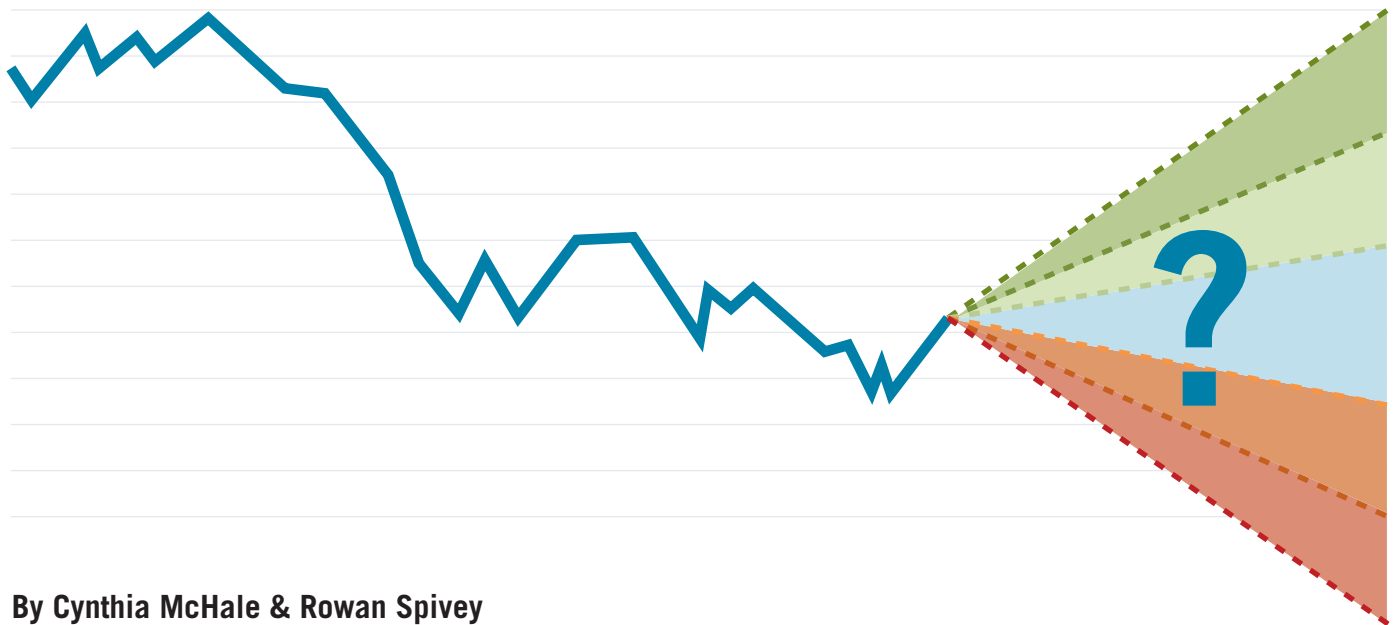




ASSETS OR LIABILITIES?

Fossil Fuel Investments of Leading U.S. Insurers



By Cynthia McHale & Rowan Spivey
Created in collaboration with Mercer.

June 2016

ABOUT CERES

Ceres is a nonprofit organization advocating for sustainability leadership. It mobilizes a powerful network of investors, companies and public interest groups to accelerate and expand the adoption of sustainable business practices and solutions to build a healthy global economy. Ceres also directs the Investor Network on Climate Risk (INCR), a network of over 120 institutional investors with collective assets totaling over \$14 trillion. For more information, visit www.ceres.org or follow Ceres on Twitter: @CeresNews.

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The opinions expressed in this report are those of Ceres and do not necessarily reflect the views of reviewers.

This version of the report includes corrected data regarding the major oil and gas investee companies of the top ten insurers which is shown in Figure 3.3.

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Contents

| | |
|--|-----------|
| ACKNOWLEDGEMENTS | 2 |
| EXECUTIVE SUMMARY | 4 |
| SECTION 1: OVERVIEW OF CARBON ASSET RISK | 12 |
| 1 · Introduction | |
| 2 · Carbon Asset Risk Factors | |
| 3 · Implications for Institutional Investors | |
| SECTION 2: INSURERS AS INVESTORS | 19 |
| 1 · Insurers' Asset Allocations | |
| 2 · Effect of Oil Price Volatility | |
| 3 · Insurer, Rating Agency, and Regulatory Responses | |
| SECTION 3: FOSSIL FUEL INVESTMENTS OF THE TOP FORTY U.S. INSURANCE GROUPS | 23 |
| 1 · Methodology | |
| 2 · Key Findings | |
| 3 · Summary | |
| SECTION 4: INSURER FINANCIAL STABILITY AND MARKET OVERSIGHT | 34 |
| 1 · NAIC Capital Markets and Investment Analysis Office | |
| 2 · Insurer Financial Supervision | |
| SECTION 5: SUMMARY OF RECOMMENDED ACTIONS | 40 |
| 1 · Insurance Companies/Groups | |
| 2 · Industry Regulators | |
| 3 · NAIC Capital Markets and Investment Analysis Office | |
| 4 · Financial Stability Board Task Force on Climate-Related Financial Disclosures | |
| APPENDICES | 44 |
| A: List of Insurance Groups Analyzed | |
| B: Bloomberg Industry Classification Definitions and Methodology | |
| C: Suggestions for Future Research | |
| D: Details of Insurance Group Bond Investments in Oil & Gas | |
| E: Details of Insurance Group Bond Investments in Utilities | |
| F: Details of Insurance Group Bond Investments in Coal | |

Executive Summary

Global energy transformation has significant implications for fossil fuel companies and their investors.

A global clean energy transition is underway. In 2015, investments in clean energy—including renewables such as wind and solar, as well as energy efficiency—far outstripped investments in traditional, high-carbon fossil fuel infrastructure such as coal, oil and gas power plants and distribution systems.¹ The successful outcome of the December 2015 U.N. Framework Convention on Climate Change Conference in Paris (referred to as COP21) was a turning point. Those negotiations concluded with the adoption by 196 countries of the Paris Agreement, described as *a universal pact that sets the world on a course to a zero-carbon, resilient, prosperous and fair future*.² Implementation of the Paris Agreement will significantly accelerate clean energy investments, with the aim of making renewables more cost effective and widely available than ever before, in all corners of the world.

This energy transformation has significant implications for fossil fuel companies and their investors. Worldwide, it has been estimated that a third of oil reserves, half of natural gas reserves and over 80 percent of coal reserves from 2010 to 2050 will need to remain unused to meet the Paris Agreement commitment to limit global temperature rise to well below two degrees Celsius.³ The concept of carbon asset risk (CAR)—that a significant quantity of the world’s fossil fuel resources will be left in the ground, and that both these high-carbon fuel resources and associated fossil fuel infrastructure will become stranded assets—is gaining traction as Wall Street analysts, investors, regulators and governments increasingly recognize this as a significant and actionable financial risk that must be addressed.⁴

Several studies released in 2015 highlighted that institutional investors face exposure to a range of climate change related risks, including carbon asset risk. *Investing in a Time of Climate Change*, published by the investment consulting group Mercer with support from sixteen investor partners, the International Finance Corporation and the UK Department for International Development, concluded that annual investment returns for coal, oil, gas and utilities will be the most negatively impacted of all industry sub-sectors evaluated, and that the biggest impacts will be in the next decade.⁵ In essence, after long being considered “safe” core investments, oil, gas, coal and utilities are becoming more risky for the world’s investors.

This new Ceres report, *Assets or Liabilities? Fossil Fuel Investments of Leading U.S. Insurers*, focuses on the risks to insurance companies—the second-largest type of institutional investor after pension funds based on assets under management.⁶ U.S. insurers’ year-end 2014 statutory financial statements show the industry owned cash and invested assets totaling just under \$6 trillion.^{7,8} It is already well understood by U.S. insurance regulators that insurers’

1 *Renewable Energy Investments: Major Milestones Reached, New World Record Set*, March 24, 2016, United Nations Environment Program (UNEP), March 24, 2016, <http://unep.org/newscentre/default.aspx?ArticleID=36112&DocumentID=27068>

2 David Waskow and Jennifer Morgan, *The Paris Agreement: Turning Point for a Climate Solution*. World Resources Institute, December 12, 2015. Retrieved online at <http://www.wri.org/blog/2015/12/paris-agreement-turning-point-climate-solution>.

3 Christophe McGlade and Paul Elkins, *The geographical distribution of fossil fuels unused when limiting global warming to 2C*. Nature International Weekly Journal of Science, January 8, 2015. Retrieved online at http://www.collectif-scientifique-gaz-de-schiste.com/fr/accueil/images/pdf/texteschois/McGlade_et_al-2015-Nature.pdf.

4 *Carbon Asset Risk: From Rhetoric to Action*. Ceres, October 16, 2015. Retrieved online at <https://www.ceres.org/resources/reports/carbon-asset-risk-from-rhetoric-to-action/view>.

5 *Investing in a Time of Climate Change*. Mercer, July 2015. Retrieved online at 2015 <http://www.mercer.com/content/dam/mercer/attachments/global/investments/mercer-climate-change-report-2015.pdf>.

6 Serdar Çelik and Mats Isaksson, *Institutional investors and ownership engagement*, OECD Journal Financial Market Trends, 2014. Retrieved online at <http://www.oecd.org/corporate/institutional-investors-ownership-engagement.pdf>.

7 *Capital Markets Special Report, Year-End 2014 Insurance Industry Investment Portfolio Asset Allocations*, June 22, 2015, National Association of Insurance Commissioners (NAIC) Center for Insurance Policy Research, http://www.naic.org/capital_markets_archive.htm.

8 According to the *Annual Report on the Insurance Industry* published by the Federal Insurance Office, U.S. Department of the Treasury, in September 2015, the life/health and property/casualty insurance sectors held assets totaling \$8.1 trillion at year-end 2014. It is presumed that the difference between the total U.S. insurance industry assets of \$5.7 trillion reported by the NAIC and the \$8.1 trillion reported by the Federal Insurance Office is due to the inclusion of \$2.4 trillion held in separate accounts, which is included in the larger figure.

massive bond and equity holdings expose them to both credit risk (the risk that a particular investee company will default), and systemic/market risk including macroeconomic factors such as interest rate fluctuations. As insurers also face uncertainty related to the size and timing of their insured loss payouts, insurance regulators require companies to invest conservatively so they can meet their financial obligations and remain financially stable.

In light of these factors, as well as the crucial role of insurers in providing a safety net in the face of climate change and other risks, Ceres believes that an examination of individual insurers' (or insurance groups') potential exposure to carbon asset risk is warranted and timely. A December 2015 Standard & Poor's (S&P) Rating Services report concluded that climate change is a greater threat to insurance companies than has been previously recognized, particularly in regard to insurers' investments.⁹ Through an analysis that drew on the work of other experts including Mercer and Risk Management Solutions (RMS), S&P calculated the likely erosion of insurers' capital adequacy, and concluded that increasing risks related to climate change may require insurers to hold higher levels of capital. The investment impact on insurers' capital adequacy is expected to be greater than the weather-related impact for all types of insurers analyzed.

However, despite growing awareness of insurers' portfolio risks related to climate change, including carbon asset risk, it is unclear whether insurers have taken action to identify and evaluate their potential investment exposure, both of which are necessary before implementing strategies to reduce identified threats.

CERES' ANALYSIS OF THE TOP 40 U.S. INSURANCE GROUP ASSETS

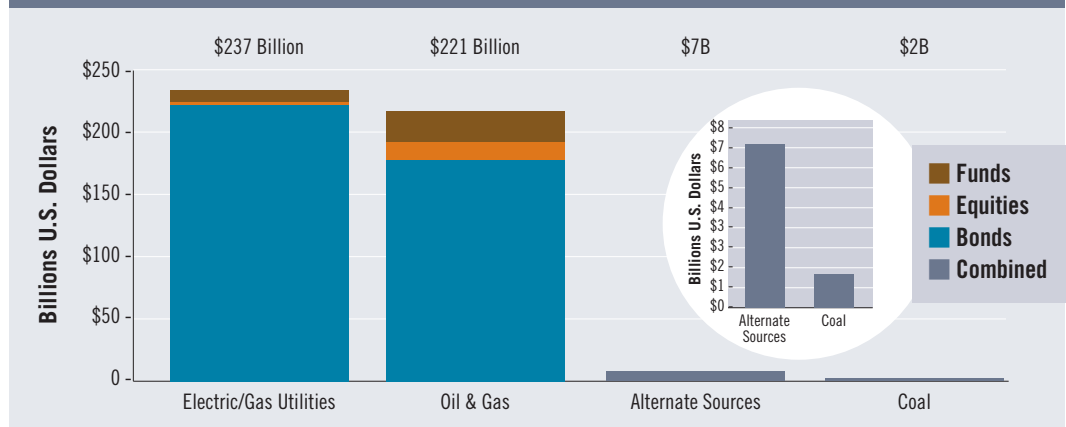
Building off the work of Ceres' Carbon Asset Risk Initiative,¹⁰ Ceres examined investments (bonds, common stock, and preferred stock) in the coal, oil, gas and electric/gas utilities sectors of the forty largest U.S. insurance groups. This examination of the fossil fuel holdings of insurers was feasible due to the industry's publicly available statutory financial statements, which provide a unique opportunity to conduct detailed analyses of the companies' energy assets. For this analysis, Ceres evaluated investment data from NAIC Schedule D within the statutory financial statements and used the fair market value of investments in bonds, common stocks and preferred stocks, as of December 31, 2014. Key findings from Ceres' review are summarized below.

Leading U.S. insurers are substantial investors in the fossil fuel energy and electric/gas utility sectors. Cumulatively, the insurance groups analyzed owned investments of nearly a half-trillion dollars (\$459 billion) in oil and gas, coal, and electric/gas utilities at the end of 2014—an amount roughly equal to the GDP of Norway. The \$459 billion includes investments of \$237 billion in electric/gas utilities, \$221 billion in oil and gas companies, and just under \$2 billion in coal companies. (See **Figure ES.1** below). This amount would likely be greater if Ceres had included all of the insurance groups' fund investments and other schedules of the insurers' statutory financial statements, which included additional fossil fuel holdings that were not analyzed due to their added complexity.

9 Insights, *Climate Risk: Rising Tides Rising Stakes*. Standard & Poor's Rating Services, December 2015. Retrieved online at <https://www.spratings.com/documents/20184/984172/Insights+Magazine+-+December+2015/cff352af-4f50-4f15-a765-f56dcd4ee5c8>.

