONSOL Energy
Chevron	Exxaro
CNOOC Ltd	Glencore
ConocoPhillips	Xstrata Mitsubishi Corp.
Devon Energy Corp	Peabody Energy
Eni S.p.A.	Rio Tinto
EOG Resources, Inc.	Severstal Shanxi Coking Co. Ltd.
ExxonMobil	Vale
Gazprom	
Hess Corp.	ELECTRIC UTILITIES
Lukoil	AES Corp.
Occidental Petroleum	American Electric Power
Oil and Natural Gas Corp. Ltd.	China Power Intl Dev Ltd
PetroChina	Duke Energy
Royal Dutch Shell	First Energy
Sinopec	NTPC
Statoil	Southern Company
Suncor	
Total	

These long-term, climate change-related risks raise additional concerns for discussions that are already underway between the investment community and oil and gas companies about the viability of their capital expenditure plans. There is now a widespread view that it is not in the best interest of investors for companies to expend further capital on low-return projects. Government policies to reduce GHG emissions would be likely to further reduce the returns of these projects.

Therefore, we ask that the Company review both its exposure to these risks and its plans for managing them. To inform this review, in line with IEA's recent report, *Redrawing the Energy-Climate Map*, we request that the Company conduct a risk assessment under at least two main scenarios: (1) a business-as-usual scenario such as that used in the Company's current reporting and (2) a low-carbon scenario consistent with reducing GHG emissions by 80% by 2050 to achieve the 2°C goal. We recommend that this assessment evaluate:

- Capital expenditure plans for finding and developing new reserves, including consideration of rates of return and payback periods and alternative uses of capital;
- The potential GHG emissions associated with the production of all unproduced reserves categorized by resource type, e.g., onshore conventional, tight oil, shale gas, oil sands, offshore, etc.;
- The risks to unproduced reserves, due to factors such as carbon pricing, pollution and efficiency standards, removal of subsidies and/or reduced demand;
- The risks of assets, particularly oil and gas infrastructure, posed by the physical impacts of climate change, including extreme weather, water stress, and sea level rise; and
- The impacts of climate change on the Company's current and projected workforce.

The letter was adapted for each company, but it set out the basic underpinnings of carbon asset risk in relation to the needed climate actions and the current estimates of fossil fuel reserves. It was the first coordinated attempt to engage the largest fossil fuel companies on this issue by clearly outlining the scope and definition of carbon asset risk, articulating a consistent set of requests for disclosures, and proposing concrete steps that companies could take to reduce or eliminate carbon asset risk.

The letter also provided, in broad terms, a range of alternatives to continued capital expenditures on high-cost and high-carbon projects that are subject to carbon asset risk:

We would also like to understand what options there are for [the Company] to manage these risks by, for example, reducing the carbon intensity of its assets, divesting its most carbon-intensive assets, diversifying its business by investing in lower-carbon energy sources, or returning capital to shareholders.¹¹

SUPPLEMENTAL GUIDANCE

After evaluating some of the initial responses to the carbon asset risk letter, Ceres' Investor Network on Climate Risk (INCR) collaborated with IIGCC, IGCC and Carbon Tracker Initiative to publish "Supplementary Guidance for Oil and Gas Companies: September 9, 2013 Investor Letter Regarding Carbon Asset Risk"¹² in March 2014. This document sought to clarify the assumptions behind the carbon asset risk argument and assure companies that investors were fully aware of the many factors that influence oil and gas prices in addition to the issue of carbon asset risk. In particular,

¹¹ See Letter to ExxonMobil at 2-3 (Sept. 9, 2013).

¹² Supplementary Guidance available at the private Carbon Asset Risk website. Contact Shanna Cleveland for access.

it emphasized that investors' concerns were not based solely or even largely on the idea that global policy action to address climate change would reduce demand for fossil fuels. Rather, a variety of trends—from increasing transportation efficiency to the growing pace of technological innovation in the renewables sector to fuel switching in the petrochemical sector—were working in tandem to reduce global demand for fossil fuels in ways that the industry's projections did not foresee. Global policy action on climate change would only serve to exacerbate these trends.

In at least some cases, it appeared that companies were deliberately choosing to misinterpret the letter in order to create a strawman argument – one that can be quickly batted down:

Chevron	<p>“Notwithstanding the intent of nations to do so, our view is that the implementation of comprehensive, enforceable and verifiable regulation to implement policies assumed similar to the IEA’s 450 Scenario is not a likely outcome.”¹³</p> <p>Left unsaid is that Chevron itself is spending millions of dollars to discredit and derail state, local and federal efforts to regulate carbon emissions.¹⁴</p>
ExxonMobil	<p>ExxonMobil explained that its “outlook process” did “not project overall atmospheric GHG concentration,” nor did it “model global average temperature impacts.” ExxonMobil did claim that one of the scenarios included would “closely approximate” the intermediate IPCC RPC 4.5 curve.¹⁵</p> <p>Rather than discussing the potential for cost effective reductions of global GHG emissions, ExxonMobil focused solely on the potential economic costs to an average U.S. electricity customer.</p>
Shell	<p>“It is interesting to note that the majority of the share price implication in much of the carbon tracker work, alongside the HSBC reports regarding carbon asset risk, directly relates to the impact on oil prices and not the inability to produce the stated reserves of the company.”¹⁶</p> <p>This, of course, misses the point perhaps purposefully. In the context of share price and the trend of ever rising costs, the potential that oil prices would drop precipitously – either as a result of reduced demand or because of oversupply – affects a company’s ability to produce specific reserves depending on the break-even prices necessary to make such production economic.</p>
BP	<p>BP responded that it publicly supports a price on carbon, and indicated that it considers “multiple scenarios” in its planning analysis.¹⁷</p> <p>At the time, however, BP was still a member of the American Legislative Exchange Council (ALEC) and other trade associations that supported attacks on climate regulation.</p>
Peabody Energy	<p>In September 2014, the company issued a report¹⁸ on “Carbon Considerations in a World of Rising Energy Need” in which it failed to acknowledge the risks of climate change and argued that demand for coal would continue to rise globally, despite numerous reports of increased production costs and slackening demand due to a range of factors.</p>

The initial responses also generated some constructive outcomes. Though praise for positive responses to engagement has to be tempered by many other factors including an evaluation of behind-the-scenes lobbying, integration of positive statements into actual company planning processes, emissions profiles, and overall contribution to the climate change debate, the following companies were spurred to take some positive actions and stake out some meaningful positions in response to the initial letters:

¹³ Letter from Lydia Beebe, Corporate Secretary and Chief Governance Officer to Ryan Salmon, at 2.

¹⁴ Richard Gonzales, “Chevron Spends Big, and Loses Big, In a City Council Race,” NPR (Nov. 5, 2014), available at <http://www.npr.org/blogs/thetwo-way/2014/11/05/361875792/chevron-spends-big-and-loses-big-in-a-city-council-race>; Brad Wiens, “Leaked: The Oil Lobby’s Conspiracy to Kill Off California’s Climate Law,” Bloomberg (Nov. 25, 2014) available at <http://www.bloomberg.com/bw/articles/2014-11-25/revealed-the-oil-lobbys-playbook-against-californias-climate-law#p2>; NRDC, “Unmasked: The Oil Industry’s Campaign to Undermine California’s Clean Energy Future,” (Nov. 2014) available at <http://www.nrdc.org/energy/files/oil-industry-undermining-california-clean-energy-IB.pdf>.

¹⁵ Exxon, Energy and Carbon: Managing the Risks at 2 (March 31, 2014) available at <http://cdn.exxonmobil.com/~media/global/files/other/2014/report--energy-and-carbon--managing-the-risks.pdf>.

¹⁶ Letter from J.J. Traynor, Executive Vice President to Ryan Salmon, at 1 (Oct. 1, 2013).

¹⁷ Letter from Carl-Henric Svanberg, Chairman to Members of the Ceres Coalition at 1 (Oct. 2, 2013).

¹⁸ <http://www.peabodyenergy.com/content/200/publications/csr-reports>.

BG Group	<ul style="list-style-type: none"> • Explained that it has a “group-wide GHG target which applies to our equity-share emissions from all assets in our portfolio which we set to align with recommendations from IPCC and IEA 450 ppm scenarios.”¹⁹ • Recognized that for natural gas to contribute meaningfully to climate goals, methane has to be controlled. BG Group explicitly pointed to the recommendation of IGCC, INCR, and IIGCC as its rationale for joining the UN’s CCAC initiative to reduce methane emissions.²⁰ • Pointed to its decision not to pursue Arctic, oil sands, heavy oil, or coal as a signal of its climate commitment and • BG Group has integrated the use of the Ceres AquaGauge tool as part of its water risk management plan.²¹
PetroChina	<ul style="list-style-type: none"> • Indicated support for a global climate agreement in strong terms. PetroChina noted that China has embraced a target of limiting warming to 2C and 450 ppm, and pointed to a binding emissions reduction target of 40-45%.²²
Statoil	<ul style="list-style-type: none"> • Voiced support for a 2C goal even though it ultimately concluded it is “not a realistic outcome.”²³ • Provided detailed information about its portfolio-wide carbon intensity claiming that its GHG intensity is only 9kgCO₂/boe as compared to an industry average of 23kgCO₂/boe²⁴
Total	<ul style="list-style-type: none"> • Voiced support for “international and progressive agreements on climate”²⁵ • Pointed to a goal of reducing GHG emissions by 15% from 2008-2015. However, that goal was limited to operational emissions rather than the asset portfolio.²⁶
Eni	<ul style="list-style-type: none"> • Supported a post-2020 climate agreement and discussed a strategy to reduce “carbon intensity” that has been in place since 2000.²⁷ • Part of its strategy involved increasing the percentage of its portfolio invested in natural gas and “green downstream” technology.
Suncor	<ul style="list-style-type: none"> • Recognized the “importance” of working to keep CO₂ below 450ppm, and committed to establishing GHG reduction targets for 2015.²⁸ • However, has yet to set those targets.
BHP Billiton	<ul style="list-style-type: none"> • Recognized the IPCC assessment of climate change and that the world must pursue:²⁹ <ul style="list-style-type: none"> - Limiting climate change to the lower end of the IPCC emission scenarios in line with current international agreements - Providing access to the affordable energy required to continue economic growth - Acceleration of effort to drive energy efficiency, develop and deploy low emissions technology and adapt to the impacts of climate change - Implementing a price on carbon in a way that addresses competitiveness concerns and achieves lowest cost emissions reductions.
Exxaro	<ul style="list-style-type: none"> • Accepted the IPCC assessment of climate change and asserted its goal of becoming carbon neutral and positioning itself to thrive in a low carbon economy through a range of initiatives including:³⁰ <ul style="list-style-type: none"> - Carbon Capture and Storage (CCS) for coal plants - Increased energy efficiency throughout its operations - Development of co-generation power plants - Development of wind energy projects - Effective management of climate impacts through increased resilience