10 For more information on Ceres Carbon Asset Risk initiative go to www.ceres.org/issues/carbon-asset-risk.

FIGURE ES.1: TOP 40 INSURANCE GROUPS: SCHEDULE D INVESTMENTS IN UTILITIES, OIL & GAS, ALTERNATE SOURCES AND COAL (AS OF 12/31/14)



With regard to insurers’ oil and gas investments, the vast majority—81 percent—were held in bonds issued by fossil fuel companies used to finance extraction and other capital expenditure (capex), and to provide working capital. Recently, the largest oil and gas companies are also selling bonds to cover the cost of annual shareholder dividends. In the case of ExxonMobil, the company’s total shareholder dividend payment was in excess of \$12 billion and the oil company did not generate adequate cash from operations to cover this amount.¹¹

Coal investments were a small portion of the forty insurance groups’ bond and equity holdings—\$1.8 billion as of December 31, 2014—in part because the market value of U.S. coal companies has fallen. According to a report by SNL Energy, the total market capitalization of thirteen selected publicly traded coal companies shrunk by 74 percent between August 2014 and October 2015 (from about \$26 billion in August 2014 to under \$7 billion in early October 2015).¹² U.S. insurers’ coal holdings are miniscule in comparison to their oil and gas and utility investments. Accordingly, while coal is a sector some insurers are publicly mobilizing to manage in their investments, it is not the sector that poses the largest forward-looking investment risk to insurers as a whole.

Insurers’ alternative energy (including renewables) investments were small, but significantly greater than companies’ coal holdings. The forty insurance groups had \$7.2 billion invested in renewable energy, an amount dwarfed by their oil and gas and utilities holdings, yet significantly larger than total coal holdings of \$1.8 billion. (Note that this clean energy figure does not include direct investments in clean energy projects, which are not included in Schedule D.) Some insurance groups are starting to invest more in clean energy and are stepping up public commitments for additional investments. While this is a positive trend, insurers’ collective investments in this sector do not match the pace and scale of the clean energy transition currently underway. In the same Mercer study referenced above, renewable energy was highlighted as the sector offering greatest potential for additional returns. Depending on the scenario, average expected returns from renewables may increase from over six percent to as high as ten percent annually, Mercer estimated.¹³ (See **Figure ES.1** for a comparison of alternative energy investments versus coal investments).

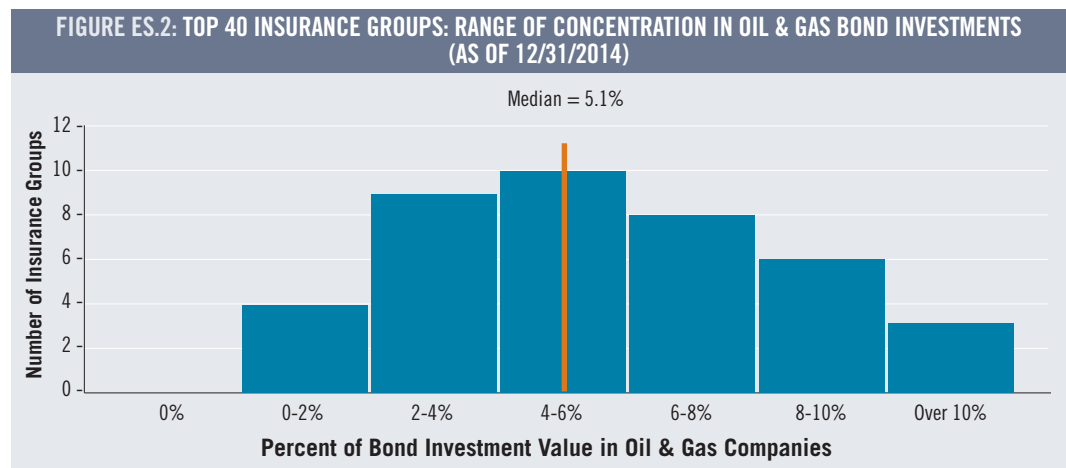
11 Nicole Bullock and Ed Crook, “ExxonMobil sells \$12bn of bonds amid rise in borrowings,” *Financial Times*, February 29, 2016. Retrieved online at <https://next.ft.com/content/78e76856-df38-11e5-b072-006d8d362ba3>.

Notably, ExxonMobil Chairman, President and CEO Rex Tillerson is the largest direct shareholder of ExxonMobile with over 2.5 million shares as of December 2015.

12 Christopher Coats, *SNL: U.S. Coal Valuations Continue to Drop*. IEEFA, October 22, 2015. Retrieved online at <http://ieefa.org/snl-u-s-coal-valuations-continue-to-drop/>.

13 *Investing in a Time of Climate Change*. Mercer, July 2015. Retrieved online at 2015 <http://www.mercer.com/content/dam/mercer/attachments/global/investments/mercer-climate-change-report-2015.pdf>.

Certain insurance groups owned double the median bond portfolio concentration in the oil and gas sector. The forty groups had a range of concentrations with a median of 5.1 percent of their total bonds invested in the oil and gas sector (See **Figure ES.2** below). Notably, three insurance groups held significantly higher concentrations of oil and gas bonds—over 10 percent—which represents roughly double the median. These groups and their respective oil and gas bond investments as a portion of their total bond portfolios were **Ameriprise** (12.4 percent), **Lincoln National** (11.8 percent) and **Voya Financial** (10.9 percent). See the full list of all insurance groups in **Appendix D** of this report.



Oil and gas investments have been especially risky over the past two years as a result of prolonged low commodity prices. Just in North America sixty-nine oil and gas producers have filed for bankruptcy since the beginning of 2015 through May 2016. Bond ratings for oil and gas companies have also been broadly downgraded in recent months. In February 2016, Standard & Poor’s Rating Services cut the ratings of Chevron, Apache and eight other U.S. oil and gas exploration and production companies, citing the drop in crude oil prices.¹⁴ Ceres analyzed the specific oil and gas company investments (bonds and equities) of the top ten insurers. The results showed that most of the top twenty five oil and gas investee companies (reflecting almost \$50 billion in cumulative investments) have been subject to some form of credit downgrade by S&P or Moody’s during 2015 and 2016. (See **Figure 3.3** on page 25.)

Some of the largest oil and gas producers, including ExxonMobil, face even greater financial risk since they now must respond to investigations and potential litigation over thwarting action on climate change, in addition to the damage caused to the environment and human health from oil spills such as the BP Gulf of Mexico spill and natural gas leaks such as the Aliso Canyon disaster in 2015 in California. In November 2015, the New York Attorney General opened an investigation to determine if Exxon deliberately misled shareholders about the financial risks of climate change to its business.¹⁵ California Attorney General Kamala Harris has since launched a similar investigation,¹⁶ as have the Attorneys General of Massachusetts and the U.S. Virgin Islands.

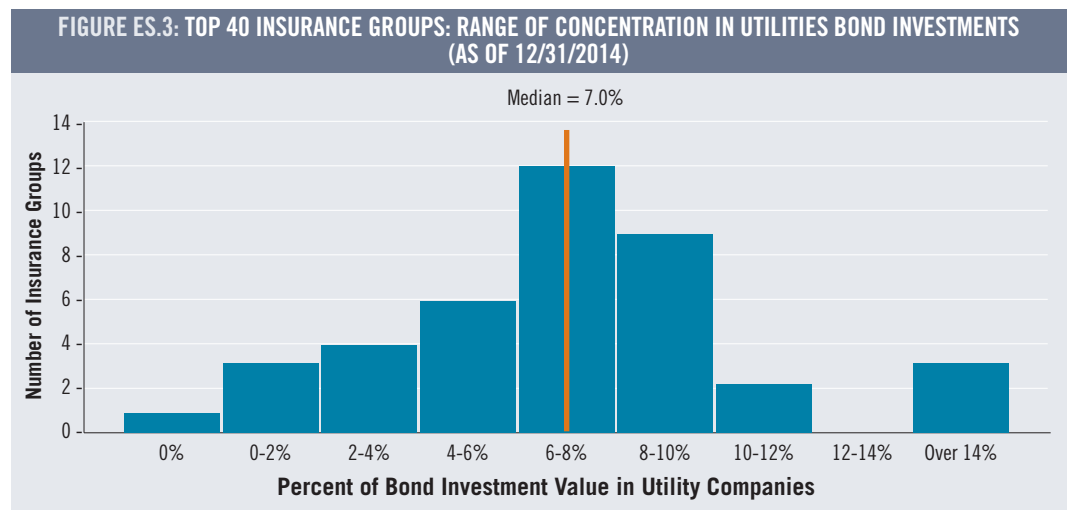
14 Ed Crooks and Eric Platt, “Standard & Poor’s cuts ratings of US oil and gas groups,” *Financial Times*, February 2, 2016. Retrieved online at <https://next.ft.com/content/46395110-ca09-11e5-be0b-b7ece4e953a0>

15 Justin Gillis and Clifford Krauss, *Exxon Mobil Investigated for Possible Climate Change Lies by New York Attorney General*. The New York Times, November 5, 2015. Retrieved online at www.nytimes.com/2015/11/06/science/exxon-mobil-under-investigation-in-new-york-over-climate-statements.html?_r=0.

16 John Schwartz, *California said to Target Exxon in Climate Inquiry*. The New York Times, January 21, 2016. Retrieved online at www.nytimes.com/2016/01/21/science/california-said-to-target-exxon-in-climate-inquiry.html.

Other insurance groups owned double the median bond portfolio concentration in electric/gas utilities based on the forty insurance groups analyzed. The median concentration of bond investments in electric/gas utilities was 7.0 percent. (See **Figure ES.3** below). However, some insurance groups reported much larger concentrations of investments, and in the case of three insurance groups, double the median level. These companies are **John Hancock** (16.8 percent), **Pacific Life** (16.0 percent) and **Lincoln National** (14.4 percent), which all reported utility holdings that comprised over 14 percent of their bond portfolios. See the full list of all insurance groups in **Appendix E** of this report

Utilities have traditionally been a stable investment, providing reliable dividends and yields. Today, however, electric and gas utility investors are beginning to face complex carbon asset risk exposures. In essence, investors need to consider how emerging carbon asset risk may affect utilities and, in the case of electric power plants, the fuel sources used to generate power such as coal, natural gas and oil.¹⁷



Overall, the insurance groups analyzed have higher concentrations of fossil fuel and electric/gas utilities in their bond holdings compared to Barclays U.S. Aggregate Bond Index. Most U.S. institutional investors use Barclays U.S. Aggregate Bond Index as a standard fixed income benchmark. This index measures the investment grade, U.S. dollar-denominated, fixed-rate taxable bond market.^{18,19} By applying the same methodology Ceres used to analyze the top forty U.S. insurance groups to Barclays Bond Index, Ceres found that 3.9 percent of the index investments were in oil and gas energy sector bonds. By comparison, the forty insurance groups had a median concentration of 5.1 percent of their bonds in the oil and gas energy sector. (See **Figure ES.4** below). Twenty-seven of the insurers analyzed held higher concentrations of oil and gas investments than Barclays Index.

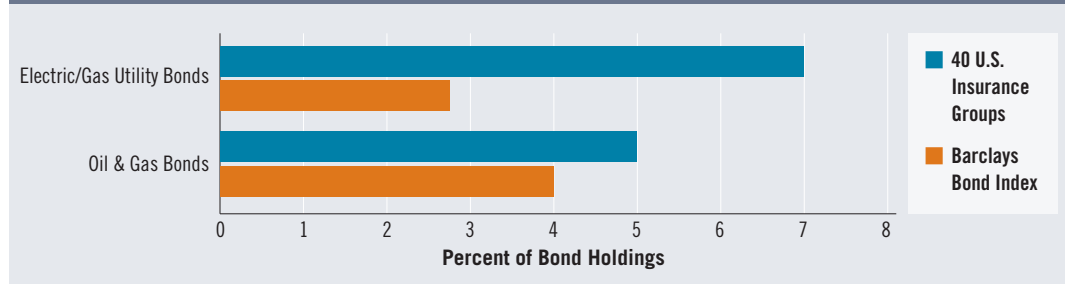
Ceres' analysis of Barclays US Aggregate Bond Index also revealed a sector concentration of 2.8 percent for electric/gas utilities, compared with a 7.0 percent median concentration for the forty insurance groups analyzed. This shows that insurers are higher in their exposure to electric and gas utilities relative to the broader market. In fact, 36 of the insurance groups analyzed had higher electric and gas utility sector concentration than Barclays U.S. Aggregate Bond Index.

¹⁷ For more information on the fuel mix of the 100 largest power producers, see Ceres' report *Benchmarking Air Emissions of the 100 Largest Electric Power Producers in the United States 2015* available online at <http://www.ceres.org/resources/reports/benchmarking-air-emissions-of-the-100-largest-electric-power-producers-in-the-unites-states-2015>.

¹⁸ Barclays, *Guides and Factsheets*. Retrieved online at https://index.barcap.com/Home/Guides_and_Factsheets.

¹⁹ Less than 6 percent of insurers' bond investments were below investment grade in 2014 according to the NAIC Capital Markets Bureau. For additional information see the NAIC Special Report, *Are Insurers Reaching for Yield in the Low Interest Rate Environment*. http://www.naic.org/capital_markets_archive/150702.htm.

FIGURE ES.4: AVERAGE SECTOR PERCENTAGE OF TOTAL BOND HOLDINGS OF 40 LARGEST INSURANCE GROUPS VS. BARCLAYS U.S. AGGREGATE BOND INDEX (AS OF 12/31/14)



It is important to emphasize that Ceres is not suggesting that insurers should necessarily seek to hold the same oil and gas, or utility bond concentrations as that of Barclays, or any other broader index. Rather, for all investors in fossil fuels and utilities, and particularly those holding higher concentrations, it is increasingly important that the investor analyze the degree to which these holdings may be exposed to asset stranding risk.

CONCLUSIONS AND RECOMMENDED ACTIONS

An energy sector-based portfolio analysis is a key first step insurance groups should be taking to understand their carbon asset risk exposure. A more granular analysis would reveal other factors, including the amount and credit quality of investments, the type and seniority of the financial stake, and specific characteristics of the investee company (i.e. the fossil fuel company which the insurer has invested in). It is crucial that insurers, industry regulators and market oversight bodies work together to keep abreast of these emerging investment risks to ensure that they are appropriately managed.

Insurance Companies

Climate change risk management is a board level governance issue and corporate directors of insurance companies should be actively involved in establishing and monitoring strategies to reduce wide-ranging climate-related investment risks, including carbon asset risk. Boards should consider requiring the insurers' Investment Policy Statements (IPS) to explicitly include a carbon asset or climate change risk management strategy, which the board would review on a regular basis. These strategies could be informed by top-down evaluations of investment portfolio risk (as demonstrated in Mercer's climate change research), bottom-up assessments of exposure to high-risk assets (as demonstrated in this report) or a range of actions in between.

Insurers need to know how the fossil fuel companies they are invested in are considering future demand shifts and to what extent there may be stranded-asset exposure. Engagement by insurers comes at a critical time given recent oil price declines, which are squeezing company earnings, and elevating concerns about future spending on expensive, risky projects that may be unprofitable in a low-carbon future. Dialogues between insurers and fossil fuel companies should focus on the extent to which oil and gas companies are adequately preparing for changing market dynamics, managing carbon asset risk, and evaluating potential threats they pose to investment returns and income streams.

On an operational level, climate change risk management, including carbon asset risk, needs to become an integral part of each insurer's overall Enterprise Risk Management approach.

Expertise from underwriting and risk management functions should be shared with the investment function and vice versa. It is likely that most insurers will need to develop internal staff expertise on carbon asset risk or access it externally so investments at the portfolio, asset class, sector and company level can be specifically evaluated. Ultimately, insurers need to be able to make informed strategic choices, aligned with each company's investment policy statement, to reduce potential carbon asset risk exposure, either through limiting investments in risky companies or by engaging with investee companies to address and mitigate potential carbon asset risk.

Insurance Regulators

Insurance regulators should assess the options available, adopt a universally recognized source for industry sector classifications and require insurers to disclose their fossil fuel investments using these classifications—for example, within their Supplemental Investment Risks Interrogatories. Based on data submitted through insurers' Supplemental Investment Risk Interrogatories, state insurance regulators could use the financial examination process to review the detailed risk register and determine whether insurers are appropriately managing their exposure to carbon asset risk in all aspects of their businesses.

Hypothetically, since an insurer's failure to adequately manage its exposure to carbon asset risk may have negative financial consequences for investors and insurance policyholders, it is recommended that **state insurance regulators consider implementing a data call, similar to the one announced in January 2016 by the California Department of Insurance requiring all insurers to publicly disclose carbon-based investments annually.**

Insurance regulators should also consider a number of additional actions to strengthen risk-focused surveillance on potential exposure to carbon asset risk. For instance, regulators could evaluate insurers' annually submitted Own Risk and Solvency Assessment (ORSA)²⁰ reports regarding management of this emerging risk consideration. Regulators on the NAIC's Valuation of Securities Task Force²¹ could also review the Securities Valuation Office's treatment of carbon asset risk in their ratings actions.

The National Association of Insurance Commissioners (NAIC)

The NAIC's risk-based capital (RBC) requirements operate as an early warning system for U.S. insurance regulators. The RBC formula calculates the minimum amount of capital required to support an insurer's overall business operations based on considerations of size and risk profile. In light of prospective risk considerations related to carbon-intensive assets, state insurance regulators should consider enhancements to the risk-based capital (RBC) formula to include fossil fuel sector concentration risk. It is noted that the RBC formula is already quite detailed as it pertains to investment risks, however fossil fuel concentration risk is not included. Therefore it seems both important and feasible to evaluate the merits of updating the formula to help identify insurers that may be weakly capitalized relative to their CAR exposure.

20 In November 2011, as part the NAIC Solvency Modernization Initiative, the NAIC adopted the U.S. Own Risk and Solvency Assessment (ORSA). An ORSA requires insurance companies to issue their own assessment of their current and future risk through an internal risk self-assessment process and it will allow regulators to form an enhanced view of an insurer's ability to withstand financial stress. To learn more about this go to http://www.naic.org/index_smi.htm.

21 The NAIC's Valuation of Securities Task Force provides regulatory leadership and expertise on investment risk. The Task Force also that governs how assessment tools, e.g. credit assessment, valuation and classification of insurer-owned securities, are used and how insight into investment risk is used for regulation. To learn more about this go to http://www.naic.org/committees_e_vos.htm.

Overall, state insurance regulators should consider directing the resources and expertise of the NAIC, especially its Capital Markets & Investments Analysis Office, to better understand how carbon asset risk might impact insurers' credit risks and systemic/market risks.

For example, it may be necessary to strengthen the NAIC's Securities Valuation Office (SVO) staff's credit assessment of relevant insurers' oil and gas, and electric power utility securities. **Given insurance regulators' reliance on authorized credit rating agencies, the NAIC SVO may want to work directly with credit rating agencies** to better understand the degree to which they take carbon asset risk into account in their credit assessments of fossil fuel energy companies and electric power utilities. Lastly, the NAIC's Capital Markets & Investments Analysis Office may need to assume a more active and transparent role in stress-testing companies' investment portfolio exposure to fossil fuel energy sectors on behalf of the state insurance regulators.

Regulators should consider directing the NAIC's Capital Markets Bureau (CMB) to conduct additional independent research and analysis on the potential impact of the full range of carbon asset risk factors on insurance sector portfolios. For instance, the CMB could consider including an analysis of insurers' overall holdings in the oil, gas, coal and electric/gas utility sectors to identify over-exposed portfolios. State insurance regulators could also direct the CMB to conduct detailed asset reviews to identify insurers with substantial carbon asset risk exposure.

Financial Stability Board (FSB) Task Force on Climate-Related Financial Disclosure (TCFD)

Ceres recommends that the FSB TCFD include the following disclosure guidance, applicable to all insurers as institutional investors, in order to provide greater transparency regarding insurer investments with the biggest carbon asset risk exposure. First, insurers should publicly disclose if and how carbon asset risk is being addressed within their governance and risk management processes. Insurers should also submit financial information regarding their fossil fuel investments and results of portfolio carbon asset risk analyses. Lastly, insurers should submit a description of their specific actions for managing and reducing the company's potential carbon asset risk.

1 Overview of Carbon Asset Risk

I • INTRODUCTION

The impact of climate change on the insurance sector is expected to be broad and deep, affecting companies' revenues, investments, overall profitability, and, for some insurers, their financial stability. Concerned about climate risks to insurers, regulatory oversight bodies, including the National Association of Insurance Commissioners (NAIC) in the U.S. and the Bank of England's Prudential Regulation Authority in the U.K.¹ have outlined three major categories of climate-related threats to the sector:

- ➔ **Physical impact risks** from climate change due to evolving weather patterns and sea-level rise resulting in economic damages and loss;
- ➔ **Legal liability risks** from climate litigation as a result of a wide range of issues including environmental liability, directors and officers liability, physical damage and loss, and subrogation;
- ➔ **Transitional and investment risks** from a broad group of impacts to assets and as the world moves away from fossil fuel energy sources including oil, gas, and coal.

Regarding physical impact risks, property insurers do not yet have a complete understanding of how climate change will likely drive higher claims, and possibly cause certain property and business interruption risks to become uninsurable. But the insurance sector, including catastrophe risk modeling firms, is making progress in how to effectively integrate changing weather patterns and sea-level rise into their models to better characterize the impact climate change may have on insured losses. With regard to legal liability risks (or the casualty side of property and casualty insurance), legal experts are monitoring and analyzing developments and the industries' collective understanding of climate litigation continues to evolve. Insurers appear to be paying close attention to this emerging risk category.

On the issue of investment risk, insurers and the industry's regulators are in the early stages of developing the expertise, insights, and strategies required to assess the threat of climate change to insurance company assets. This report focuses on exploring one type of climate change related investment risk for insurance companies, carbon asset risk, or CAR, and suggests a range of actions regulators and insurers could undertake to better measure, manage, and ultimately reduce the related threat to insurers' financial stability, i.e. greater volatility in investments and income streams as well as overall strength and consistency of earnings.²

This analysis of insurers' fossil fuel investments is set in the context of the profound global shift underway in our energy future. The energy transformation is being propelled by investments in renewable energy aimed at increasing energy security in addition to slowing and reversing climate change. Clean energy attracted \$329 billion in global investment in 2015, nearly six times its 2004 level.³ Furthermore, the December 2015 Paris Agreement, a break-through international climate change accord aimed at limiting warming to well below two degrees Celsius and endorsed by 196 nations, is expected to significantly accelerate this worldwide energy transformation.⁴ With our future energy direction now clearer than ever before, the International Energy Agency (IEA) forecasts robust future growth in renewables through 2020 and well beyond.⁵

1 *The Impact of Climate Change on the U.K. Insurance Sector*, A Climate Change Adaptation Report by the Prudential Regulation Authority, September, 2015, <http://www.bankofengland.co.uk/prad/Documents/supervision/activities/pradefra0915.pdf>.

2 For an in depth review of the types of carbon asset risk and investors, please see WRI and UNEP FI's *Carbon Asset Risk: Discussion Framework*: http://www.unepfi.org/fileadmin/documents/carbon_asset_risk.pdf.

3 Luke Mills and Angus McCrone, *Clean Energy Investment by the Numbers*, Bloomberg New Energy Finance, January 13, 2015: <https://www.bnef.com/dataview/clean-energy-investment/index.html>.

4 David Waskow and Jennifer Morgan, "The Paris Agreement: Turning Point for a Climate Solution," World Resources Institute, December 12, 2015, <http://www.wri.org/blog/2015/12/paris-agreement-turning-point-climate-solution>.

5 International Energy Agency, *Renewable Energy Medium-Term Market Report 2015*, Paris: OECD/IEA, 2015, <https://www.iea.org/Textbase/npsum/MTrenew2015sum.pdf>

This energy revolution, accelerated by the agreement to limit climate change, has significant implications for the role of fossil fuels in our energy mix, and ultimately the value of the world's carbon reserves. A couple of key, relevant forecasts bring the issue into focus.

- ➔ The IEA estimates (conservatively) that, under a two-degree global warming scenario, the share of fossil fuels in the global energy mix would fall by 2035 to 65 percent, from 82 percent in 2014.⁶
- ➔ One third of oil reserves, half of gas reserves, and over 80 percent of coal reserves from 2010 to 2050 will need to remain unused worldwide.⁷
- ➔ Coal would be the hardest hit, as it would be necessary to eliminate all of the increases in coal consumption since 2000.⁸
- ➔ Additionally, in order to achieve the 2-degree global warming limit, no new GHG emitting electricity infrastructure can be built after 2017.⁹

In conclusion, the concept of carbon asset risk (CAR)—the risk that a significant quantity of the world's fossil fuel resources will become stranded assets—is gaining attention as Wall Street analysts, investors, regulators, and governments increasingly recognize this as an actionable, systemic financial risk that must be brought under control.¹⁰

Stranded assets are those that lose value or turn into liabilities before the end of their expected economic life. In the context of fossil fuels, this means those that will not be burned—they remain stranded in the ground. We believe the risks of this occurring are growing.¹³

**HSBC Global Research,
'Stranded Assets: What Next,'
April 16, 2015**

2 • CARBON ASSET RISK FACTORS

As a starting point, institutional investors, including insurers, will benefit by having a comprehensive understanding of the major drivers of carbon asset risk, including market, technology, policy and legal factors.

Growing Clean Energy and Energy Efficiency

As renewable energy technologies, such as solar and wind, become more widely used and commercially attractive, they are increasing the stranding risk for oil, gas, and coal assets. The dramatic decline in the cost of solar photovoltaic (PV) panels has led to a significant increase in solar PV deployment. According to recent research by McKinsey, U.S. solar will be competitive with fossil fuels in most states by 2020.¹¹ Onshore wind is already competitive with fossil fuels in some regions, while the cost of offshore wind is also dropping and becoming more competitive.¹²

Technological breakthroughs have also paved the way for energy efficiency gains and lower energy demand, further decoupling economic growth and prosperity from ever-increasing energy consumption. According to the IEA, global investments in energy efficiency since 1990 saved \$5.7 trillion in energy expenditure.¹⁴ In fact these efficiency gains are expected

6 International Energy Agency, *World Energy Investment Outlook*, 2014, Paris: OECD/IEA, 2014, <http://www.iea.org/publications/freepublications/publication/WEIO2014.pdf>

7 Christophe McGlade and Paul Elkins, "The Geographical Distribution of Fossil Fuels Unused When Limiting Global Warming to 2C," *Nature* 517 (08 January 2015): 187-190. <http://www.nature.com/nature/journal/v517/n7533/full/nature14016.html>

8 Ibid.

9 Alexander Pfeiffer et al., "The '2°C Capital Stock' for Electricity Generation: Committed Cumulative Carbon Emissions from the Electricity Generation Sector and the Transition to a Green Economy." *Applied Energy*, March 24, 2016.

10 Shanna Cleveland et al., *Carbon Asset Risk: From Rhetoric to Action*, Ceres, 2014, <https://www.ceres.org/resources/reports/carbon-asset-risk-from-rhetoric-to-action/view>

11 Scott Nyquist, "Lower Oil Prices but More Renewables: What's Going on?" McKinsey & Co., June 2015, <http://www.mckinsey.com/industries/oil-and-gas/our-insights/lower-oil-prices-but-more-renewables-whats-going-on>

12 Zoe Knight, Wai-Shin Chan, and Ashim Paun, *Stranded Assets: What Next?*, HSBC Global Research, April 16, 2015, http://www.businessgreen.com/digital_assets/8779/hsbc_Stranded_assets_what_next.pdf

13 Zoe Knight, Wai-Shin Chan and Ashim Paun, *Keeping it Cool: Oil, CO2 and the Carbon Budget*, HSBC Global Research, March 2015, <https://www.research.hsbc.com/midas/Res/RDV?p=pdf&key=16wwwBhH8M&n=448964.PDF> and Zoe Knight, Wai-Shin Chan and Ashim Paun, *Stranded Assets: What Next?*, HSBC Global Research, April 16, 2015, http://www.businessgreen.com/digital_assets/8779/hsbc_Stranded_assets_what_next.pdf

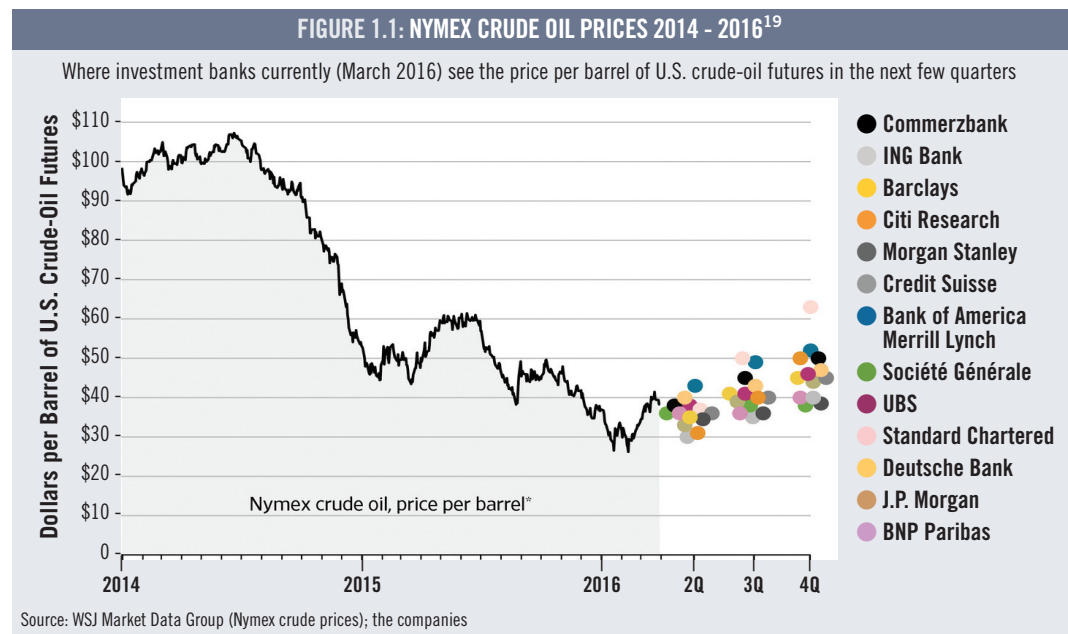
14 International Energy Agency, *Energy Efficiency Market Report 2015*, Paris: OECD/IEA, 2015, <https://www.iea.org/publications/freepublications/publication/MediumTermEnergyefficiencyMarketReport2015.pdf>

to play a major role in meeting future carbon pollution reduction goals as well as the energy needs of the developing world. About 40 percent of the emissions reductions needed by 2050 to limit climate change would potentially come from energy efficiency, according to some estimates.¹⁵ Oil and gas giant BP predicts that energy intensity, or the amount of energy required per unit of gross domestic product (GDP), will drop by 36 percent between 2012 and 2035, with the rate of decline accelerating rapidly after 2020.¹⁶