19 Letter from Andrew Gould, Chairman to Ryan Salmon at 1 (Aug. 28, 2014).

20 Id. at 2, 8.

21 Id. at 10.

22 Letter from Mao Zefeng, Joint Company Secretary to Narina Mnatsakanian (Apr. 4, 2014).

23 Letter from Hilde Merete Nafstad, Senior Vice President to Ryan Salmon at 5 (Oct. 4, 2013).

24 Id. at 6.

25 Letter from Martin Deffontaines, Vice President to Ryan Salmon at 3 (Apr. 9, 2014).

26 Id. at 2.

27 Letter from Francesco Gattei, Senior Vice President to Ryan Salmon at 2 (Jun. 9, 2014).

28 Letter from Arlene Strom, Vice President to Ryan Salmon at 1-2 (Nov. 15, 2013).

29 BHP Billiton webpage on Climate Change, <http://www.bhpbilliton.com/home/society/climatechange/Pages/default.aspx>

30 Letter from SA Nikosi, CEO to Ryan Salmon (Jan. 28, 2015).

Companies' initial responses to the investors' letters also provided new information about which companies use a shadow price of carbon in their internal planning. Little was disclosed, however, about how exactly or even whether the prices were integrated into capital expenditure planning and whether this was done on a short-, mid-, or long-term basis. These numbers provide a valuable insight into whether companies are using a carbon price but little information to judge whether these prices meaningfully influence capital planning and business strategy. Further engagement to understand how and when these internal carbon prices are used presents an opportunity to move companies in a positive direction.

ExxonMobil	Includes a carbon price ranging from \$20-80/ton based on geographic location, but provided no information on how it is incorporated. ³¹
Shell	Indicated that it includes a \$40/ton carbon price in investment decisions but did not explain how it is applied, e.g. project-by-project, or the time-frame in which it is evaluated. ³²
Total	Explained that it has included a price of 25 Euros/ton since 2008 and said that it "conducts a dedicated analysis of carbon impacts before deciding on any sizeable investments." Again, the details are not provided. ³³
BG Group	Indicated that it supports a price on carbon and factors in a "shadow" carbon price on all investment decisions. ³⁴
PetroChina	Helped establish and participates in the carbon trading markets in China and the EU but provided no further detail. ³⁵
Suncor and Eni	Claimed to support carbon pricing and include a shadow price in investment planning but provided no detail. ³⁶

OUTCOMES: PROGRESS AND CHALLENGES

Why are these disclosures so important, and what real change has been achieved since the launch of the Carbon Asset Risk Initiative? Over the eighteen months of the initiative, at least 45 shareholder resolutions related to carbon asset risk have been filed, over 20 companies have submitted detailed responses to the CAR letter, and hundreds of investor engagements have taken place with company executives.

THE DEVELOPMENT OF THE INVESTOR NETWORK ON CLIMATE RISK'S CARBON ASSET RISK WORKING GROUP

In 2011, Carbon Tracker released its seminal report Unburnable Carbon, putting the concept of carbon asset risk on the agenda of many investors for the first time. The following year, the International Energy Agency concluded in its World Energy Outlook that "No more than one-third of proven reserves of fossil fuel can be consumed prior to 2050 if the world is to achieve the 2°C goal, unless carbon capture and storage (CCS) is widely deployed." In early 2013, HSBC issued the first report that attempted to quantify the impact of carbon asset risk for investors, concluding that oil companies could lose 40 to 60 percent of their value in a carbon-constrained world.

At the same time, investors were increasingly concerned that a business-as-usual approach by industry would drive increasingly extreme weather, putting the industry's infrastructure, distribution networks—and ultimately its customers—at risk.

³¹ Energy and Carbon: Managing the Risks at 17-18.

³² Letter from J.J. Traynor, Executive Vice President to Ryan Salmon at 9 (May 16, 2014).

³³ Letter from Martin Deffontaines to Ryan Salmon at 2.

³⁴ Letter from Andrew Gould to Ryan Salmon at 2.

³⁵ Letter from Mao Zefing to Narina Mnatsakanian at 2.

³⁶ Letter from Arlene Strom to Ryan Salmon at 1-2; Letter from Francesco Gattei to Ryan Salmon at 3.



This growing tide of evidence that carbon asset risk could materially impact investors spurred Ceres, Carbon Tracker, and our partners in the Global Investor Coalition on Climate Change to develop an engagement strategy to address the issue, culminating in the October 2013 letter to 45 major global fossil fuel companies.

PROGRESS: BUILDING MOMENTUM FOR CHANGE

For decades, the energy industry has presented a united front to the world at large even as oil, coal, and natural gas jockeyed for market share behind-the-scenes. In public, at least, they were first uniformly opposed to acknowledging climate change, and then opposed to addressing it through regulation. Over the last few years, that monolithic “energy lobby” has begun to show fissures and cracks. The first signs of this split began to emerge as cheap fracked gas started to dislodge coal’s firm grip on power generation in the U.S., and by the time the first responses to the Carbon Asset Risk Initiative letter began to arrive, the rift was clear. One after another, oil and gas major pointed to coal as the overwhelming source of carbon dioxide emissions and the most likely fossil fuel to be subject to stranding. At the same time, these companies pointed to their ability to shift their portfolios towards natural gas to reduce their “carbon intensity” and take up the market share once occupied by coal in the power generation sector as the primary reasons that, they claim, they would not see major stranding.

The past few months have exposed another fault line between the European oil and gas majors, with Shell, BP, BG Group, Statoil, Total and Eni on one side and the North American heavyweights Exxon and Chevron firmly entrenched on the other. In late spring of 2015, six major European fossil fuel companies sent an open letter to the UN and world leaders calling for a global price on carbon while extolling the virtues of natural gas and highlighting the break from coal. Although the European companies publicly invited Exxon and Chevron to join them, when questioned about the move by investors at their annual meetings, both Exxon and Chevron made it clear that they would not join the club. In the past, Exxon and Chevron have at least given lip service to the principle of carbon pricing, but they seem to be digging in their heels as momentum builds towards an agreement in Paris. This reluctance to move first to adapt may cost them—and their shareholders—in the end.



Changing the Conversation:

At the end of 2013, **Arjuna Capital**, **As You Sow**, **The Christopher Reynolds Foundation** and the **Tri-State Coalition** began a series of engagements regarding carbon asset risk with **ExxonMobil**. After in-depth meetings with members of the INCR CAR Working Group, **ExxonMobil** agreed to conduct and issue a report assessing its vulnerability to carbon asset risk. Exxon released the report on March 31, 2014.³⁷ Though the conclusions Exxon reached were at odds with the premises of the Carbon Asset Risk Initiative, this represented a significant departure for Exxon from its usual strategy of setting its own terms for the debate.³⁸ For the first time, a major—in many people’s mind, the major—integrated oil and gas company was entering into the conversation on investors’ terms and providing new insight into the assumptions that drive its business decisions. As Carbon Tracker explained in its response, the Exxon report revealed assumptions that were inconsistent with the most recent evidence, relying instead upon an expectation that business as usual would continue.³⁹ Gaining access to that information and evaluating how it stacks up against other energy forecasts and the rapidly shifting landscape of demand and price has been invaluable to informing engagements with policymakers and the development of shareholder resolutions.

In January of 2015, **Shell** became the first fossil fuel company to support a shareholder resolution requiring additional reporting on carbon asset risk.⁴⁰ In decades

37 Exxon Mobil, *Energy and Carbon: Managing the Risks* (March 2014) available at <http://cdn.exxonmobil.com/~media/global/files/other/2014/cover-letter-to-arjuna-capital.pdf>.

38 Andrew Logan, *Investors question forecasts from ExxonMobil and other oil companies*, *The Guardian* (Dec. 12, 2014) available at <http://www.theguardian.com/sustainable-business/2014/dec/12/investors-exxonmobil-big-oil-forecasts-climate-change-environment>.

39 Carbon Tracker Initiative, *Response to Exxon: An Analytical Perspective* available at <http://www.carbontracker.org/wp-content/uploads/2014/09/Exxonresponse-Full-110914.pdf>

40 <http://www.reuters.com/article/2015/01/29/climatechange-investor-shell-idUSL1NOV82IE20150129>

of filing shareholder resolutions, there have been many cases where companies have agreed to address concerns raised by investors in exchange for withdrawal of the resolution, but it is extremely rare for a company to pro-actively support a resolution and recommend that investors vote in favor of it. **BP** followed suit, recommending support of a similar resolution.⁴¹

The Shell and BP resolutions were unique from their inception. In the U.K., shareholder resolutions are often viewed as much more of a direct assault on a company than in the U.S. Years of company engagement and relationship building led by **IIGCC** and **CCLA** as well as careful coordination among investors under the “Aiming for A” coalition⁴² informed the drafting of the resolution and garnered the support of the 100 co-filers needed for the resolutions to be added to the ballot.

The reporting requirements imposed by these resolutions get at the heart of investor concerns about CAR:

That in order to address our interest in the longer term success of the Company, given the recognised risks and opportunities associated with climate change, we as shareholders of the Company direct that routine annual reporting from 2016 includes further information about: ongoing operational emissions management; asset portfolio resilience to the International Energy Agency’s (IEA’s) scenarios; low-carbon energy research and development (R&D) and investment strategies; relevant strategic key performance indicators (KPIs) and executive incentives; and public policy positions relating to climate change. This additional ongoing annual reporting could build on the disclosures already made to CDP (formerly the Carbon Disclosure Project) and/or those already made within the Company’s Energy Outlook, Sustainability Review and Annual Report.