The 2015 Paris Agreement was a catalyst for further accelerating investment in clean energy and energy efficiency. Billionaires Bill Gates, Mark Zuckerberg, Richard Branson and other high-profile entrepreneurs announced the *Breakthrough Energy Coalition*, a multi-billion dollar fund backed by more than twenty-five investors from ten countries who want to spur investment in potentially break-through renewable technologies. The initiative was launched in conjunction with *Mission Innovation*, an effort from twenty-one governments, including the U.S., Britain, Australia, Germany, China, and Brazil, aiming to double the amount of public money going into clean energy innovation.¹⁷

Fossil Fuel Price Volatility and High Cost Extraction

Volatility—a hallmark of the current oil industry—creates significant financial risk for fossil fuel companies, institutions that finance them, as well as companies and consumers that buy oil, gas and coal. During the last two decades, oil prices have swung dramatically, rising from a low of \$10 a barrel in December 1998 to \$133 in July 2008 then back down to \$31 in 2016.¹⁸ This volatility is likely to continue due to a wide range of market, technological and geo-political factors. According to the U.S. Energy Information Administration (EIA) in its January 2016 report on global crude oil prices, "...the current values of futures and options contracts continue to suggest high



15 Ibid.

16 Izabella Kaminska, "Energy is gradually decoupling from economic growth," *Financial Times Alphaville*, January 17, 2014, <http://ftalphaville.ft.com/2014/01/17/1745542/energy-is-gradually-decoupling-from-economic-growth/>

17 Oliver Milman, "Zuckerberg, Gates and Other Tech Titans Form Clean Energy Investment Coalition," *The Guardian*, November 30, 2015, <http://www.theguardian.com/environment/2015/nov/30/bill-gates-breakthrough-energy-coalition-mark-zuckerberg-facebook-microsoft-amazon>

18 Energy Information Administration, Europe Brent Spot Price FOB, May 4, 2016, <https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RBRT&f=M>

19 Georgi Kantchev, "Banks Raise Oil Price Forecasts But Remain Cautious," *The Wall Street Journal*, March 31, 2016, <http://www.wsj.com/articles/banks-raise-oil-price-forecasts-but-remain-cautious-1459426781>

uncertainty in the price outlook.”²⁰ Future uncertainty over oil prices widens further over time, according to the report. For example, the forecasted December 2016 price range is between \$22 and \$82 per barrel.²¹

The fallout from this volatility and deterioration of oil pricing has been stark. Some types of oil production, such as oil sand extraction, and deep-water drilling, are economically viable only at \$75 or more a barrel, according to energy experts.²² As a result of the prolonged low commodity prices, sixty-nine North American oil and gas producers have filed for bankruptcy since the beginning of 2015 through May 2016, involving approximately \$34 billion in cumulative secured and unsecured debt.²³

While low oil prices are hitting high-cost producers the hardest, commodity prices also have significant financial implications for the global oil majors. For example, in early 2016, several of the major oil companies cut payroll²⁴ and Moody’s Investors Service lowered the rating outlook to negative for the largest publicly traded oil company in the world, ExxonMobil.²⁵

The coal industry has fared even worse. The market value of U.S. coal companies continues to fall, contracting by 74 percent between August 2014 and October 2015 and by nearly 90 percent from where it stood in April 2011, according to SNL Energy.²⁷ The total market capitalization of thirteen publicly traded U.S. coal companies slid from about \$26 billion in August 2014 to under \$7 billion in early October 2015.²⁸ Competition from cheap natural gas (due to the boom in hydraulic fracturing), demand reductions due to energy efficiency measures, and strengthened air pollution regulations in the U.S. and China set off this multi-year drop in coal stocks, which fell even further amid increasing competition from renewable energies, including solar and wind.

Tightened Regulation of Carbon Emissions

Tougher controls on carbon emissions by international, national, and local governments will increasingly impact the operational and financial viability of oil, gas, and coal assets.

The Paris Agreement underscored an already expanding commitment to strong national and regional actions³⁰ and national reporting on greenhouse gas reduction efforts. The Agreement is expected to accelerate a broad array of policies such as emissions trading schemes, as well as laws and regulations aimed at reducing greenhouse gas emissions. Importantly, the Paris Agreement provides for successive commitments every five years to ratchet upward actions on greenhouse gas reductions, and ensure that the “well-below 2 degrees Celsius” objective is met.

While the company is cutting its capital spending and operating costs in response to lower commodity prices, this diminished level of capital reinvestment could adversely affect ExxonMobil’s reserve replacement and production profile in the latter part of this decade.²⁶

**Moody’s Investors Service,
February 2016**

Because the Paris Agreement is a universal, legally binding agreement to tackle climate change under international law, it joins other such agreements as the highest expression of political intent and will.²⁹

**World Resources Institute,
December 2015**

20 Ibid

21 Energy Information Administration, *Short-Term Energy Outlook*, February 9, 2016, <http://www.eia.gov/forecasts/steo/report/prices.cfm>

22 Mitchell Anderson, “Why Cheap Oil is the Key to Beating Climate Change,” *The Guardian*, December 11, 2015, <http://www.theguardian.com/commentisfree/2015/dec/11/cheap-oil-climate-change-fossil-fuel-extraction-tar-sands>

23 Haynes and Boone, *LLP Oil Patch Bankruptcy Monitor*, May 1, 2016: http://www.haynesboone.com/-/media/files/attorney%20publications/2016/energy_bankruptcy_monitor/oil_patch_bankruptcy_20160106.ashx

24 Clifford Krauss, “Oil Prices, What’s Behind the Drop? Simple Economics,” *New York Times*, February 16, 2016, <http://www.nytimes.com/interactive/2016/business/energy-environment/oil-prices.html>

25 Moody’s Investor Service, *Moody’s Affirms ExxonMobil’s AAA Rating, Outlook Changed to Negative*, February 25, 2016, https://www.moody.com/research/Moodys-affirms-ExxonMobils-Aaa-rating-outlook-changed-to-negative--PR_344377

26 Ibid. According to a Bloomberg News article, ExxonMobil failed to replace all of the oil and natural gas it pumped last year with new discoveries and acquisitions for the first time in more than two decades. The company’s reserve-replacement ratio fell to 67 percent in 2015, it reported. Prior to that, the world’s largest oil explorer by market value had achieved ratios of 100 percent or higher for twenty-one consecutive years. Joe Carroll, “Exxon Fails to Replace Production for First Time in 22 Years,” *Bloomberg News*, February 19, 2016, <http://www.bloomberg.com/news/articles/2016-02-19/exxon-fails-to-replace-production-for-first-time-in-22-years>

27 Christopher Coats, “US Coal Producer Market Value Only a Fraction of its Former Self,” *SNL*, October 21, 2015, <https://www.snl.com/InteractiveX/articleabstract.aspx?id=34212442&KPLT=8>

28 Ibid.

29 Jennifer Morgan and Eliza Northrop, “Form AND Function: Why the Paris Agreement’s Legal form is So Important,” World Resources Institute, December 16, 2015, <http://www.wri.org/blog/2015/12/form-and-function-why-paris-agreement%E2%80%99s-legal-form-so-important>

30 During 2015 a number of nations, including the US, implemented major new initiatives to reduce carbon emissions. For example, in August 2015 the U.S. EPA announced the Clean Power Plan (CPP)—a historic action to reduce carbon pollution from electric power plants. The CPP establishes state-by-state targets for carbon emissions reductions, and seeks to reduce national electricity sector emissions by an estimated 32 percent below 2005 levels by 2030. To read more about the CPP: “Clean Power Plan for Existing Power Plants,” EPA, <http://www.epa.gov/cleanpowerplan/clean-power-plan-existing-power-plants>

Other regulatory efforts to deal with various human health and safety issues could further limit the production and use of fossil fuels. For instance, faced with serious air pollution and health challenges caused by the burning of coal, China is beginning to curb its use. The country has already implemented new regulations to reduce coal use in major urban areas such as in Beijing, which will close the last of its four major coal-fired power plants in 2016.³¹ During 2015, China's coal consumption declined by 3.7 percent, marking the second consecutive annual decline. As a result, the portion of coal-fired power generation fell from 74 percent in 2013 to 69 percent in 2015.³² Since China is the largest emitter of GHGs globally, and its coal use is equivalent to that of the entire rest of the world's use, its decisions about future coal consumption have global import.³³

Increasing Divestment and Climate Litigation

Concerned about financial and reputational risks, a growing number of foundations, institutional investors, and national governments are divesting from fossil fuel companies.³⁴ During COP21 in Paris, representatives from the Rockefeller Brothers Fund, the California Senate, the World Resources Institute, and the London School of Economics joined 350.org in announcing that investors controlling more than \$3.4 trillion in assets had committed to some form of divestment from fossil fuels.³⁵ Just prior to this announcement, the French National Assembly in November 2015 adopted a resolution encouraging companies and local authorities to not invest in fossil fuels.³⁶

Oil, gas and coal companies are also confronting mounting reputational risks and potential climate litigation. In November 2015, New York Attorney General Eric Schneiderman announced that his office was investigating ExxonMobil to determine whether the company lied to the public about the risks of climate change or to investors about how such risks might hurt the oil business.^{37,38} New York's attorney general is investigating whether ExxonMobil's statements to investors denying or downplaying climate risks, made as recently as 2015, were consistent with the company's own long-running scientific research. Investigators are also trying to determine if ExxonMobil funded outside groups to undermine climate science, even as its in-house scientists outlined the potential consequences to company executives.

3 • IMPLICATIONS FOR INSTITUTIONAL INVESTORS

As carbon asset risk factors become better understood, investing in fossil fuels is shifting from being considered a "safe" core investment to a major concern for the world's largest investors and their regulators. At issue is whether institutional investors, including insurance companies, are adequately taking carbon asset risk into account when assessing their carbon intensive bond, equity, and alternative financial instruments. The fundamental question is to what extent are investors aware of the potential risks facing investments in fossil fuels and utilities, and are they sufficiently managing them?

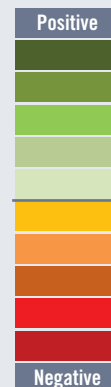
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- 31 "Beijing to Shut All Major Coal Power Plants to Cut Pollution," *Bloomberg News*, March 23, 2015, <http://www.bloomberg.com/news/articles/2015-03-24/beijing-to-close-all-major-coal-power-plants-to-curb-pollution>
- 32 Alvin Lin, "It's Official: China Continued to Reduce its Coal Consumption in 2015 While Growing its Clean Energy," NRDC, March 1, 2016: <https://www.nrdc.org/experts/alvin-lin/its-official-china-continued-reduce-its-coal-consumption-2015-while-growing-its>
- 33 Edward Wong and Chris Buckley, "Fading Coal Industry in China May Offer Chance to Aid Climate," *New York Times*, September 21, 2015, http://www.nytimes.com/2015/09/22/world/asia/fading-coal-industry-in-china-may-offer-chance-to-aid-climate.html?_r=0
- 34 Reputational risks encompass damages stemming from a direct or indirect association with an asset or company. Institutions, through their association as investors in the fossil fuel industry, could suffer damage to their brand value or reputation, lost revenue, or require additional capital expenditures.
- 35 Thomas Schueneman, "Record \$3.4 Trillion Committed to Fossil Fuel Divestment," *Triple Pundit*, December 2, 2015, <http://www.triplepundit.com/2015/12/record-3-4-trillion-committed-fossil-fuel-divestment/>
- 36 Jamie Henn, "Divestment Commitments Pass the \$3.4 trillion Mark at COP21: 500+ Institutions Have Now Joined the Movement, Campaigners Urge Governments to Follow Suit," 350.org, December 2, 2015: <http://350.org/cop21-divestment/>
- 37 Justin Gillis and Clifford Krauss, "Exxon Mobil Investigated for Possible Climate Change Lies by New York Attorney General," *New York Times*, November 5, 2015: http://www.nytimes.com/2015/11/06/science/exxon-mobil-under-investigation-in-new-york-over-climate-statements.html?_r=0
- 38 The *Los Angeles Times* reported that California Attorney General Kamala D. Harris is also investigating whether ExxonMobil Corp. repeatedly lied to the public and its shareholders about the risk to its business from climate change, and if such actions might amount to securities fraud and violations of environmental laws. Ivan Penn, "California to Investigate Whether Exxon Mobile Lied about Climate Change Risk," *Los Angeles Times*, January 20, 2016, <http://www.latimes.com/business/la-fi-exxon-global-warming-20160120-story.html>

Mercer's Climate Risk Stress Testing

Mercer developed the TRIP™ climate risk assessment methodology as part of its 2015 report, *Investing in a Time of Climate Change*.³⁹ This modeling approach allows investors to quantify in financial terms the impact of four climate change risk factors on investor portfolios, asset classes, and equity sectors over a thirty-five year time horizon. These factors represent the potential influence on portfolios of low carbon **technology** shifts (T) and climate change **policy** (P)—the major climate change transition risks—as well as the effects of shifts in **resource** availability (R) and extreme weather **impacts** (I)—the major climate change physical risks.

FIGURE 1.2: MERCER'S TRIP CLIMATE RISK ASSESSMENT

| EQUITY SECTOR | T | R | I | P |
|------------------|-------|-------|-------|-------|
| ENERGY | -0.25 | -0.75 | -0.75 | -0.75 |
| Oil | -0.50 | -0.75 | -0.75 | -0.75 |
| Gas | <0.25 | -0.50 | -0.75 | <0.25 |
| Coal | -0.50 | -0.75 | -0.75 | -1.00 |
| Renewable | 0.50 | -0.25 | -0.25 | 1.00 |
| Nuclear | 0.50 | -0.75 | -0.25 | 0.50 |
| UTILITIES | -0.25 | -0.75 | -0.50 | -0.50 |
| Electric | -0.50 | -0.75 | -0.50 | -1.00 |
| Gas | -0.25 | -0.75 | -0.25 | -0.50 |
| Multi | -0.25 | -0.75 | -0.50 | -0.75 |
| Water | -0.25 | -0.50 | -0.25 | -0.75 |



Note: Sensitivity is assigned on a relative basis with -1 representing the most expected negative impact on investment returns, and +1 representing the most expected positive impact on investment returns

There are meaningful impacts on return at the industry-sector level. This is particularly evident for those industry sectors expected to be most sensitive to the Policy factor: energy and utilities. The sub-sectors with the highest negative sensitivity are coal and electric utilities. Renewables have the highest positive sensitivity.

Mercer's TRIP climate risk assessment methodology extends beyond carbon asset risk highlighted in this report, as it:

- ➔ Encompasses a complete range of climate change risk factors enabling a holistic assessment of investment risk and return impacts;
- ➔ Has been built into an asset-liability modeling framework enabling climate change stress-testing of insurer investment portfolios and the resultant impacts to be presented in financial terms.

Using a financial risk assessment tool like Mercer's TRIP framework in conjunction with sector or carbon footprint exposure analyses can help to improve an investor's understanding of long-term portfolio climate resilience and inform related risk management decisions. Since climate change is a largely prospective investment risk, with both near and long-term implications, such information can be particularly useful to buy-and-hold investors with long-term asset-liability matching concerns and a large exposure to long-dated debt securities such as U.S. insurers.

Several studies released in 2015 raised significant concerns about institutional investors' exposure to carbon asset risk. *Investing in a Time of Climate Change*, a report published by Mercer found that the annual investment returns for coal, oil, and utilities will be the most negatively impacted of the sub-sectors evaluated.⁴⁰ The coal industry is expected to experience the greatest reduction in annual returns, while the oil and utilities sectors could also be significantly negatively impacted during the next thirty-five years, according to Mercer's

39 Mercer, *Investing in a Time of Climate Change*, 2015, <http://www.mercer.com/content/dam/mercer/attachments/global/investments/mercer-climate-change-report-2015.pdf>

40 Ibid

analysis. The biggest impacts from these changes will be felt during the next decade. In contrast, renewable energy has the greatest potential for additional returns. Depending on the scenario, average expected returns from renewable energy may increase from 6.6 percent to as high as 10.1 percent annually, Mercer estimates.

Reports by other major global asset managers, each exploring the issue of climate change, stranded assets, and investment risks for institutional investors, offer additional insights into carbon asset risk.

The Price of Climate Change, Global Warming's Impact on Portfolios.⁴¹ Blackrock Investment Institute, November 2015.

Report Highlights: With more nations taking action to curb greenhouse gas emissions, climate change risk is now an investment issue. Momentum to reduce climate risk in portfolios is building because long-term asset owners are increasingly concerned about extreme loss of capital and 'stranded' assets (write-downs before the end of their expected life span). The report also concludes that climate change related data should be used to measure climate risks and mined for opportunities. Notably, the report analyzes the carbon intensity of an insurer's corporate debt portfolio and highlights research that ties improving carbon efficiency to equity outperformance.

The full report is available at: <https://www.blackrock.com/au/intermediaries/literature/market-commentary/blackrock-price-ofclimate-change-global-warming-impact-en-au.pdf>

The Cost of Inaction, Recognizing the Value at Risk from Climate Change.⁴² Sponsored by Aviva and published by the Economist Intelligence Unit, July 2015.

Report Highlights: The report concludes that climate change is expected (on average) to result in \$4.2 trillion in losses to current assets (present value)—roughly the total value of the world's publicly listed oil and gas companies or the entire GDP of Japan. Yet, regulators have barely recognized, let alone begun to address the risk. Requiring that companies disclose their carbon emissions would improve investors' risk management. Long-term investors are advised to engage with the most exposed companies in their portfolios, and to shift investments towards profitable, low-carbon sectors.

The full report is available at: <http://www.economistinsights.com/sites/default/files/The%20cost%20of%20inaction.pdf>

Stranded Assets, What Next?⁴³ Published by HSBC Global Research, April 2015.

Report Highlights: HSBC concludes that fossil fuels will increasingly become stranded assets that will lose value or become liabilities before the end of their expected economic viability. Institutional investors will need to manage these risks by analyzing which assets are most at risk for stranding. Coal assets face the greatest risks, given the high associated emissions and substitution possibilities. Oil reserves with a high breakeven oil price are also at risk, including oil sands, shale oil, Arctic, and some offshore assets.

The full report is available at: http://www.businessgreen.com/digital_assets/8779/hsbc_Stranded_assets_what_next.pdf

41 Deb Johnson and Cynthia Ng, "The Price of Climate Change: Global Warming's Impact on Portfolios," BlackRock press release, November 18, 2015, <https://www.blackrock.com/au/intermediaries/literature/press-release/20151118-blackrock-price-of-climate-change-global-warming-impact-en-au.pdf>

42 "US\$4.2trn in Investable Assets at Risk for Climate Change," Economist Intelligence Unit, July 24, 2015, <http://www.eiimedia.com/index.php/latest-press-releases/item/1921-us-4-2trn-in-investable-assets-at-risk-from-climate-change>

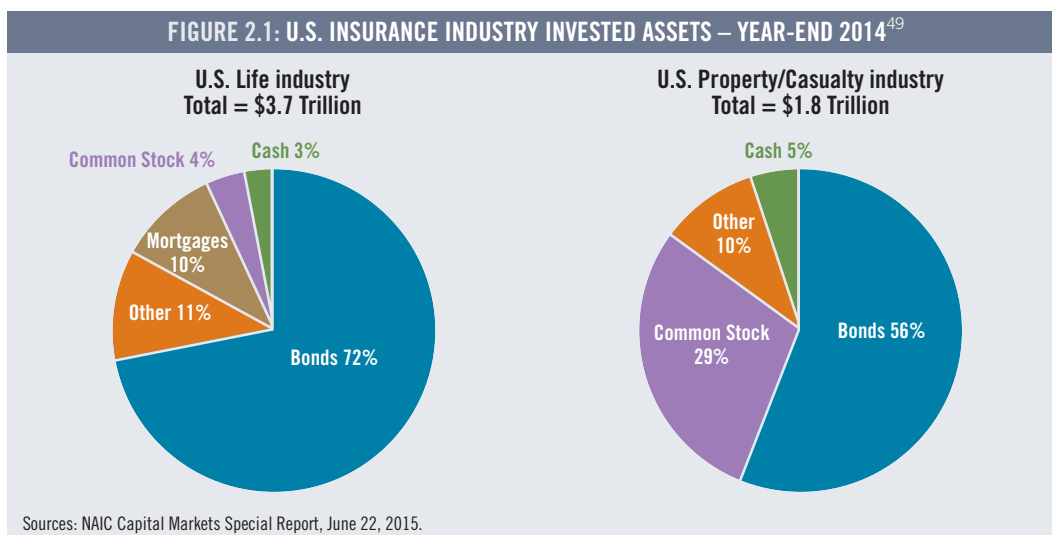
43 Zoe Knight, Wai-Shin Chan, and Ashim Paun, *Stranded Assets: What Next?*, HSBC Global Research, April 16, 2015, http://www.businessgreen.com/digital_assets/8779/hsbc_Stranded_assets_what_next.pdf

1 • INSURERS' ASSET ALLOCATIONS

Based on assets under management, insurance companies are the second-largest type of institutional investors after pension funds.⁴⁴ U.S. insurers' year-end 2014 statutory financial statements show the industry owned cash and invested assets totaling almost \$6 trillion.⁴⁵ Because investing is such a major part of an insurance company's business, regulators pay close attention to companies' overall portfolio risks. All insurers, which need to manage a wide range of financial and non-financial risks, must meet specific asset allocation requirements and carry more capital if regulators determine that their investment risk increases. Unsurprisingly, insurers make different investment decisions depending on the capital charges (which reflect risks) associated with particular assets.⁴⁶

Portfolio compositions vary depending on the type of insurer due primarily to the need to appropriately match assets to liabilities, taking into consideration relative duration and liquidity risk. Insurance company asset allocations and strategies for life and property/casualty insurers are broadly summarized below.⁴⁷

Life insurers are typically “buy-and-hold” investors seeking to generate predictable and stable income to match long-dated and generally predictable liabilities that must be paid when claims come due (life insurance contract durations can be twenty or thirty years or more). In 2014, about 72 percent of U.S. life insurers' invested assets were comprised of bonds, the majority of which represented high credit quality corporate bonds.⁴⁸



44 Serdar Çelik and Mats Isaksson, “Institutional Investors and Ownership Engagement,” *OECD Journal: Financial Market Trends*, 2013/2 (2014): 97, <http://www.oecd.org/corporate/Institutional-investors-ownership-engagement.pdf>

45 Insurance Information Institute, *A Firm Foundation: How Insurance Supports the Economy*, 2014, http://www.iii.org/sites/default/files/docs/pdf/a_firm_foundation_2015.pdf

46 Kris DeFrian, *U.S. Insurance Financial Regulatory Oversight and the Role of Capital Requirements*, National Association of Insurance Commissioners, January 2012, http://www.naic.org/cipr_newsletter_archive/vol2_oversight.htm

47 Note that other types of insurers including health, fraternal and title insurers hold an additional 5 to 6 percent of industry assets.

48 National Association of Insurance Commissioners, *Capital Markets Special Report*, http://www.naic.org/capital_markets_archive/150622.htm

49 According to the Annual Report on the Insurance Industry published by the Federal Insurance Office, U.S. Department of the Treasury, in September 2015, the life/health and property/casualty insurance sectors held assets totaling \$8.1 trillion at year-end 2014. It is presumed that the difference between the total U.S. insurance industry assets of \$5.5 trillion reported by the NAIC and the \$8.1 trillion reported by the Federal Insurance Office is due to the inclusion of \$2.4 trillion held in separate accounts, which is included in the larger figure.

Property/Casualty insurers, in contrast, had only 56 percent of their 2014 invested assets in bonds, also mostly high credit quality corporate bonds.⁵⁰ This insurance segment's 2014 exposure to common stocks was 29 percent, while life companies' exposure was only 4 percent.⁵¹ Property/casualty insurers' investment categories are geared towards being more liquid in order to compensate policyholders quickly and efficiently (property/casualty insurance contracts are typically one year in duration).

Overall, given the sector's massive bond and equity holdings, insurers and the industry's regulators are focused on managing exposure to both **credit risk** (the risk that a debtor will default) and **market risk** (such as movements in interest rates, foreign currency rates or equity prices that have an adverse effect on market value of investments).

2 • EFFECT OF OIL PRICE VOLATILITY

During the past eighteen months, oil price volatility and related fossil fuel company losses negatively impacted investment results for some insurance companies. While it is true that market value volatility does not always translate into realized losses, e.g. for fixed income assets, prolonged low commodity prices offer a glimpse of the potential future impacts of a rapidly accelerating global clean energy transition. Morgan Stanley Investment Research recently examined the exposure of leading U.S. life insurers by comparing insurers' investments in energy and utilities as a percentage of GAAP equity as of third quarter 2015.⁵² Life insurer Unum was found to have the highest energy exposures relative to its size among all insurers analyzed. Morgan Stanley noted this as a significant weakness given volatility and uncertainty in oil prices.

In the year to date, Manulife has lost \$626 million on its oil and gas holdings... largely offset by \$457 million of gains from other invested assets.⁵³

CBC News, November 12, 2015

Property and casualty insurer Travelers reported a 16.6 percent fall in quarterly net profit as its net investment income was hurt due to low interest rates and a slump in oil prices.⁵⁴

CNBC, January 21, 2016

A different example was highlighted by the online InsuranceNewsNet.com in a February 2016 article on insurance company oil sector investments. It reported that according to Lincoln Financial's CEO Dennis Glass, the company... 'had stopped investing in the energy sector a year ago, and has trimmed its fixed income energy exposure by nearly \$1 billion since the end of 2014'.⁵⁵ While the article states that most insurers believe the current energy risks to be manageable, it conceded that, "Clearly there's reason to keep a close eye on the portfolios as the past six months have turned into a lesson about how affected segments of an insurance carrier's income streams swing from a gain to a loss."⁵⁶

It should be noted that between 2012 and 2015, broad market index returns have exceeded returns for the fossil fuel sector overall (see **Figure 2.2** below). For example, a comparison of the MSCI ACWI index (encompassing 2,450 companies with a market capitalization of \$34.5 trillion) with the MSCI ex-Fossil Fuels index (which excludes 127 companies in the fossil fuel sector) clearly shows investments in fossil fuels lagging the overall market over this time period.⁵⁷ Companies excluded from the MSCI ex-Fossil Fuel index include major oil producers such as ExxonMobil Corp., Chevron, BP PLC, Total SA and Royal Dutch Shell PLC.

50 Ibid.

51 National Association of Insurance Commissioners, *Capital Markets Update*: Mid-2015, http://www.naic.org/capital_markets_archive/150811.htm

52 Nigel Daly and Tanmay Gupta, *What We're Hearing from Life Investors*, January 15, 2016, Morgan Stanley Research, http://linkback.morganstanley.com/web/sendlink/webapp/f/eamn5mqo-3pdr-g00p-95b1-005056013601?store=0&d=UwBSZXNIYXJaF9NUwBjNjJjNWY2NC1yYWZlTExZTU0iODI3Mi1mZDZlYWlOY2l2ODc%3D&user=4x3f7dwn9zow1-25&gda__=1578997695_1a9913b9ab7679a212bb0c5c7925b234

53 Manulife Profit Falls 43 Percent on Oil and Gas," *CBC News*, November 12, 2015, <http://www.cbc.ca/news/business/manulife-earnings-1.3315913>

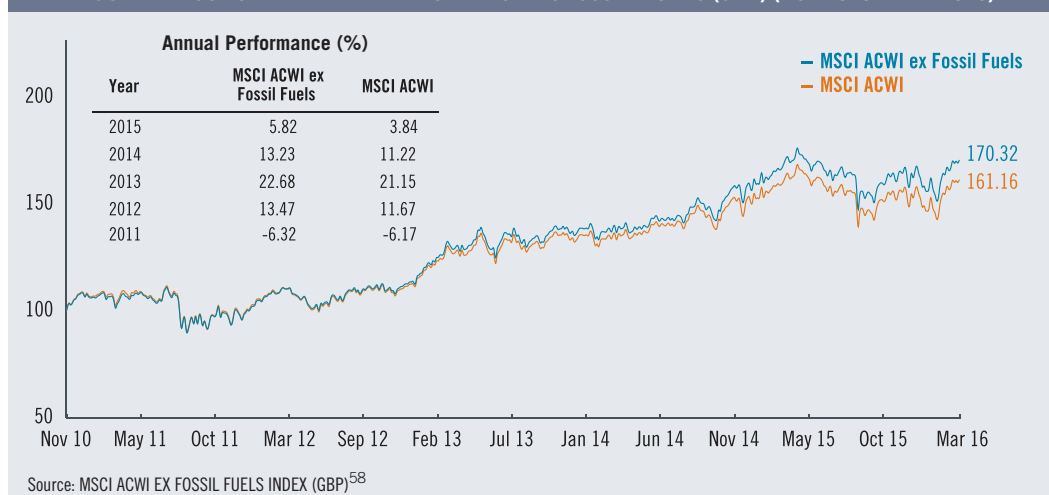
54 "Travelers Posts Earnings of \$2.90 a Share vs \$2.65 Expected," *CNBC*, January 21, 2016, <http://www.cnb.com/2016/01/21/travelers-reports-q4-earnings.html>

55 InsuranceNewsNet.com, *Execs: No Need to Dump Energy Holdings*, February 15, 2016, <http://insurancenewsnet.com/inarticle/execs-no-need-to-dump-energy-holdings>.