Investors continued to engage with the companies as the annual general meetings (“AGM”) approached. **CalPERS**, the largest pension fund in the United States, and one of the founding members of the INCR Carbon Asset Risk Working Group, coordinated the first carbon asset risk proxy solicitation campaign geared towards building the U.S. votes for the Shell and BP resolutions. Ceres’ INCR CAR Working Group members Bill McGrew of **CalPERS** and Julie Tanner of **Christian Brothers** traveled to London for BP’s AGM and spoke on behalf of CalPERS, ICCR and Ceres’ INCR CAR Working Group. When the votes were counted, 98.28% of the shares had been cast in favor of the resolution. This marked an historic moment in shareholder engagement on climate as the first time that a company’s executives spoke in favor of such a resolution and the first time that a climate resolution garnered such a high vote. This meant that support for developing actionable information on the threat of climate risk had spread beyond a few socially responsible shareholders to virtually every shareholder in the company. That broad support will help drive rigorous, comprehensive reporting. Most importantly, this broad investor support will spur further integration of this information into the company’s planning processes for capital expenditures and the long-term business strategy of the company.

Shell’s shareholders also indicated overwhelming support for the resolution approving it by a vote of 98.9%.⁴³ Unfortunately, optimism over the vote was dampened by Shell’s continued refusal to heed investor warnings against moving forward with Arctic drilling. Investor questions over how Shell could proceed with high-cost Arctic drilling in the face of climate change and whether Shell was serious about addressing climate became the main theme of the meeting and dwarfed all other issues.

⁴¹ <http://www.reuters.com/article/2015/02/05/us-climatechange-bp-idUSKBN0L92GK20150205>

⁴² Led by IIGCC investors Helen Wildsmith of CCLA and Matthew Crossman of Rathbone Greenbank Investments, a global coalition of investors including INCR CAR Working Group members filed the resolutions on January 21, 2015. The full list of co-filers and supporters available at <http://action.shareaction.org/page/-/Campaigns/Green%20Light/Shareholder%20Resolutions%202015/Institutional%20Co-filing%20Group%20-%20BP%20and%20Shell%202015.pdf>.

⁴³ Sean Farrell, Climate Change Dominates Marathon Shell Annual General Meeting, *The Guardian* (May 19, 2015) available at <http://www.theguardian.com/business/2015/may/19/climate-change-shell-annual-meeting-oil-global-warming-resolution-shareholders>.

A decision by **Statoil** to support a similar resolution resulted in the highest of the votes in favor of climate resolutions by earning 99.95%.⁴⁴ In fact, Statoil actually welcomed the filing of the resolution, perhaps because of the role that it has played in coordinating with other European oil companies to promote carbon pricing and its recent plans to develop a new unit dedicated to renewable energy development such as offshore wind.

If these resolutions are fully carried out, then other oil majors should begin to feel the pressure to update their reporting in order to avoid finding themselves at a competitive disadvantage with respect to risk assessment and management.

Changing the Business Model

The Carbon Asset Risk Initiative seeks to prevent companies from wasting capital on finding and producing reserves that ultimately will not be burnable; at the same time, it also seeks to engage companies to change their business models by diversifying their asset portfolios to be more resilient to a carbon constrained future. There are multiple internal and external barriers to achieving this type of change. One of the central hurdles to convincing the oil and gas majors of the imperative to adapt their business models are the current measures that are used to rate their performance and value. Whether it is the internal key performance indicator of “reserves replacement ratio,” or “production growth,” or the more broad metric of “total shareholder return,” the share price and performance of oil and gas companies have always been linked (internally and externally) to the value of reserves on their books and their efficiency at producing those reserves. In an era when fossil fuels are expected not only to provide a smaller share of the energy mix, but must also be actively limited over time to maintain any hope of stemming climate change, the thinking around production growth and reserves replacement has to shift.

The precipitous decline in oil prices has created more focus on the issue of capital discipline and a re-invigorated concern over price volatility, but few of the oil and gas majors have recognized, much less embraced, the need to shift their business models towards lower carbon energy resources. While companies with currently strong balance sheets like

⁴⁴ Gail Moss, “Shell, Statoil investors vote for climate change disclosure,” Investments and Pensions Europe (May 20, 2015) available at <http://www.ipe.com/news/esg/shell-statoil-investors-vote-for-climate-change-disclosure/10008085.fullarticle>.

A WIDENING DIVIDE BETWEEN THE WORLD AND NORTH AMERICAN MAJORS

Notably, some of the largest international oil majors have been taking this opportunity to shift some of their resources towards projects that are likely to do well in a carbon-constrained world. Total has begun to explore solar power with its 65% equity stake in SunPower. Statoil tapped the head of its renewable energy division as its new CEO, and has been investing in offshore wind opportunities. The CEO of Sinopec recently commented that providing fuel will soon become one of its “non-core” functions, and has begun to invest in more renewable energy projects.

There is a real opportunity for the oil majors to use this downturn to redeploy capital towards lower carbon resources, and right now, it looks as though the North American companies will miss that chance.



ExxonMobil have been able to withstand the price shocks of the past six months, surviving in a world where carbon is constrained to the levels necessary to preserve lives and economic growth will require a wholesale change in how these companies approach energy. That is, these companies should start to integrate metrics that will provide them with clear financial indicators of whether new capital expenditures would be better spent on a much broader range of energy resources including solar, wind, energy storage, microgrids, hydropower or low carbon biofuels rather than focusing solely on unconventional versus conventional fossil reserves. Although integrating a carbon price into capital expenditure planning is one potential measure, none of the current “shadow carbon prices” disclosed by oil and gas majors appear to be meaningfully used in capital planning. One benefit of such an approach, if properly employed, is an accounting of the carbon intensity of different types of oil reserves.⁴⁵

Still, carbon pricing is not enough. Ultimately, the companies that intend to survive in the longer-term (beyond 2030) need to consider employing the kind of metric that analyst Mark Lewis of Kepler Cheuvreux has developed to compare “Energy Returned On Capital Invested” (“EROCI”) in order to guide capital expenditures and business strategies.⁴⁶ This concept, detailed in Kepler Cheuvreux’s 2014 analysis, “The Toil for Oil,” allows a company or investor to evaluate the returns on capital across multiple types of energy. This measure was developed in order to account for the “astronomical” increase in capital expenditures the industry has experienced over the last decade and its failure to produce an equivalent level of growth in production.⁴⁷ As Lewis explains:

[W]e here consider the concept of energy return on capital invested (EROCI) for oil and renewable-electricity sources (solar PV as well as onshore and offshore wind). How much energy does an outlay of USD100bn buy if invested in oil or solar PV, or wind? And how much energy will USD100bn yield in 2020 and 2035 if our assumptions about the future trend in oil prices prove correct and if, as we expect, the cost of renewables continues to fall?

Lewis and his colleagues compared these investments on the basis of gross and net energy yield, and assume that the energy is used “for powering cars and light commercial vehicles.”⁴⁸ They chose this particular use of power because the majority of the expected increase in demand for oil for the time period through 2035 in the IEA’s base case scenario is allocated for transportation.⁴⁹ The results were stunning. Even when compared on a gross energy basis, onshore wind is already competitive with oil at \$75/barrel and offshore wind approaches parity with oil at \$100/barrel:

45 “Know Your Oil: Creating A Global Oil-Climate Index” available at <http://carnegieendowment.org/2015/03/11/know-your-oil-creating-global-oil-climate-index>.

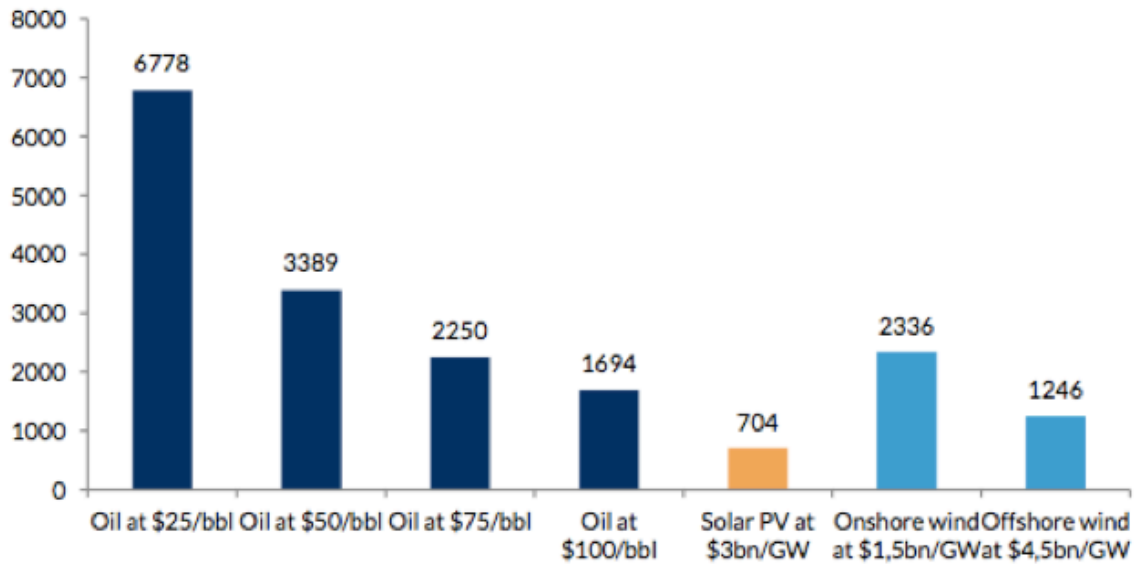
46 The Toil for Oil, Mark Lewis, Kepler Cheuvreux (September 2014) available at https://www.keplercheuvreux.com/document.aspx?tag=EG_EG_274333.pdf.

47 Id. at 116.

48 Id. at 117.

49 Id. at 114, Chart 67 and 117.

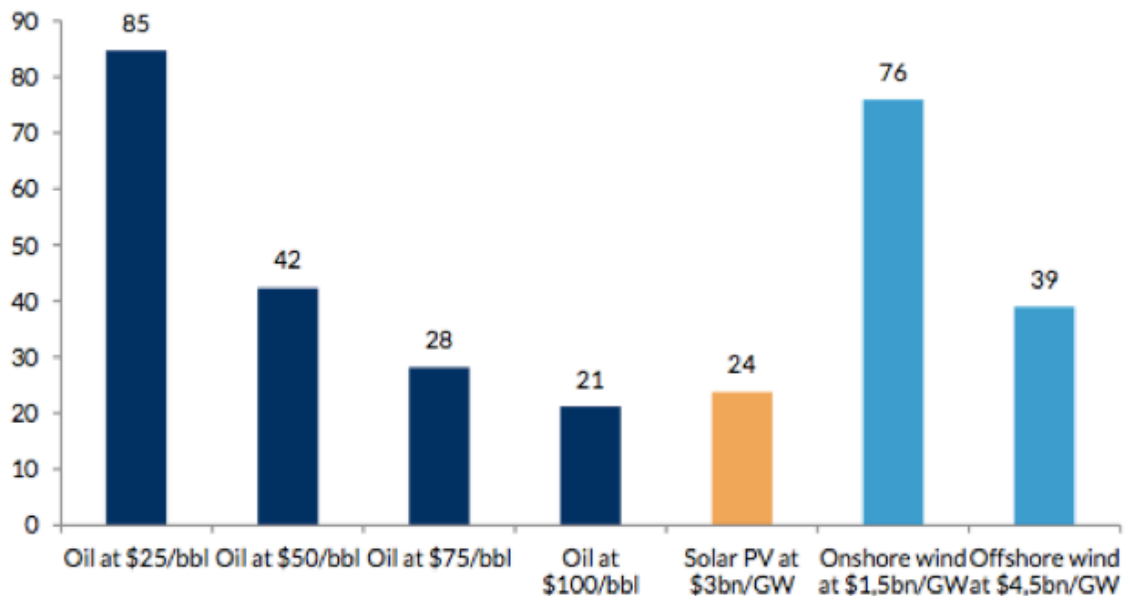
Estimated gross cumulative EROCI over project lifetime from investing USD100bn in 2014 (TWh)



Source: Kepler Cheuvreux estimates

When evaluated over a 20-year period and considered on a net energy yield basis, assuming a net energy yield for oil of 25% and a net energy yield for electric vehicles of 70% (taking into account transmission losses) the results are even better. Solar is cheaper than \$100/barrel oil, and offshore wind is competitive with \$75/barrel oil even approaching parity with \$50/barrel oil:

Estimated net annual EROCI over 20 years from investing USD100bn in 2015 (TWh)



Source: Kepler Cheuvreux estimates

The analysis of investments for 2020 and 2035 show an even more stark advantage for renewable energy. The oil majors would do well to heed the concerns of investors and consider this valuable analysis. As Kepler Cheuvreux succinctly puts it: “we think the majors should be asking themselves whether it makes sense to replace lost output from their existing producing assets on a barrel-for-barrel basis, or whether in fact they should be reducing their capital allocation to higher-cost new projects. . . and looking instead to invest the money thus freed up in renewables.”⁵⁰ The window for making that shift is rapidly closing as innovations in clean energy and commitments to reduce emissions are literally being announced on a daily basis. Although there has been some shift in this direction necessitated by the drop in oil prices, as highlighted below, oil majors that fail to move quickly risk massive hits to their free cash flow making them vulnerable to takeover while independents and smaller operators risk bankruptcy and default on bonds and other securities.^{51, 52}

Shell has made some adjustment to its executive compensation structure in response to investor efforts by IIGCC members. In its 2014 executive remuneration report, **Shell** announced that the long-term incentive program performance measures would be altered and that “[f]or awards from 2014 onwards, the relative hydrocarbon production growth performance measure has been replaced by relative return on average capital employed (ROACE) growth, giving greater focus on capital efficiency.” In the context of carbon asset risk, removing the emphasis from absolute production growth and placing it on capital efficiency can have a significant impact. In January 2015, Shell announced that it would be deferring and evaluating over 40 projects as it considered how to deploy its greatly reduced capital expenditures in 2015.⁵³ If Shell were to properly account for ROACE and potential carbon pricing on a project-by-project or even reserve type-by-reserve type basis, that would result in some of the higher cost and higher carbon projects falling off the table. Unfortunately, it appears that Shell has either scrapped this new metric when determining to forge ahead with its plans to drill in the Arctic or has decided to gamble that the troubles that plagued its last attempts in the Arctic will vanish and that the areas where it has chosen to drill will be completely full of oil.⁵⁴ If Shell really integrates a 2 degree scenario analysis into its planning, a high risk, high cost project like Arctic exploration would be exposed as completely uneconomic.

Increased Accountability and Reporting

Apache Energy has continued a tradition of working with investors to develop leading reporting and measurement programs from methane emissions and greenhouse gas intensity. Though Apache did not provide a written response to the initial CAR letter, its executives reached out to shareholders immediately to schedule meetings with executives at the highest levels and discuss the company’s detailed modeling analysis and approach. Apache has also developed metrics for determining executive compensation that are tied to recycling water and treating water that is used in hydraulic fracturing operations. Most recently, Apache supported the proxy access resolution filed by the New York City Comptroller’s office and appears poised to lead among North American energy companies on engagement.

⁵⁰ Id. at 129.

⁵¹ Chevron is the most illustrative example among the majors. As the rumors of possible mergers and acquisitions began to fly in the wake of low oil prices and earnings losses, Occidental’s quip about Chevron’s current levels of free cash flow during a 4th quarter earnings call boosted Occidental’s stock and quelled any questions about whether Chevron was in a position to buy. Ernest Scheyder, “Occidental CEO jokes Chevron is an unsuitable buyer; lifts stock,” (Jan. 29, 2015) available at <http://www.reuters.com/article/2015/01/29/us-occidental-chevron-idUSKBN0L22XH20150129>; Meanwhile, Chevron has embarked on what is now expected to be an asset divestiture program of \$15 billion. Nora Olabi, “Chevron to sell billions in assets,” Houston Business Journal (Mar. 11, 2015) available at http://www.bizjournals.com/houston/morning_call/2015/03/chevron-to-sell-billions-in-assets.html.

⁵² Sridhar Natarajan and Elliott Stam, “Oil Bonds Lose Investors \$7 billion in 10 Days,” BloombergBusiness (Mar. 17, 2015) available at <http://www.bloomberg.com/news/articles/2015-03-17/energy-junk-bond-revival-cut-short-as-7-billion-lost-in-10-days>.

⁵³ See answer to first question in Royal Dutch Shell Earnings Call Transcript for 4th Quarter 2014 available at <http://seekingalpha.com/article/2870986-royal-dutch-shells-rds-a-ceo-ben-van-beurden-on-q4-2014-results-earnings-call-transcript?page=11&p=qanda&l=last>.

⁵⁴ http://seekingalpha.com/article/3262535-royal-dutch-shells-5-billion-coin-toss?app=1&auth_param=12j23q:1a0msl:b0d5eb97136c315a2db97f13fc2e120b&uprof=28&dr=1

Statoil provided one of the most detailed responses to the initial CAR letter and has a history of engaging with shareholders on sustainability issues at the highest levels. In September of 2014, after extensive engagement with **Mercy Investment Services** and **Boston Common Asset Management**, Statoil deferred the Corner oil sands project in Alberta for at least three years and announced that it would be reviewing all of its projects and prioritizing only the most competitive.⁵⁵ In 2015, Statoil chose a new CEO, Eldar Saetre, who previously served as the head of the company's renewable energy group.⁵⁶ Statoil also announced that it would defer plans for Arctic drilling and re-evaluate them next year.⁵⁷ Statoil's focus on capital discipline, the elevation of an executive with renewable expertise, and the recent announcement that it will restructure to build a unit focused on renewable energy bodes well for further engagement.

Newfield Exploration changed their 10-K reporting in direct response to shareholder engagement. They are one of the only oil and gas companies to use the "Reserve Sensitivity Table" which was developed by the SEC in 2009 as part of its efforts to amend its reserve reporting rules. The sensitivity table allows a company to present information about the impacts that lower prices could have on reserves volumes and capital expenditure and production costs. In **Newfield Exploration's** case, they provided two sensitivity analyses, one for a cost of \$70/bbl and one for a cost of \$60/bbl.⁵⁸ This is a step forward, but given that oil prices have recently reached \$40-50/bbl it is important to advocate for companies to consider using an even lower price range.

ConocoPhillips agreed to include scenario analyses that evaluated the impacts of reaching a carbon-constrained world where global average temperature rise is limited to no more than two degrees Celsius.⁵⁹

Adjusting for Demand

Sinopec shocked many analysts when its CEO shared its forecast for peak demand of diesel and gasoline in mid-March of 2015.⁶⁰ According to him, based on performance at the 30,000 gas stations Sinopec owns, he expected diesel demand to peak as early as 2017 and gasoline demand to peak in China within ten years. More importantly, he acknowledged that it was time for Sinopec to start thinking of selling fuel as a "non-core" activity.⁶¹ That is a far different picture than the demand forecasts that other majors like Exxon, Shell, Chevron and BP are counting on to bring prices back up and make their continued investment in high cost projects worthwhile.

Saudi Arabia's oil minister has also been raising eyebrows in the last few months, and not solely because of his refusal to cut production in the face of oversupply. At a recent gathering in Davos, Sheikh Al-Naimi explained that he expected Saudi Arabia to wean itself off of oil by 2040, and he voiced aspirations of exporting solar energy.⁶²

Taken together, these statements by the world's largest importer of oil and largest exporter of oil about the rapid pace of changes in demand completely undercut the expectations that companies like Chevron and Exxon are using to sanction projects. Clearly, one of the oil majors' greatest blind spots

55 See Statoil announcement available at http://www.statoil.com/en/NewsAndMedia/News/2014/Pages/25Sept_CornerPostponement.aspx; Mercy Investment announcement available at <http://www.mercyinvestmentservices.org/community-investing-news/925>.