56 Ibid.

57 Barry Burr, "MSCI Launches Fossil-Fuel Free Indexes," *Pensions & Investments*, October 16, 2014, <http://www.pionline.com/article/20141016/ONLINE/141019892/msci-launches-fossil-fuel-free-indexes>

FIGURE 2.2: CUMULATIVE INDEX PERFORMANCE – GROSS RETURNS (GBP) (NOV 2010 - MAR 2016)



3 • INSURER, RATING AGENCY, AND REGULATORY RESPONSES

In response to broad concerns over climate change and fossil fuel investments, and to demonstrate a willingness to take action on climate change, several European insurers recently announced shifts in their investment strategies. Most of these changes were focused on insurers' plans to reduce or entirely divest from their coal sector holdings.

- ➔ In May 2015, **AXA** announced it would sell 500 million euros of coal assets and invest 3 billion euros in green investments. CEO Henri de Castries explained in a speech, "It is our responsibility, as a long-term institutional investor, to consider carbon as a risk and to accompany the global energy transition."⁵⁹
- ➔ **Aviva** announced in July 2015 that it had identified an initial set of forty companies in the thermal coal business (either mining or coal power generation) where Aviva has investments. Aviva pledged to engage with this initial group of companies during the next year around their carbon risk exposures. If these companies do not make 'sufficient' progress to reduce carbon risks, Aviva would withdraw its capital.⁶⁰
- ➔ Before the December climate negotiations, both French reinsurer **SCOR** and German insurer **Allianz** announced plans to divest from coal companies. SCOR intends to divest from any company generating more than 50 percent of its revenues from coal, while Allianz intends to divest from any company generating more than 30 percent of revenues from coal, including coal mining and coal-fueled power generation.^{61, 62}

Ceres did not undertake exhaustive research on possible credit rating agency assessments of the potential impact of climate change on insurers. However, a recent Standard & Poor's Rating Services (S&P) report concluded that climate change is a greater threat to insurers than has been previously recognized. The rating agency determined that insurers' earnings

58 MSCI, *MSCI ACWI Ex Fossil Fuels Index (GBP)*, 2016, https://www.msci.com/resources/factsheets/index_fact_sheet/msci-acwi-ex-fossil-fuels-index-gbp-gross.pdf

59 Fiona Harvey, "Axa to Divest from High-Risk Coal Funds Due to Threat of Climate Change," *The Guardian*, May 22, 2015, <http://www.theguardian.com/environment/2015/may/22/axa-divest-high-risk-coal-funds-due-threat-climate-change>

60 Matt Cullen and Denis Kessler, "How Re/insurers' Trillions in Investments Can Influence Climate Change Policy," *Intelligent Insurer*, January 6, 2016, <http://www.intelligentinsurer.com/article/how-re-insurers-trillions-in-investments-can-influence-climate-change-policy>

61 Ibid.

62 "Statement on Coal-based Investments," Allianz, November 2015, https://www.allianz.com/v_1448622620000/media/responsibility/Energy_Guideline_PublicVersion_final.pdf

*Insurers' capital positions could be affected by lower investment income and higher capital requirements, and by the anticipated increase in weather-related claims. The investment impact appears to be more material than the weather-related impact across all four types of insurers analyzed.*⁶⁵

Standard & Poor's Rating Services, November 2015

could be reduced as a consequence of greater weather-related losses and lower investment returns.⁶³ S&P also believes that climate change may require insurers to hold higher levels of capital. Through an analysis that drew on the work of other experts including Mercer and Risk Management Solutions (RMS), the rating agency calculated the likely erosion of insurers' capital adequacy. S&P's analysis concluded that insurers' capital management tools *should* be adequate to address climate change, however there could be negative consequences for insurance company shareholders.⁶⁴ The investment impact of climate change on capital adequacy is expected to be greater than the weather-related impact for all types of insurers analyzed. Therefore, it appears that S&P and other major credit rating agencies would view favorably insurers that take steps to reduce carbon asset risk in their investment portfolios.

One U.S. insurance regulator is already taking action. In January 2016, California Insurance Commissioner Dave Jones, whose office regulates the largest insurance market in the U.S. by premium volume and the sixth largest in the world,⁶⁶ asked all insurers doing business in California to voluntarily divest from their holdings in thermal coal. The California Commissioner is also requiring all insurers subject to his supervision to annually disclose their carbon-based investments, including those in oil, gas, coal, and electric power companies. According to the California Department of Insurance press release, "These required financial disclosures will be made public and will be used by the Department of Insurance to assess the degree of financial risk posed to insurance companies by their investments in the carbon-based economy."⁶⁷ This is the first time any insurance regulator—in the U.S. or globally—has required insurers to publicly disclose their carbon intensive investments.

63 "Climate Risk: Rising Tides Raise the Stakes," Standard & Poor's Rating Services' *Insights*, December 2015, <https://www.spratings.com/documents/20184/984172/Insights+Magazine+-+December+2015/cff352af-4f50-4f15-a765-f56dcd4ee5c8>

64 The Standard & Poor's analysis of the expected impact on insurers' capital adequacy found that the affect is gradual, i.e. about 0.5% per year reduction in an insurer's capital/surplus. Over the projection period of 2016 through 2050 the cumulative effect may be material.

65 "Climate Risk: Rising Tides Raise the Stakes," Standard & Poor's Rating Services' *Insights*, December 2015, <https://www.spratings.com/documents/20184/984172/Insights+Magazine+-+December+2015/cff352af-4f50-4f15-a765-f56dcd4ee5c8>

66 "About the Department," California Department of Insurance, <http://www.insurance.ca.gov/0500-about-us/02-department/index.cfm>

67 "California Insurance Commissioner Dave Jones Calls for Insurance Industry Divestment From Coal," California Department of Insurance press release, January 25, 2016, <http://www.insurance.ca.gov/0400-news/0100-press-releases/2016/statement010-16.cfm>

1 • METHODOLOGY

Building upon the work of Ceres' Carbon Asset Risk Initiative,⁶⁸ and in collaboration with Mercer, Ceres examined specific U.S. insurers' investments (bonds, common stocks, and preferred stocks) in the oil and gas, utilities (specifically electric and gas) and coal sectors. This analysis of the fossil fuel investments of insurers was feasible due to the statutory requirement that insurers annually disclose highly detailed investment data, which is publically available. This regulatory requirement offers a unique opportunity to conduct an analysis of companies' energy sector holdings.

The scope of review included the U.S. insurance legal entity holdings of the forty largest insurance groups. Specifically, the report analyzed statutory investment data of the twenty largest groups filing the NAIC Life, Accident and Health Annual Financial Statement (based on total admitted assets including Separate Accounts) and from the twenty largest groups filing the NAIC Property and Casualty Annual Financial Statement (based on direct written premiums). For a full list of the insurance groups analyzed in this report, please see **Appendix A**.

Data Source

The investment data was sourced from 'Schedule D' of insurers' NAIC Annual Financial Statements and represents the fair market value⁶⁹ of investments in bonds, common stocks, and preferred stocks as of December 31, 2014. This data covers all U.S. legal insurance entities required to file and was extracted from A.M. Best's BestLink database of statutory financial data.⁷⁰ This data also includes Separate Accounts⁷¹ Schedule D data and excludes parent and affiliate investments.

Ceres aggregated Schedule D data from each U.S. insurance legal entity to determine the collective holdings of the insurance group (as defined by A.M. Best, see footnote 70 for additional information) and then adjusted, where possible, to remove affiliated investments.⁷²

Classification by Industry Sectors

In order to determine the NAIC Schedule D investments in energy sectors exposed to significant carbon asset risk, the investment data was uploaded into a Bloomberg terminal. Bloomberg was used to classify holdings in target sectors including coal, oil and gas, utilities—only electric and gas—and alternative energy investments according to the Bloomberg Industry Classification System (BICS). For more details regarding how the BICS classifies investments, as well as the subsectors that are classified within each target sector, please see **Appendix B**.

This approach offered the ability to quantify the actual investments in the oil and gas, utility and coal sectors of the target U.S. insurance groups. It should be noted that the energy sector holdings quantified using this approach should be viewed as understated. There are additional investments not included in this analysis that would need to be considered in a comprehensive evaluation of insurers' carbon asset risk. Please see **Appendix C** for a discussion of avenues for further research.

68 In September 2013, an international group of 75 institutional investors representing more than \$3 trillion in assets launched the Carbon Asset Risk Initiative—a coordinated effort to spur 45 of the world's largest fossil fuel companies to address the physical and financial risks posed by climate change. Coordinated by Ceres and Carbon Tracker with support from the Global Investor Coalition on Climate Change, the initiative aims to 1) prevent shareholder capital from being wasted on developing high-carbon, high-cost fossil fuel reserves that cannot be burned if the world is to avoid catastrophic climate change; and 2) drive fossil fuel companies to acknowledge and plan for the escalating physical impacts of climate change such as sea level rise, stronger storms and more severe droughts. For additional information go to www.ceres.org/issues/carbon-asset-risk

69 This analysis uses fair market value to assess the value of investments in order to have data uniformity when looking at both bonds and common stock.

70 In some cases AM Best reformats the NAIC data, and considers different legal entities to be part of the overarching insurance group as identified by the NAIC Group Code. As this report sourced data from AM Best, there may be differences between the investments reported in this report and the investments reported directly to the NAIC.

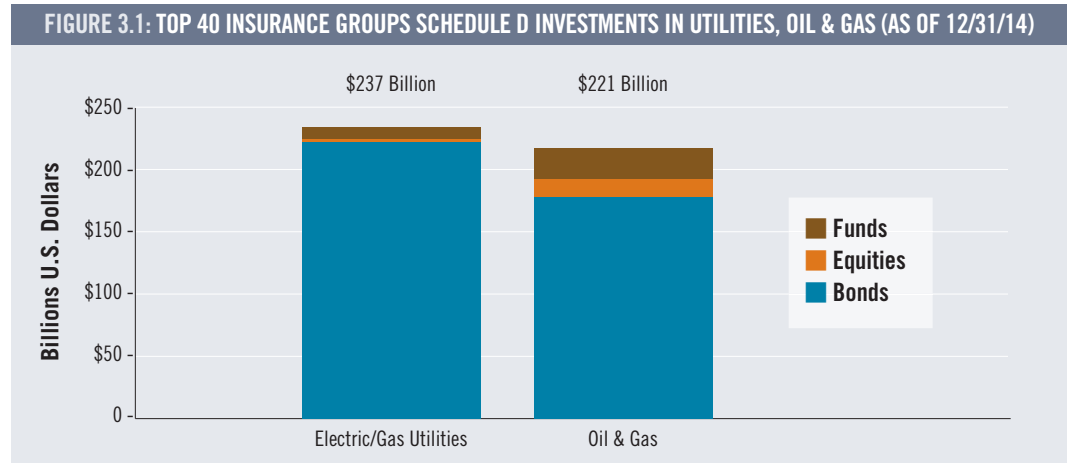
71 With regard to Separate Accounts, the authors recognize that for certain types of life/annuity insurance products, the policyholder may absorb investment risk. However, the assets are still owned by the insurer and guarantees may exist that could present contingent liabilities to the general account. Additionally, certain investment products are designed to mimic a set index or market, so the separate accounts may have a different risk profile from the insurer's general accounts. This could increase or decrease the overall concentration risk depending on the index the accounts are managed to.

72 Investment data was publicly available only for regulated legal entities domiciled in the U.S. that are required to file to the NAIC. Therefore, this analysis does not cover investments made by non-U.S. legal entities or affiliated non-insurance entities, as legal entities within an insurance group that are domiciled outside of the U.S. and non-insurance entities are not typically required to disclose their detailed invested asset holdings.

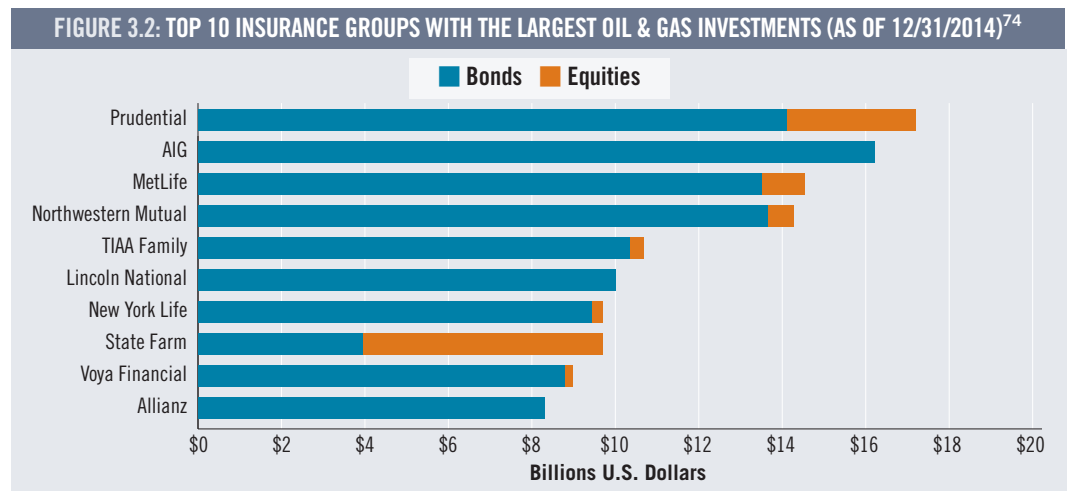
2 • KEY FINDINGS

Major US insurers are significant investors in the fossil fuel energy and utility sectors.

The forty largest insurance groups owned cumulative investments of almost half-trillion dollars (\$459 billion) in oil and gas, utilities and coal at the end of 2014—a value roughly equal to the GDP of Norway. Specifically, these forty insurance groups analyzed held investments of \$237 billion in the utilities sector and \$221 billion in the oil and gas sector. As noted above, these totals would likely be greater if Ceres had included the insurance groups’ fund investments and other schedules of the insurers’ Annual Financial Statements, both of which represent additional holdings that were not analyzed due to their additional complexity.



As illustrated in **Figure 3.1** the majority of these investments were in bonds (corporate bonds and municipal bonds), while substantially fewer were held in equities (common or preferred stocks, excluding funds), or in funds (mutual funds and ETFs). This is unsurprising given the fact that insurers’ portfolios are heavily weighted towards bonds in general, and indicates that changes in credit ratings for large investee companies within a sector (such as S&P downgrading ExxonMobil in April 2016 for the first time in over seventy years due to a negative outlook for the oil industry⁷³) could negatively impact insurers’ energy sector portfolio risks.



73 Ernest Scheyder, “Exxon ups dividend 3 percent day after ratings downgrade,” Reuters, April 27, 2016 accessed on April 29, 2016 <http://www.reuters.com/article/us-exxon-mobil-dividend-idUSKCN0X02E6>, *Bloomberg News*, February 2, 2016, Joe Carroll, “Exxon Faces First Downgrade Since Depression as Oil Rout Worsens,” *Bloomberg News*, February 2, 2016 www.bloomberg.com/news/articles/2016-02-02/chevron-hess-join-ranks-of-downgraded-crude-oil-explorers

74 Note that oil and gas investments held in funds are not included in these figures as the insurance groups had varying sizes of unclassifiable funds, limiting the validity of comparisons across insurers.