56 Mikael Holter, "Statoil Picks Acting CEO as Permanent Boss after Lund," Bloomberg Business (Feb. 4, 2015) available at <http://www.bloomberg.com/news/articles/2015-02-04/statoil-appoints-eldar-saetre-as-new-ceo-to-succeed-helge-lund>.

57 Mikael Holter, "Statoil Puts Arctic Exploration on Hold after Oil Price Plunge," Bloomberg Business (Jan. 29, 2015) available at <http://www.bloomberg.com/news/articles/2015-01-29/statoil-puts-arctic-exploration-on-hold-after-oil-price-plunge>.

58 Newfield Exploration 2014 10-K.

59 <http://www.conocophillips.com/sustainable-development/environment/climate-change/managing-risks-and-opportunities/Pages/carbon-asset-risk.aspx>

60 Timothy Coulter, "China's Fuel Demand to Peak Sooner than Oil Giants Expect," Bloomberg Business (Apr. 1, 2015) available at <http://www.bloomberg.com/news/articles/2015-04-01/china-s-fuel-demand-to-peak-sooner-than-oil-giants-expect>.

61 Id.

62 <http://www.bloomberg.com/news/articles/2015-05-21/saudi-arabia-oil-minister-sees-day-when-nation-exports-gigawatts>

exists with respect to the potential for oil and gas demand to decline on a time scale of years rather than decades as their forecasts suggest. Recent studies by academics and analysts alike have thrown the oil majors' conventional wisdom on forecasting demand into serious question.⁶³

CHALLENGES: OPPORTUNITIES FOR FUTURE ENGAGEMENT

Despite the clear progress that has been made in shifting the conversation and exposing the oft-flawed assumptions behind company strategy, there is a need for renewed pressure and new strategies and actions based on the material being gleaned from company engagements and new developments in renewable energy, world demand, and policy.

Retrograde Public Policy Actions and Spending

Exposing the conflicts between what companies say and what they do is one area that provides fertile ground for continued action. Many fossil fuel majors continue to exhibit climate denial and intransigence through their contributions to political action committees, trade associations, and front groups bent on halting any meaningful climate action. **Exxon** and **Chevron** are among the worst having been caught recently in high profile cases of funneling money to people and purposes that were at odds with their public stances on climate action. **Exxon** was found to have provided support for climate science skeptic Willie Soon. Meanwhile, **Chevron** spent over \$3 million trying to influence the Richmond, California city council elections, and spent almost \$17 million through the Western States Petroleum Alliance supporting attacks on California's low carbon fuel standard and landmark climate law, AB32. **BP** agreed to withdraw its membership from ALEC under questioning from investors, but only a few days later donated directly to the United States Senate's most vocal climate denier, James Inhofe.⁶⁴

Inadequate SEC Disclosures

More action is also needed in the regulatory sphere. A recent report by Carbon Tracker Initiative analyzing voluntary climate risk reporting by 49 oil and gas companies found low levels of assessment of these risks and application of the findings to current and future exploration projects.⁶⁵ Ten of these companies acknowledged running scenario analyses of different global temperature increases, eight ran internal carbon price stress tests for prospective investments, and five ran stress tests regarding the resilience of their capital expenditures under a scenario consistent with limiting the average global temperature increase to 2°C. However, no companies disclosed their stress testing parameters—much less the impacts of a 2 degree scenario on their portfolio—leaving investors unable to objectively assess the adequacy of these resilience tests.

Increasingly concerned by this lack of disclosure, over 60 investors wrote to the SEC in April 2015 to request action by the agency.⁶⁶ The letter highlighted three typical examples of this lack of disclosure: Exxon, Chevron and Canadian Natural Resources. While these three companies provided little carbon asset risk disclosure in their annual SEC filings, as discussed below, other oil and gas companies likewise reported little or nothing about the range of risks from existing and future laws and trends, such as those related to carbon pricing, pollution and efficiency standards, removal of subsidies, fuel switching and other factors that may reduce demand for oil and gas.

63 Toil for Oil, Kepler Cheuvreux; Amy Myers Jaffe, "Why the World's Appetite for Oil will peak soon," Wall Street Journal (May 5, 2015) available at <http://www.wsj.com/articles/why-the-worlds-appetite-for-oil-will-peak-soon-1430881507>; Stanford Researchers Say Concerns Over Peak Oil Should Ease, available at <http://news.stanford.edu/news/2013/july/peak-oil-supply-070913.html>; Carbon Asset Risk Investor Quarterly, Ceres available at <http://www.ceres.org/files/carbon-asset-risk-investor-quarterly/view>. Carbon Tracker Initiative, The Fossil Fuel Transition Blueprint, (Apr. 23, 2015) available at <http://www.carbontracker.org/wp-content/uploads/2015/04/Blueprint-Carbon-Tracker-230415.pdf>.

64 Simon Bowers, "Climate-sceptic U.S. Senator given funds by BP political action committee," The Guardian (Mar. 22, 2015) available at <http://www.theguardian.com/us-news/2015/mar/22/climate-sceptic-us-politician-jim-inhofe-bp-political-action-committee>.

65 Carbon Tracker Initiative, Recognising Risk, Perpetuating Uncertainty: A baseline survey of climate disclosures by fossil fuel companies at 21-22 (October 2014).

66 <http://www.ceres.org/files/confidential/investor-sec-letter-inadequate-carbon-asset-risk-disclosure-by-oil-and-gas-companies>

In its latest 10-K filing, **ExxonMobil** provided virtually no information about carbon asset risks. The company mentioned that government regulations could “reduce demand for hydrocarbons”, shift demand “toward relatively lower-carbon sources such as natural gas” and increase costs in other ways, without providing any further discussion. The company stated that it expects oil to remain the largest source of the world’s energy—about one-third—in 2040, without discussing other possible scenarios for the world’s energy mix. The filing discussed the company’s capital and exploration expenditures in 2013 and 2014, and estimated an average about \$34 billion per year “for the next few years.”

ExxonMobil also discussed projections for total renewable energy growth (15% of total energy by 2040) and the International Energy Agency’s (IEA) fossil fuel energy investment projection from 2014-2040 (about \$28 trillion). The company did not mention IEA research that examined other realistic scenarios.⁶⁷ A 2013 IEA report found that a world in which atmospheric CO₂ is kept below 450 ppm “requires . . . reduced investment in fossil-fuel supply [\$4.0 trillion lower than in the “New Policies Scenario” through to 2035]. However, this saving is more than offset by a \$16.0 trillion increase in investment in low-carbon technologies, efficiency measures and other forms of intervention.” The report also found, “In the case of oil and gas fields that have yet to start production, or have yet to be found, the lower level of demand in the 450 Scenario means that fewer of them justify the investment to bring them into production (or to find them) before 2035. . . .”

Chevron has provided some limited voluntary reporting related to carbon asset risks. For example, in its response to the CDP climate change survey, the company said it does not conduct scenario analyses based on a 450ppm goal because, it argued, the risk exposure to current assets and capital is minimal in view of the continuing global demand for oil and gas, the future investment required to meet that demand, and other factors. The company discussed how it may fare under the IEA’s global energy demand and 450ppm scenarios, and the embedded carbon within different types of fossil fuel reserves. It did not provide most of the information investors require, such as capital expenditure plans for new reserves including payback periods and alternative uses of capital, potential GHG emissions of unproduced reserves by resource type, and a discussion of existing and long term risks to unproduced reserves.

In its latest 10-K filing, Chevron provided almost no information about carbon asset risks. The company briefly mentioned that “incentives to conserve or use alternative energy sources” could reduce demand for its products and affect sales volumes, revenues and margins. It discussed regulatory and physical risks related to climate change, renewables projects, a range of environmental issues, oil and gas reserves and related matters. It discussed its oil sands and heavy crude oil projects and the differential in crude oil prices between high-quality and lower quality crudes. It discussed its capital and exploration expenditures in 2012-2014, and it estimated \$35 billion in expenditures in 2015: a “planned reduction” compared to 2014, “in large part a response to current market conditions.” However, it did not disclose the trend towards increasingly high cost, carbon intensive oil and gas exploration projects nor other information investors require about carbon asset risks.

Canadian Natural Resources is included here as an example of a company with more than 50% of its capital expenditure exposed to high risk, carbon intensive projects, according to the Carbon Tracker Initiative. The company provided almost no voluntary disclosure of carbon asset risks. In its CDP response, the company said it does not conduct scenario analyses based on a 450ppm goal but instead completes scenario planning exercises to identify “various risks” to the business. The company mentioned its six core principles for GHG emissions management, which do not include

⁶⁷ International Energy Agency, Redrawing the Energy-Climate Map: World Energy Outlook Special Report, June 10, 2013.

consideration of carbon asset risks. While the company discussed the four techniques it uses to extract bitumen from oil sands, it did not disclose information about the relative energy intensity of each method or breakeven costs for such projects.

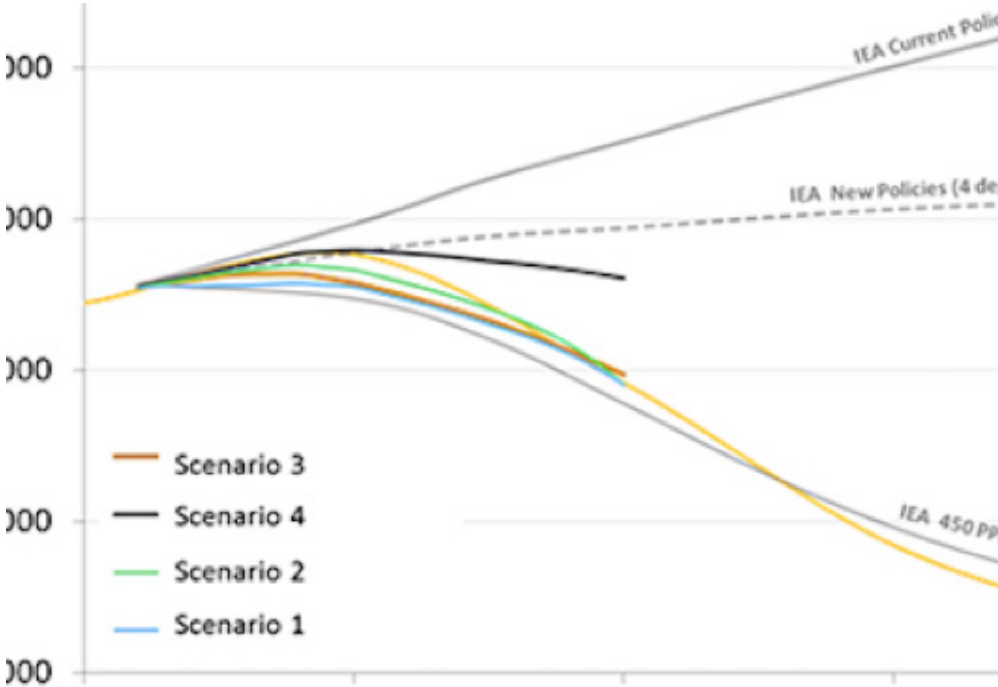
In its form 40-F filed on March 24, 2014, Canadian Natural Resources discussed climate-related and oil sands regulations, its emissions reduction efforts and related issues. It did not discuss carbon asset risks, apart from briefly mentioning differing market prices for heavy crude oil and bitumen vs. light and medium crude, and possible U.S. regulation to limit purchases of oil in favor of less energy intensive sources.

Continued engagement with the SEC and financial regulators is warranted to ensure that investors and regulators have sufficient information to gauge the vulnerability of companies and investments to the growing carbon asset risk.

Integrating Low Carbon Scenario Analysis into Capital Planning

One of the key opportunities for engagements with companies to better manage carbon asset risks is the integration of forecasts consistent with limiting temperature scenario analysis into their medium and long-term planning. Notably, BG Group and PetroChina declared that they conduct company planning for greenhouse gas emissions that is consistent with the IEA’s 450 ppm scenario.⁶⁸ More should be done to understand how BG Group and PetroChina build that analysis into their capital planning decisions and what impact BG Group’s proposed merger with Shell may have on its continued use of this tool.

Of the North American majors, only ConocoPhillips has publicly endorsed the use of scenario planning that includes an analysis of three scenarios that would result in a 50% chance of limiting global average temperature rise to two degrees Celsius.⁶⁹ According to ConocoPhillips: “We have integrated carbon-restricted scenarios into the strategic portfolio planning process to test our portfolio, and have developed annual GHG price forecasts for companywide use in long-range planning and project evaluation.”⁷⁰ This analysis is represented in the following chart:



68 Letter from Andrew Gould, BG Group to Ryan Salmon at 1 (Aug. 28, 2014); Letter from Mao Zefeng, Joint Secretary to Narina Mnatsakanian at 1 (Apr. 4, 2014).

69 <http://www.conocophillips.com/sustainable-development/environment/climate-change/managing-risks-and-opportunities/Pages/carbon-asset-risk.aspx>.

70 Id.

ConocoPhillips is leading the industry by conducting this analysis, but it has yet to reveal any information about the viability of specific types of assets under these scenarios. While the integration of these scenarios is critical to understanding and managing carbon asset risk, the lack of transparency around the results of such analyses on the profitability and viability of specific projects or types of resources is an area where engagement must continue.

SECTION II

LEARNING FROM RECENT MARKET AND ECONOMIC DEVELOPMENTS – HIGH VOLATILITY, RISING RISKS.

The key economic concept in carbon asset risk is of course “risk”. There are many technical definitions of this and different approaches to managing it, both as a company and an investor.

However, one of the most simple is that of volatility. The operational economics of an oil field obviously relate mostly to the oil price received. If that falls substantially and becomes more volatile then the project economics of oil become more uncertain and risky. Crucially the “hurdle rate” return companies should apply when they are deciding whether to sanction a project for development must reflect at least this key component. This depends on the perceived risk of investing in fossil fuel projects compared to other lower risk opportunities. We can call this the ‘fossil fuel risk premium’

The steep fall in the price of oil since the middle of last year has brought volatility back to the market with a vengeance, after three years of generally range-bound trading where the Brent price hovered around the \$110/bbl level.

Following this period of relative price stability, investors and oil companies alike have been sharply reminded that they are trading commodities where pricing cannot be taken for granted; volatility and hence risk are inherent.

The drivers for this have been discussed in great detail by many commentators. The most generally agreed driver is of course the shift in Saudi policy towards focus on their market share from price support focus in OPEC. The question then becomes what drove that?

The Saudi Oil Minister Sheikh al-Naimi crystallized the key trends driving this move in remarks he made in Berlin:

[W]e have seen higher production from oil fields that are more costly to develop or operate, such as in the arctic, deep offshore, heavy oils in Canada and Venezuela, and shale oil deposits in the US..... If you add into this speculation about a future oil glut and potential falling demand, you get falling prices

During periods of rapid price movement, up or down, there is often a frenzy of commentary ascribing various bizarre theories and motives – about collusion or conspiracy – to OPEC and to major producers, most notably Saudi Arabia. With the recent price drop, OPEC and Saudi Arabia have yet again been maliciously – and unfairly – criticized for what is, in reality, a market reaction. Some speak of OPEC’s “war on shale”, others claim “OPEC is dead.” Theories abound. They are all wrong.

Over the past eight months, though, with the market in surplus, it is Saudi Arabia that is called upon to make swift and dramatic cuts in production. This policy was tried in the 1980s and it

was not a success. We will not make the same mistake again. Today, it is not the role of Saudi Arabia, or certain other OPEC nations, to subsidize higher cost producers by ceding market share. And the facts on the ground are very different anyway. Non-OPEC supplies are much larger than they were in the 1980s and a much more multi-national approach is required.

“Over the long term, the facts are indisputable. The world’s population is increasing, the global middle class is expanding, and the demand for energy will rise accordingly. Access to reliable and stable energy supplies will help improve global living standards, increase educational levels and boost economies worldwide. In this, I believe all nations are in agreement. We have a shared responsibility to create the conditions that can make this happen. In terms of oil, the global market is large and growing, albeit slowly at the moment. But I believe there is room for all producers. Of course, during periods when supply growth outpaces demand, the lowest-cost producers will inevitably have an edge over higher cost marginal producers. Saudi Arabia, blessed with a massive hydrocarbon resource base and some of the world’s largest conventional oilfields, enjoys very low production costs. And we are more efficient than other producers. It is an advantage which we will use, as any producer would, to help supply dependent global customers.”

Clearly Saudi Arabia is presenting this as straightforward long-term rationale economics. As the low cost producer, they are not prepared to cede market share to high cost producers. But in the long run they see demand growing, leaving room for all producers eventually.

Relating this to the Carbon Asset Risk Initiative and its risk issues yields the following observations:

- As expressed in Carbon Tracker’s Carbon Supply Curves-Oil Capital Expenditures⁷¹, OPEC and Saudi Arabia were identified as having the lowest cost supply and so the most “climate secure” oil if demand falls more than expected due to climate and other economic factors. Put another way, any battle for market share would see Saudi Arabia in particular as a winner in the long term.
- The list of high cost new marginal producers is the key focus of much CAR engagement “such as in the arctic, deep offshore, heavy oils in Canada and Venezuela, and shale oil deposits in the US.”
- Climate and longer-term environmental constraints are not mentioned by Sheikh al-Naimi at all.
- The key assumption is ultimately “Over the long term, the facts are indisputable. The world’s population is increasing, the global middle class is expanding, and the demand for energy will rise accordingly”. However the implicit assumption here would seem to be that increasing demand for energy means oil demand will rise. The premise behind the Carbon Asset Risk Initiative is that such an assumption ignores two key issues 1) how steeply advances in efficiency bend the demand curve downward, and 2) how quickly alternatives in the transport industry—particularly electrification—takes place. Notably, the alternatives in the electricity sector are already surpassing forecasts and dampening demand for coal and oil for power generation.
- There is evidence that while supply was the key issue in the recent oil price fall, demand growth has also disappointed as hinted at in al-Naimi’s comment about “potential falling demand.”

⁷¹ Carbon Tracker Initiative, Carbon Supply Curves: Evaluating Financial Risk to Oil Capital Expenditures (May 2014) available at <http://www.carbontracker.org/wp-content/uploads/2014/09/CTI-Oil-Report-Oil-May-2014-13-05.pdf>.



If the demand outlook is challenged, then the recent plunge in oil prices and return to volatility we have just witnessed becomes the new norm. That is, if increasing energy efficiencies, rapidly declining costs for renewable energy and energy storage, and climate-related regulation are here to stay, the demand forecasts of companies like Exxon, Chevron, and Shell will continue to underestimate the risk to continued capital expenditures on high cost unconventional projects.⁷² Under these circumstances, CTI and a growing number of analysts believe that actual demand for fossil fuels will disappoint industry expectations, and since it is clear that Saudi Arabia is not just going to sit by while every new source of supply eats into its market share, this mix spells continued uncertainty and periods of volatility.⁷³

It is clear from companies' responses to the investors that the majority of fossil fuel companies are not adequately factoring in these risks when choosing to press ahead with high-cost projects. A particularly stark example is Shell's decision to forge ahead with its plans to drill in the Arctic when every other company has at least deferred Arctic projects, if not cancelled them entirely. Increasingly, small percentage changes in the supply-demand balance can lead to dramatic price falls.

Indeed, various commentators see further volatility on the horizon, including the International Energy Agency (IEA).⁷⁴

The coal industry, meanwhile, has been facing strong headwinds and there are numerous indicators of a structural shift in demand for this sector as well. In fact, recent reports⁷⁵ indicating that Chinese coal demand may have peaked in 2014. Key factors include increased energy efficiency, competition from renewables and natural gas, increased regulatory risks and rising construction and production costs.

⁷² Carbon Tracker Initiative, *The Fossil Fuel Transition Blueprint*, at 14-15 (April 23, 2015) available at <http://www.carbontracker.org/wp-content/uploads/2015/04/Blueprint-Carbon-Tracker-230415.pdf>.