Ten insurance groups collectively held \$119 billion in oil and gas investments, reflecting 60 percent of the total for the forty insurance groups analyzed. As illustrated in **Figure 3.2**, **Prudential** and **AIG** each had combined equity and bond investments of over \$16 billion in oil and gas, while **MetLife** and **Northwestern Mutual** both reported investments of over \$14 billion respectively. While for almost all these insurers the majority of their investments were held in bonds, **State Farm** had \$6 billion invested in oil and gas by way of equity instruments, representing 60 percent of its total oil and gas investments.

Ceres analyzed the specific oil and gas company investments (bonds and equities) of the top ten insurers shown in **Figure 3.2**. The results showed that most of the top twenty five oil and gas investee companies (reflecting almost \$50 billion in cumulative investments) have been subject to some form of credit downgrade by S&P or Moody's during 2015 and 2016. See **Figure 3.3** for a ranking of the top twenty five oil and gas investee companies of the largest U.S. insurance groups, along with the cumulative amounts invested and recent credit rating agency actions.

FIGURE 3.3: MAJOR OIL & GAS INVESTEE COMPANIES OF THE TOP 10 U.S. INSURANCE GROUPS (AS OF 12/31/14)⁷⁵

| | Company* | Cumulative Investments of the Top 10 Insurance Groups, U.S. \$ Billions | Credit Rating Agency Downgrades (2015 & 2016, as of 5/31/16) |
|----|------------------------------|---|---|
| 1 | ExxonMobil | \$3.3 | S&P: downgrade from AAA to AA+; Moody's: negative watch |
| 2 | Chevron | \$3.3 | S&P: downgrade from AA to AA- |
| 3 | Royal Dutch Shell | \$3.1 | S&P: downgrade from AA- to A+ and on negative watch; Moody's: downgrade from Aa1 to Aa2 |
| 4 | ConocoPhillips | \$2.6 | S&P: downgrade from A to A-; Moody's: downgrade from A2 to Baa2 |
| 5 | Total S.A. | \$2.5 | S&P: downgrade from AA- to A+; Moody's: downgrade senior unsecured debt from Aa1 to Aa3 |
| 6 | Enterprise Products Partners | \$2.4 | Stable |
| 7 | TransCanada Corporation | \$2.3 | Stable |
| 8 | BP | \$2.2 | S&P: downgrade from A to A- |
| 9 | Kinder Morgan | \$2.1 | Stable |
| 10 | Noble Energy | \$2.0 | Moody's: downgrade senior unsecured debt from Baa2 to Baa3 |
| 11 | Apache Corporation | \$1.9 | S&P: downgrade from BBB+ to BBB; Moody's: downgrade senior unsecured debt from Baa2 to Baa3 |
| 12 | Enbridge | \$1.9 | S&P: downgrade from A- to BBB+; Moody's: downgrade from Baa1 to Baa2 |
| 13 | Plains All American Pipeline | \$1.8 | S&P: downgrade from BBB+ to BBB; Moody's: downgrade senior unsecured debt from Baa1 to Baa3 |
| 14 | Devon Energy | \$1.8 | S&P: downgrade from BBB+ to BBB; Moody's: downgrade senior unsecured debt from Baa1 to Baa2 |
| 15 | Canadian Natural Resources | \$1.6 | Moody's: downgrade senior unsecured debt from Baa1 to Baa3 |
| 16 | Statoil | \$1.6 | S&P: downgrade from AA- to A+; Moody's: downgrade senior unsecured debt from Aa2 to Aa3 |
| 17 | Williams Companies | \$1.6 | S&P: downgrade from BB+ to BB; Moody's: downgrade senior unsecured debt from Baa3 to Ba1 |
| 18 | Schlumberger | \$1.5 | Moody's: downgrade from Aa3 to A1 |
| 19 | Halliburton | \$1.5 | S&P: downgrade from A to A- and on negative watch; Moody's: negative watch |
| 20 | Anadarko Petroleum | \$1.5 | Moody's: downgrade senior unsecured debt from Baa2 to Ba1 |
| 21 | Energy Transfer Partners | \$1.4 | Stable |
| 22 | Occidental Petroleum | \$1.4 | Moody's: downgrade from A2 to A3 |
| 23 | Hess Corporation | \$1.3 | S&P: downgrade from BBB to BBB-; Moody's: downgrade senior unsecured debt from Baa2 to Ba1 |
| 24 | ONEOK | \$1.3 | Stable |
| 25 | EOG Resources | \$1.2 | S&P: downgrade from A- to BBB+; Moody's: downgrade from A3 to Baa1 |
| | Total | \$48.9 | |

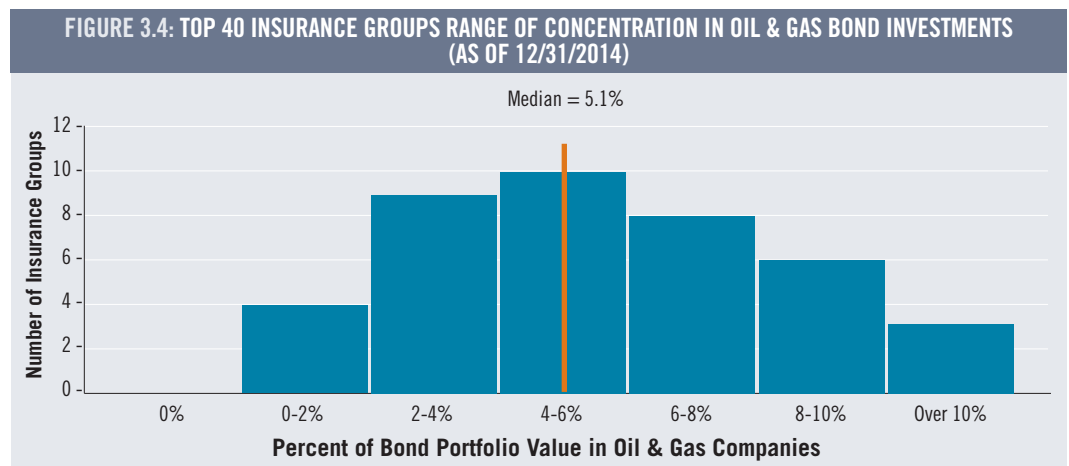
* This list reflects the major oil & gas companies in which the top ten U.S. insurance groups had investments (direct bond and equity holdings) as of 12/31/2014 (see **Figure 3.2**). Note that Ceres did not include oil & gas parent companies or subsidiaries in this analysis.

75 Credit Rating Profile, via Bloomberg LP, accessed May 31, 2016.

While any rating action can be problematic, it is important to also consider the magnitude of the downgrade, and specifically whether it changes the rating to below investment grade. Few of the oil and gas companies shown in this ranking were downgraded to below investment grade, however the sheer number of rating agency actions is a clear sign of the mounting credit risks of the oil and gas sector.

Certain insurance groups owned double the median concentration of oil and gas sector bonds.

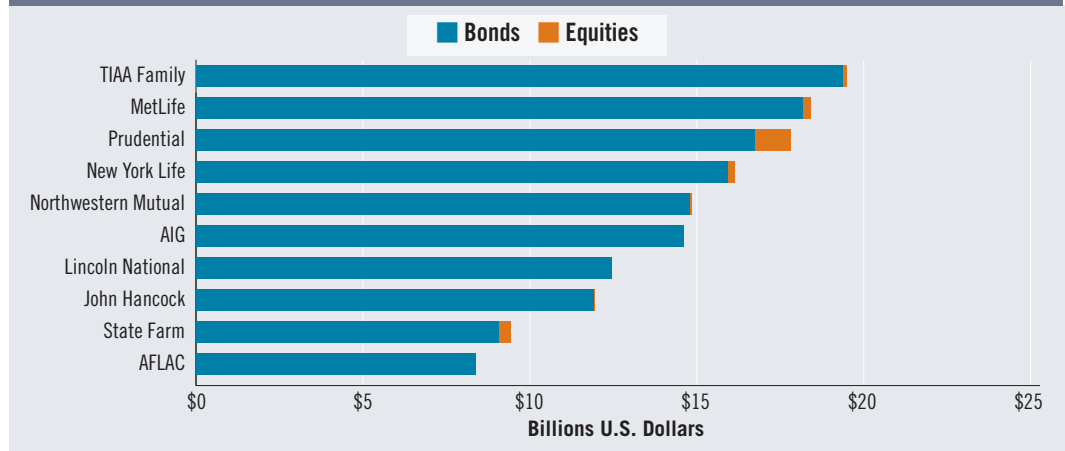
Across the forty insurance groups the median percentage of bonds invested in the oil and gas sector was just over 5 percent (see **Figure 3.4** for additional details). Notably, three insurance groups held significantly higher concentrations of oil and gas bonds—over 10 percent—roughly double the median. These groups and their respective oil and gas bond investments as a portion of their total bond portfolios were **Ameriprise** (12.4 percent), **Lincoln National** (11.8 percent) and **Voya Financial** (10.9 percent). The companies have higher concentrations of oil and gas energy sector holdings and, as a result, may be more exposed to credit risks related to investee companies, and more broadly to carbon asset risk. In contrast, several groups including **ACE**, **W.R. Berkley**, and **QBE** each reported oil and gas holdings values of less than 2 percent of their bond portfolios, and **Progressive** had only 0.2 percent of its bond portfolio invested in oil and gas. For detailed information regarding each insurance group’s actual bond holdings in oil and gas, and as a percentage of their total bonds, see **Appendix D**.



Ten insurance groups collectively invested \$143 billion in utilities—over 62 percent of the total for the forty insurers analyzed.

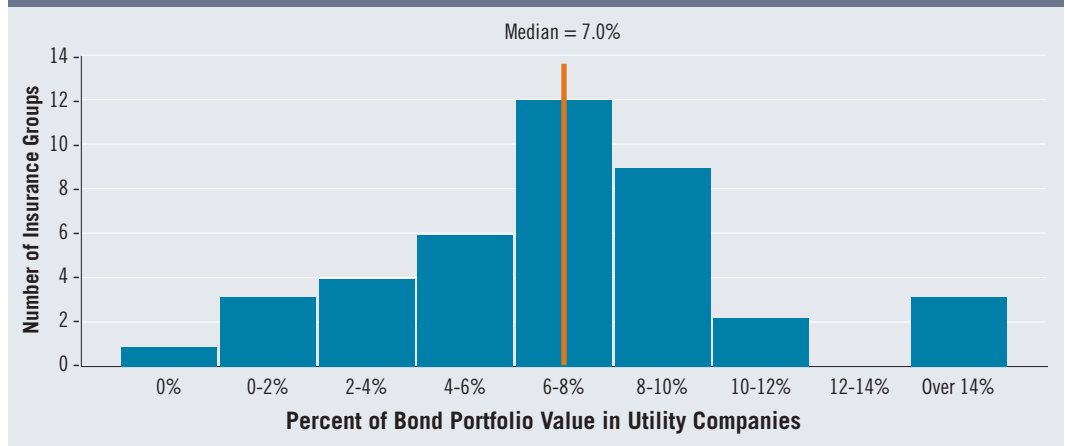
All insurance groups reported some utility investments, whether in bonds or in equities though the range of concentration within the portfolio varied significantly. **Figure 3.5** shows the insurance groups that held the largest total investments in this sector based on their bond and equity investments. **TIAA Family**, **Metlife**, **Prudential** and **New York Life** each had investments of well in excess of \$15 billion in utilities, while **Northwestern Mutual** and **AIG** each held investments just under \$15 billion. For almost all insurers, the majority of utility investments were held in bonds. For a more detailed look at each insurance group’s specific utility bond holdings, and as a percentage of the group’s total bond portfolio, please see **Appendix E**.

FIGURE 3.5: TOP 10 INSURANCE GROUPS WITH THE LARGEST UTILITIES INVESTMENTS (AS OF 12/31/2014)



Certain insurance groups owned double the median concentration of utility sector bonds based on the forty insurance groups analyzed. The median concentration of bond investments in utilities was 7.0 percent as shown in **Figure 3.6** below. However, some insurance groups reported much larger concentrations of utility investments, and in the case of three insurance groups, double the median level. These insurance companies and their respective utility bond investments as a percentage of their total bond holdings were **John Hancock** (16.8 percent), **Pacific Life** (16.0 percent) and **Lincoln National** (14.4 percent).

FIGURE 3.6: TOP 40 INSURANCE GROUPS RANGE OF CONCENTRATION IN UTILITY BOND INVESTMENTS (AS OF 12/31/2014)



Utilities have traditionally been a stable investment for insurers, providing reliable dividends and yields. Today, however, utilities are facing complex carbon asset risk exposures. As new technologies develop, renewable energy costs continue to drop, and energy efficiency increases, electric utilities are in varying stages of up-grading their technology and business models.⁷⁶ For example, **Figure 3.7** shows the fuel mix of the twenty-five largest U.S. power producers.⁷⁷ Some rely on coal for about 86 percent of their generation capacity, while others derive a greater proportion of their energy from sources such as natural gas and nuclear. Many also have been increasing their renewable energy generation capacity, though the amounts vary widely.