⁷³ Id.; Ashim Paun, HSBC, "Stranded Assets: What's Next?" (Apr. 16, 2015); Maria Galluci, "Goldman Sachs cuts oil price forecast" *Int'l Bus. Times* (May 18, 2015) available at <http://www.ibtimes.com/goldman-sachs-cuts-oil-price-forecast-downgrades-sector-outlook-cautious-1926998>.

⁷⁴ IEA Oil Market Report Online, available at <https://www.iea.org/oilmarketreport/>; Eric Yep and Nicole Friedman, "Oil's Big Swings are the New Normal," *Wall Street Journal* (Feb. 26, 2015) available at <http://www.wsj.com/articles/oil-prices-are-still-far-from-stable-1424973592>.

⁷⁵ Carbon Tracker Initiative, *The U.S. Coal Crash: Evidence for Structural Change*, (Mar. 2015) available at <http://www.carbontracker.org/report/the-us-coal-crash/>.

Regardless of whether current low prices in oil and coal persist or vanish, investors and companies must all learn the lessons and translate them into lasting changes in the way they look at fossil fuel investments.

Companies should be disciplined with capital and demanding of the returns they require from their developments, focusing their efforts on low-cost projects and cancelling those that are high-cost. Companies should also disclose the hurdle return rates/break even prices that they require, to reassure shareholders that the dangers have been recognized and are being managed.

The fossil fuel risk premium needs to be raised both by the companies themselves, and by investors assessing those companies.

SECTION III

MANAGING CARBON ASSET RISK

As former BP CEO (and current industry investor⁷⁶) John Browne noted in a speech last fall, climate change poses an “existential threat”⁷⁷ to the oil industry, which needs to fundamentally evolve its business model if it hopes to prosper in a carbon-constrained world.

His voice is one of many, ranging from Citigroup analysts⁷⁸ to Saudi Oil Minister Ali al-Naimi⁷⁹ to executives from oil sands companies,⁸⁰ that have begun to embrace the idea that global demand for oil may soon peak, due to a variety of factors that includes increasing global concern about climate change. Even absent aggressive global action on climate change, a variety of existing trends—from increased transportation efficiency in North America, to clear air regulation in China, to fuel switching in the petrochemical sector—are eroding demand in a significant way. Global action on climate change would simply exacerbate this demand destruction.

This runs counter to the predominant industry narrative that oil demand will grow robustly throughout the coming decades⁸¹, and given the industry’s current high cost structure it poses a fundamental threat to its long-term financial viability. Fossil fuel companies are spending hundreds of billions of dollars annually to find and develop additional resources. They base their investment decisions on forecasts that global energy supply will continue to be dominated by oil, gas and coal—forecasts that are consistent with a warming of four degrees Celsius or more, which the World Bank and other experts warn would have dire consequences for the economy and human civilization.

As discussed in more detail in Section 2, the steep decline in oil prices in recent months highlights the inherent volatility of fossil fuel markets and has offered a preview of how sensitive prices are to small shifts in supply and demand. As the world continues to reduce its reliance on fossil fuels, accelerate renewable energy growth and reduce overall carbon emissions to counter the threat of climate change, the risks of investing in fossil fuels and dealing in them will increase.

76 <http://www.riverstonelc.com/people/partners/lord-browne-of-madingley>.

77 <http://www.c-resource.com/lord-browne-calls-for-stronger-industry-action-on-climate-change/>.

78 <http://blogs.wsj.com/marketbeat/2013/03/27/citi-oil-demand-could-peak-by-end-of-decade/>.

79 <http://www.bloomberg.com/news/articles/2015-04-12/saudi-arabia-s-plan-to-extend-the-age-of-oil>.

80 <http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/oil-overflow-as-prices-slump-producers-grapple-with-a-new-reality/article20815601?page=all>.

81 <http://corporate.exxonmobil.com/en/energy/energy-outlook>.

Despite the fundamental nature of this threat, there is still time for the oil industry to embark upon a relatively orderly transition that would generate substantial value for shareholders. This is, in part, because the average reserve life index (RLI) in the industry is only ~12 years. In other words, there is a path forward that allows companies to exploit the reserves that are already on the books (and from which companies derive most of their current value) while at the same time making sure that new capital expenditures are allocated in a way that acknowledges the very real implications of carbon asset risk.

Given the importance of the energy sector to investor portfolios, and the potential for significant value generation at companies that manage the transition well, it is imperative that investors take steps to assess and manage their own carbon asset risk exposure and that of the companies they hold.

While carbon asset risk impacts different kinds of financial actors—from providers of capital to fixed income holders to equity investors—in different ways, this document focuses on the implications for asset owners invested in the public equity of oil and gas companies.

Investors have a critical role to play in pushing oil companies to examine carbon asset risk, evaluate the impacts of reaching the 2-degree scenario, and adapt their business models to meet the demands of a carbon-constrained world. As Section 1 highlighted, even in its earliest stages, the Carbon Asset Risk Initiative has begun to gain some meaningful ground. Still, the landscape is shifting quickly including: competition from falling costs of renewable energy; initiatives in China, India and the Middle East to deploy solar and wind in both the electric and transportation sectors; and a closing window for traditional fossil fuel companies to adapt their business models and diversify their portfolios to mitigate risk. Indeed, recent statements by the CEOs of Total, Statoil and Sinopec indicate a growing awareness by the oil and gas companies outside of North America of the need to shift their business models or risk being left behind.⁸²

There are many steps that investors can take to protect themselves and spur companies to action. The IEA and others have suggested several ways that companies can address the risks posed by climate change, including 1) reducing the carbon intensity of their assets; 2) divesting from their most carbon-intensive assets; 3) diversifying their business by investing in lower-carbon energy sources; and 4) in the event that they choose not to adapt, by winding down and returning capital to shareholders.

Asset owners must manage these risks at both the portfolio level and at the level of individual assets. At the portfolio level, asset owners should ask their managers, consultants and data providers to develop tools and services to assess and manage portfolio exposure to carbon asset risk. Potential strategies to address carbon asset risk at the portfolio level include diversification (both within sectors and between low- and high-carbon sectors) and portfolio tilting.

At the level of individual holdings, asset owners should focus their risk management on: 1) engagement with at-risk companies; and 2) engagement on public policy that reduces the macro risk of carbon asset risk.

Engagement With At-Risk Companies

Experience has demonstrated that engagement is an effective tool to change corporate behavior, including in the fossil fuel sector. Ceres worked with partners at IIGCC and IGCC to develop guidance for investors in their engagement with fossil fuel companies around carbon asset risk.⁸³ The goal of any engagement, we believe, should be to understand a company's current approach to assessing

⁸² <http://www.forbes.com/sites/jeffmcmahon/2015/06/10/oil-giant-statoil-predicts-carbon-emissions-will-limit-economic-growth/>; <http://www.bloomberg.com/news/articles/2015-04-01/china-s-fuel-demand-to-peak-sooner-than-oil-giants-expect>.

⁸³ <http://www.iigcc.org/publications/publication/investor-expectations-oil-and-gas-company-strategy>.



and managing carbon asset risk and to then engage companies around the integration of these considerations into the capital allocation process and major decisions to acquire, dispose, develop or halt development of specific assets.

The investor expectations document laid out the following five expectations for companies on carbon asset risk that should serve as the foundation for any engagement:

1. GOVERNANCE

EXPECTATION: Clearly define board and management governance processes to ensure adequate oversight of climate change risk and the strategic implications of a transition to low carbon energy systems.

2. STRATEGY

EXPECTATION: Integrate the management of climate change risks and opportunities into business strategy and ensure business models are robust and resilient in the face of a range of energy demand scenarios through appropriate stress testing.

3. IMPLEMENTATION

EXPECTATION: Embed 'stress testing' within key business processes and investment decisions.

4. TRANSPARENCY & DISCLOSURE

EXPECTATION: Disclose in annual reports and/or on the corporate website the company's view of and response to its material climate change risks and opportunities and the key assumptions used.

5. PUBLIC POLICY

EXPECTATION: Engage with public policy makers and other stakeholders in support of cost-effective policy measures to mitigate climate change risks and support low carbon investments, such as those advocated for in the 2014 Global Investor Statement on Climate Change. Ensure there is broad oversight and transparency about the company's lobbying activity and political spending on this topic and related energy and regulatory issues.

Currently, investors engaged through the Global Investor Coalition are meeting with the 45 companies initially targeted by the Carbon Asset Risk Initiative to discuss actions related to these expectations and track results in moving companies along the path to meet each of the expectations. Investors plan to be able to benchmark company performance in integrating practices that achieve compliance with these expectations towards the end of 2015 or early 2016. This process of tracking company progress will provide a powerful tool for investors to gauge how well companies are addressing carbon asset risk and which companies are falling even further behind.

Engagement with Policymakers

In addition to engaging directly with companies in their portfolio, asset owners should prioritize engagement with policymakers as a way to reduce the overall macro risk facing the fossil fuel sector (and investors' portfolios). Public policy that provides long-term certainty to companies and investors while reducing the risks associated with unmitigated climate change is a win-win-win for industry, investors, and the public at large. The markets will respond to clear price signals for carbon and long-term price signals are important to allow all market participants to adapt.

Public policy engagement can focus on a range of issues, including the scale and scope of costs being applied to carbon, adaptation to the physical impacts of climate change, and disclosure. Investors have increasingly been leaders in calling for strong regulations and policies to address climate change in the United States and globally.

Disclosure is a topic of particular interest to investors, who have struggled with a lack of actionable data with which to appropriately assess and manage carbon asset risk, despite SEC guidance on the issue dating to 2010.⁸⁴ In some cases the disclosure gap can be closed via direct engagement with companies, but the problem is unlikely to be solved until the SEC treats the issue with greater seriousness as discussed above. Investors have played a key role in providing important information and analysis to the SEC while calling for more action.⁸⁵

New opportunities for engagement on the issue of systemic risk are also on the rise. Ahead of the meeting of G7 Finance Ministers in Germany, 120 investor CEOs with \$12 trillion in assets released an open letter to finance ministers urging them to support the inclusion of a long-term emissions reduction goal in the international climate agreement due to be sealed in Paris in December.⁸⁶ This is the first time a global coalition of investors has called for a long-term emissions reduction goal to be included in the Paris agreement. The letter was coordinated by IIGCC in Europe, Ceres' Investor Network on Climate Risk (INCR) in North America, IGCC in Australia/New Zealand, ASrIA's Asia Investor Group on Climate Change (AIGCC) and the PRI. The Bank of England is in the midst of conducting an inquiry on the potential systemic risks posed to insurers from climate change,⁸⁷ and France has mandated the measurement of carbon footprints for all listed companies.⁸⁸ In addition, the G20 has called upon the International Financial Stability Board to open an inquiry into the systemic risks of stranded assets, and the G20 countries including the United States and China have committed to conducting their own analysis.⁸⁹ Investors can and should play an important role maintaining the momentum for these actions and ensuring that they produce results.

84 <https://www.ceres.org/resources/reports/cool-response-the-sec-corporate-climate-change-reporting/view>.

85 <https://www.ceres.org/press/press-releases/investors-push-sec-to-require-stronger-climate-risk-disclosure-by-fossil-fuel-companies>.

86 <http://www.ceres.org/press/press-releases/120-ceos-managing-12-trillion-urge-finance-ministers-to-support-a-long-term-emissions-reduction-goal-in-global-climate-deal>

87 <http://www.telegraph.co.uk/finance/economics/11633745/Fossil-industry-faces-a-perfect-political-and-technological-storm.html>

88 <http://www.investmenteurope.net/regions/france/french-institutional-investors-to-disclose-carbon-footprint/>

89 <http://www.telegraph.co.uk/finance/11563768/G20-to-probe-carbon-bubble-risk-to-global-financial-system.html>



CONCLUSION

The Carbon Asset Risk Initiative has come of age in a short time, and the momentum continues to build. Each of the last three years has seen a record number of shareholder resolutions filed on the issue of climate, and the numbers of investors calling on companies, regulators, and policymakers to reign in carbon asset risk is growing. Critically, the continued innovation and investment in clean energy technologies combined with the skyrocketing costs of chasing unconventional oil has exposed just how vulnerable the fossil fuel industry remains to even small shifts in demand and a myriad of other factors.

Maintaining this momentum through Paris and beyond is vital to achieving the goal of limiting global temperature rise to no more than 2 degrees Celcius. The next phase of the Carbon Asset Risk Initiative must take advantage of the inroads that have been made with proxy access to better engage the boards at companies like Exxon and Chevron; follow through with the successful reporting resolutions adopted at Shell, BP and Statoil; and perhaps most importantly, take aim at changing the capital planning processes that have yet to integrate the changing face of the energy system.

APPENDIX

Carbon Asset Risk-Related Shareholder Resolutions filed since 2013:

OIL AND GAS			
ANADARKO			
Year	Subject	Shareholder	Outcome
2014	Carbon Asset Risk	As You Sow	30%
2015	Carbon Asset Risk	As You Sow	29.1%
2015	Proxy Access	New York City Comptroller	59.4%
APACHE			
Year	Subject	Shareholder	Outcome
2015	Proxy Access	New York City Comptroller	92.7%
BP			
Year	Subject	Shareholder	Outcome
2015	Carbon Asset Risk	Aiming for A Coalition led by CCLA, LAPFF, co-filers include:	98.28%
CHESAPEAKE			
Year	Subject	Shareholder	Outcome
2015	Carbon Asset Risk	Unitarian Universalist Association	11.5%
CHEVRON			
Year	Subject	Shareholder	Outcome
2013	Carbon Asset Risk	Christopher Reynolds Foundation	7.6%
2013	Fracking Impacts	Sisters of St. Francis	30.2%
2014	Carbon Asset Risk	As You Sow	Challenged-Omitted
2014	Governance	New York State Comptroller	21.4%
2014	Review public policy	Christopher Reynolds Foundation	Withdrawn

2015	Return capital to investors rather than continue to invest in high risk projects	As You Sow	3.2%
2015	Set science-based targets for reducing greenhouse gas emissions including those embedded in reserves	Tri-State Coalition	8.2%
2015	Revise Executive Compensation to link to Environment, Social Governance	Needmor Fund	27.9%- Withdrawn
2015	Report on public policy processes and spending with respect to climate and energy	Christopher Reynolds Foundation	27.9
2015	Add a board member with environmental expertise	New York State Common Retirement Fund	19.9%
2015	Proxy Access	New York City Office of the Comptroller	55.3%

CONOCOPHILLIPS

Year	Subject	Shareholder	Outcome
2013	GHG reduction	Presbyterian Church (USA)	29.4%
2014	GHG reduction	Presbyterian Church (USA)	25.8%
2014	Review of public policy	Needmore Fund	Withdrawn
2015	Lobbying disclosure	Walden Asset Management	26.8%
2015	Executive Compensation linked to ESG and Carbon Asset Risk	Unitarian Universalist Association	5.8%
2015	Proxy Access	New York City Comptroller	54.3%

DEVON ENERGY CORPORATION

Year	Subject	Shareholder	Outcome
2014	Carbon Asset Risk	New York State Comptroller	20.5%
2015	Public Policy Review	Unitarian Universalist Association	23.2%
2015	Carbon Asset Risk	New York State Common Retirement Fund	23.2%
2015	Proxy Access	New York City Comptroller	58.2%

EOG RESOURCES

Year	Subject	Shareholder	Outcome
2014	Report on Methane	Trillium Asset Management	28%
2014	Energy Efficiency	CalSTRS	Withdrawn
2015	Report on Methane	Trillium Asset Management	31.55%
2015	Proxy Access	New York City Comptroller	50.7%

EXXONMOBIL			
Year	Subject	Shareholder	Outcome
2013	GHG reductions	Tri-State Coalition	26.7%
2013	Hydraulic Fracturing Report	New York City Comptroller	30.2%
2013	Climate Risk Report	Christopher Reynolds Foundation	Omitted
2014	Report on Assumptions for Carbon Asset Risk	Christopher Reynolds Foundation	Withdrawn; Company addressing through further engagement
2014	GHG reductions	Tri-State Coalition	22%
2014	Review of public policy advocacy	Province of St. Joseph of the Capuchin Order	Withdrawn
2014	Hydraulic Fracturing Report	New York City Comptroller	Withdrawn; Company issued report
2014	Carbon Asset Risk Report	Arjuna Capital	Withdrawn; Company addressed with Carbon Asset Risk Report
2015	Proxy Access	New York City Comptroller	49.4%
2015	Return capital to shareholders	Arjuna Capital	Omitted
2015	GHG reductions	Tri-State Coalition	9.6%
2015	Independent Board member with climate expertise	Province of St. Joseph of the Capuchin Order	21%
2015	Executive Compensation tied to ESG	Needmor Fund	Withdrawn

HESS			
Year	Subject	Shareholder	Outcome
2014	Carbon Asset Risk	Connecticut Office of the State Treasurer	8.4%
2014	Methane Emissions	Arjuna Capital	Withdrawn; company will address
2015	Carbon Asset Risk	As You Sow, co-filer, Connecticut Office of the State Treasurer	23.36%
2015	Proxy Access	New York City Comptroller	51.1%

OCCIDENTAL PETROLEUM			
Year	Subject	Shareholder	Outcome
2014	Report on flaring and methane emissions	Arjuna Capital	30%
2015	Set targets for reduction of methane emissions	Arjuna Capital	33%
2015	Proxy Access	New York City Comptroller	62%

ROYAL DUTCH SHELL			
Year	Subject	Shareholder	Outcome
2015	Carbon Asset Risk	Aiming for A Coalition, led by CCLA and LAPFF, co-filers include:	98.9%

STATOIL			
Year	Subject	Shareholder	Outcome
2015	Carbon Asset Risk	Aiming for A Coalition	99.95%

COAL			
ALPHA NATURAL RESOURCES			
Year	Subject	Shareholder	Outcome
2013	Climate Risk Report	Unitarian Universalist Association	18%
2014	Carbon Asset Risk	Unitarian Universalist Association	23.3%
2015	Proxy Access	New York City Comptroller	61.7%

ARCH COAL			
Year	Subject	Shareholder	Outcome
2015	Proxy Access	New York City Comptroller	36.3%

CONSOL ENERGY			
Year	Subject	Shareholder	Outcome
2013	Carbon Asset Risk	As You Sow	19.7%
2014	Carbon Asset Risk	As You Sow	17.9%
2015	Carbon Asset Risk	As You Sow	11.2%
2015	Proxy Access	New York City Comptroller	47%

PEABODY ENERGY CORPORATION			
Year	Subject	Shareholder	Outcome
2014	Carbon Asset Risk	Connecticut Office of the State Treasurer	Withdrawn
2015	Proxy Access	New York City Comptroller	48.7%

ELECTRIC

AES

Year	Subject	Shareholder	Outcome
2014	Sustainability Reporting	Laborers' International Union of North America	Withdrawn;
2015	Proxy Access	New York City Comptroller	66.4%

AMERICAN ELECTRIC POWER

Year	Subject	Shareholder	Outcome
2014	Review public policy advocacy on energy and climate	Unitarian Universalist Association	Withdrawn
2015	Proxy Access	New York City Comptroller	67.2%

DUKE ENERGY

Year	Subject	Shareholder	Outcome
2015	Proxy Access	New York City Comptroller	62.7%

FIRST ENERGY

Year	Subject	Shareholder	Outcome
2014	Adopt policies to reduce emissions in line with U.S. goals and address Carbon Asset Risk	New York State Comptroller	Withdrawn
2015	Quantitative goals for reducing GHG emissions	Calvert Asset Management Company, Inc.	19.4%
2015	Proxy Access	New York City Comptroller	71.4%

SOUTHERN COMPANY

Year	Subject	Shareholder	Outcome
2014	Adopt policies to reduce emissions in line with U.S. goals and address Carbon Asset Risk	As You Sow	Withdrawn
2015	Quantitative goals for reducing GHG emissions	Sisters of Charity of St. Elizabeth	22.1%
2015	Proxy Access	New York City Comptroller	46.2%





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