⁷⁶ Peter H. Kind, *Pathway to a 21st Century Electric Utility*, Ceres, 2015, www.ceres.org/resources/reports/pathway-to-a-21st-century-electric-utility/view

⁷⁷ Bank of America, Calpine, Entergy, Exelon, Public Service Enterprise Group (PSEG), Ceres, and the Natural Resources Defense Council (NRDC), *Benchmarking Air Emissions*, July 2015, www.ceres.org/resources/reports/benchmarking-air-emissions-of-the-100-largest-electric-power-producers-in-the-united-states-2015/view

FIGURE 3.7: FUEL MIX OF THE 25 LARGEST POWER PRODUCERS (IN ORDER OF 2013 GENERATION)⁷⁸

| Rank | Owner | Ownership Type | Total (million MWh) | Coal | Natural Gas | Oil | Nuclear | Hydro | Renewable/Other |
|------|----------------------------|-------------------------|---------------------|------|-------------|------|---------|-------|-----------------|
| 1 | Duke | Investor-owned corp. | 243.4 | 42% | 27% | 0.2% | 27% | 2% | 2% |
| 2 | Exelon | Investor-owned corp. | 195.1 | 5% | 11% | 0.1% | 81% | 1% | 2% |
| 3 | Southern | Investor-owned corp. | 180.2 | 39% | 40% | 0.0% | 16% | 4% | 0% |
| 4 | NextEra Energy | Investor-owned corp. | 175.7 | 3% | 53% | 0.2% | 28% | 0% | 16% |
| 5 | AEP | Investor-owned corp. | 153.1 | 75% | 13% | 0.2% | 11% | 1% | 1% |
| 6 | Tennessee Valley Authority | Federal power authority | 144.1 | 40% | 9% | 0.1% | 38% | 13% | 0% |
| 7 | Entergy | Investor-owned corp. | 129.4 | 11% | 28% | 0.0% | 60% | 0% | 1% |
| 8 | Calpine | Investor-owned corp. | 103.0 | 0% | 94% | 0.1% | 0% | 0% | 6% |
| 9 | NRG | Investor-owned corp. | 99.4 | 63% | 26% | 0.4% | 8% | 0% | 3% |
| 10 | FirstEnergy | Investor-owned corp. | 96.5 | 63% | 4% | 0.1% | 32% | 0% | 1% |
| 11 | Dominion | Investor-owned corp. | 93.9 | 26% | 24% | 0.3% | 47% | 1% | 1% |
| 12 | MidAmerican | Privately held corp. | 91.9 | 68% | 10% | 0.1% | 4% | 3% | 15% |
| 13 | PPL | Investor-owned corp. | 88.6 | 64% | 11% | 0.1% | 19% | 5% | 0% |
| 14 | Energy Future Holdings | Privately held corp. | 73.4 | 71% | 1% | 0.1% | 28% | 0% | 0% |
| 15 | US Corps of Engineers | Federal power authority | 69.0 | 0% | 0% | 0.0% | 0% | 100% | 0% |
| 16 | Xcel | Investor-owned corp. | 68.8 | 60% | 21% | 0.0% | 16% | 1% | 2% |
| 17 | Dynegy | Investor-owned corp. | 60.8 | 73% | 27% | 0.1% | 0% | 0% | 0% |
| 18 | PSEG | Investor-owned corp. | 54.4 | 12% | 32% | 1.6% | 54% | 0% | 0% |
| 19 | DTE Energy | Investor-owned corp. | 43.9 | 77% | 3% | 0.2% | 15% | 0% | 4% |
| 20 | Ameren | Investor-owned corp. | 43.8 | 76% | 2% | 0.0% | 19% | 3% | 0% |
| 21 | US Bureau of Reclamation | Federal power authority | 42.7 | 10% | 0% | 0.0% | 0% | 90% | 0% |
| 22 | AES | Investor-owned corp. | 41.1 | 86% | 7% | 0.2% | 0% | 0% | 7% |
| 23 | Edison Mission Energy | Privately held corp. | 33.0 | 70% | 13% | 0.0% | 0% | 0% | 17% |
| 24 | PG&E | Investor-owned corp. | 31.7 | 0% | 19% | 0.0% | 57% | 23% | 1% |
| 25 | GDF Suez | Investor-owned corp. | 31.1 | 17% | 77% | 0.1% | 0% | 2% | 3% |

See Ceres' report *Benchmarking Air Emissions of the 100 Largest Electric Power Producers in the United States 2015* for fuel mix of 100 largest power producers.

Utilities have differing levels of exposure to carbon asset risk depending on how the utility is managed, its asset base, and the regulatory environment in which it operates. While these risks will continue to evolve, it will be important for insurers to consider the prospective risks that utilities could pose to their portfolios. In April 2016 a global network of more than 270 institutional investors (representing assets worth over €20 trillion) published a guide setting out the threats facing the utilities sector and investor expectations for how these companies must act to adapt their business strategies to a two degree Celsius climate change pathway.⁷⁹ Additionally, Ceres' report *Pathway to a 21st Century Utility* is a useful resource in this regard as it delves further into the carbon asset risk challenges facing utilities and strategic options to employ.⁸⁰

⁷⁸ Ibid

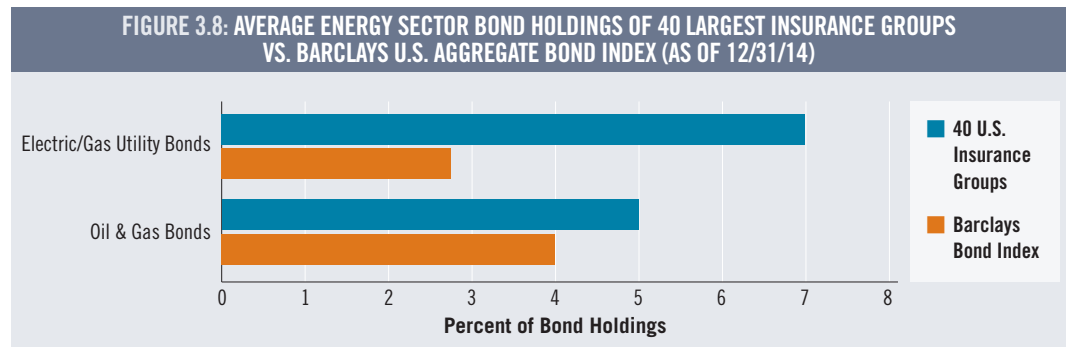
⁷⁹ For more information on *Investor Expectations of Electric Utilities Companies—Looking down the line at carbon asset risk* developed by the Institutional Investors Group on Climate Change (IIGCC), please download the April 28, 2016 press release and guide at <http://www.ceres.org/press/press-releases/global-investors-launch-guide-to-drive-engagement-on-climate-risk-with-the-electric-utilities-sector>

⁸⁰ Peter H. Kind, *Pathway to a 21st Century Electric Utility*, Ceres, 2015, www.ceres.org/resources/reports/pathway-to-a-21st-century-electric-utility/view

Overall, the insurance groups analyzed have higher concentrations of fossil fuel energy sector, as well as utility bond holdings compared to the Barclays U.S. Aggregate Bond Index. In addition to identifying and understanding the potential value at risk, as well as the energy sector investments across the forty insurance groups' portfolios, it is also helpful to understand how these figures compare to the broader market. Though insurers do not always manage to market indices due to other considerations such as state investment law limits, comparing the insurance groups to market indices can help identify areas where insurers may be more highly exposed. Most U.S. institutional investors use Barclays U.S. Aggregate Bond Index as a standard fixed income benchmark. This index measures the investment grade, U.S. dollar-denominated, fixed-rate taxable bond market.^{81, 82}

Applying the same methodology to Barclays Bond Index that Ceres used to analyze the top forty U.S. insurance groups revealed that 2.8 percent of index bonds were in utilities, compared with a 7.0 percent median concentration for the forty insurance groups analyzed. See **Figure 3.8** for additional details. In fact, thirty-six of the insurance groups analyzed had higher utility sector concentrations than Barclays U.S. Aggregate Bond Index.

Ceres' analysis of Barclays U.S. Aggregate Bond Index also revealed a sector concentration of 3.9 percent in oil and gas energy sector bonds. By comparison, the forty insurance groups had a median concentration of 5.1 percent of their bonds in the oil and gas energy sector. Twenty-seven of the the insurers analyzed held higher oil and gas sector concentrations in comparison to the Barclays Index.



Coal investments were a small portion of the forty insurance groups' bond and equity holdings—only \$1.8 billion—in part because the market value of U.S. coal companies has collapsed. At the end of 2014, coal holdings were small in comparison to the oil and gas or utility investments (i.e. the overall value of oil and gas investments was 147 times larger than the collective coal holdings for the forty insurance groups reviewed) but are crucial to quantify due to the high credit risk facing the coal industry. A myriad of rapidly evolving factors negatively impacted coal companies during the past few years, and will likely continue to strain coal companies going forward.

Concerns over high GHG emissions, along with toxic air emissions associated with burning coal (e.g. mercury, sulfur dioxide and nitrogen oxides) accelerated the move away from coal. Furthermore, natural gas is becoming increasingly competitive as a source of electricity generation, putting additional pressure on the coal industry. In fact, in April 2015, gas-fired

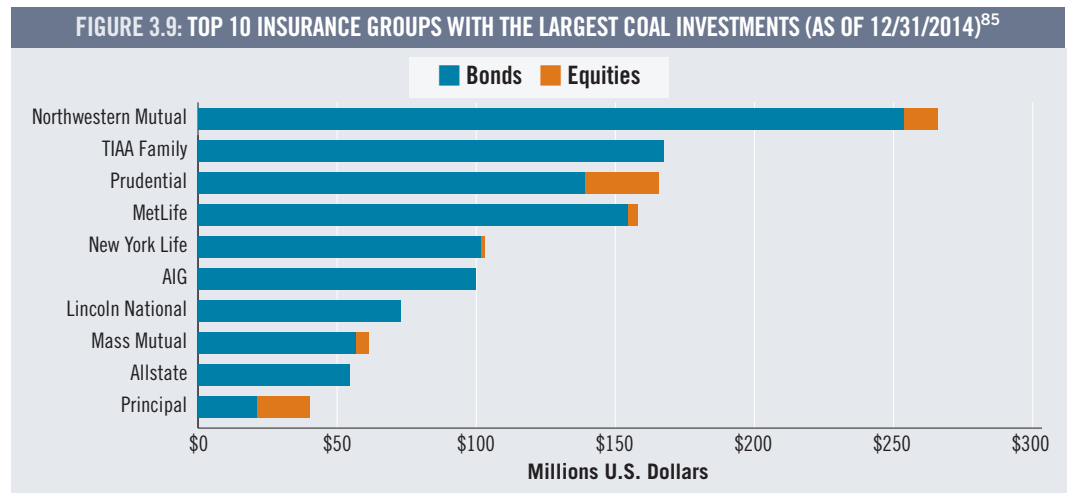
81 Barclays, *Guides and Factsheets*. Retrieved online at https://index.barcap.com/Home/Guides_and_Factsheets.

82 Less than 6 percent of insurers' bond investments were below investment grade in 2014 according to the NAIC Capital Markets Bureau. For additional information see the NAIC Special Report, *Are Insurers Reaching for Yield in the Low Interest Rate Environment*. http://www.naic.org/capital_markets_archive/150702.htm.

83 Charlotte Cox and Peter Marrin, "Total US Gas-Fired Generation Overtakes Coal Burn for 1st Time Ever," SNL, July 2, 2015, <https://www.snl.com/InteractiveX/Article.aspx?cid=A-33130767-13612>

power generation surpassed coal-fired power generation for the first time in history.⁸³ The coal divestment movement has also gained significant momentum. A growing number of large institutional investors including CalPERS, CalSTRS, the nearly \$1 trillion Norwegian pension fund, AXA, Aviva, Allianz, and SCOR have committed to offloading at least some portion of their coal holdings.⁸⁴

Ceres' analysis revealed that **Northwestern Mutual** had the largest coal holdings, with bond and equity investments worth \$266 million reported in Schedule D—nearly \$100 million more than any other group (see **Figure 3.9**). Though larger than any other group's investments, this amount represented only 0.18 percent of Northwestern Mutual's bond and equity investments. While most of insurers' coal investments were bonds, **Prudential**, **Principal** and **Northwestern Mutual** also had coal equity of \$27 million, \$20 million and \$13 million respectively.



Overall the forty insurance groups had higher concentrations of investments in coal when compared to Barclays U.S. Aggregate Bond index. Indeed, only 0.003 percent of Barclays Bond index was in coal, while the forty insurance groups showed median concentrations of 0.02 percent in coal. However, these concentrations are so small within both the Index and insurance groups' portfolios that it is hard to draw meaningful conclusions from this comparison. Six of the forty insurance groups analyzed reported no NAIC Schedule D holdings in coal: **Aflac**, **Auto Owners**, **QBE**, **Sammons**, **USAA**, and **W.R. Berkley**. For detailed information on each insurance group's coal bond holdings, please see **Appendix F**.

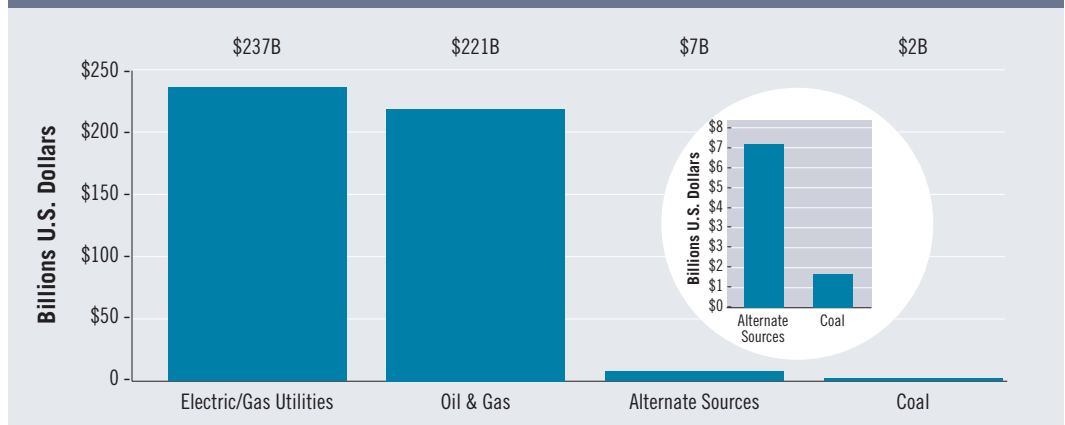
Insurers' alternative energy (including renewables) investments were small, but significant.

The forty insurance groups' total classifiable NAIC Schedule D investments in alternative energy (as defined using the BICS classification system) totaled \$7.2 billion. Clearly, these investments were dwarfed by the insurance groups' holdings in oil and gas and utilities, though overall alternative energy investments were nearly four times greater than total investments in coal. (See **Figure 3.10** for a comparison of alternative energy investments versus fossil fuel sector investments).

84 Dean Starkman, "CalPERS Set to Divest from Thermal-Coal Companies," *Los Angeles Times*, October 18, 2015, www.latimes.com/business/la-fi-calpers-divest-20151019-story.html; Dale Kasler, "CalSTRS Agrees to Unload U.S. Coal Stocks," *Sacramento Bee*, February 2, 2016, www.sacbee.com/news/business/article58306868.html; Piliita Clark, "Aviva Orders Coal Companies to Clean up," *Financial Times*, July 24, 2015, www.ft.com/intl/cms/s/0/fc4de232-321e-11e5-91ac-a5e17d9b4cff.html#axzz3zPBHjwaR; Piliita Clark, "Axa Pledges to Sell €500 of Coal Assets by End of Year," *Financial Times*, May 22, 2015, www.ft.com/intl/cms/s/0/f349dbb0-0072-11e5-b91e-00144feabdc0.html#axzz3zPBHjwaR; "Allianz to Cut Investments in Companies using Coal in Favour of Renewable Energy," *The Guardian*, November 24, 2015, www.theguardian.com/environment/2015/nov/24/allianz-to-cut-investments-in-companies-using-coal-in-favour-of-renewable-energy. For a list of additional commitments from investors see <http://gofossilfree.org/commitments/>

85 Note that funds are not included in this graph as the groups had varying sizes of unclassifiable funds, limiting the validity of comparing groups across their fund investments.

FIGURE 3.10: TOP 40 INSURANCE GROUPS SCHEDULE D INVESTMENTS IN UTILITIES, OIL & GAS, ALTERNATE SOURCES AND COAL (AS OF 12/31/14)



Investment opportunities in solar, wind and other renewable energy projects are expanding. For example, John Hancock (owned by parent company Manulife) announced in May 2016 that it has completed its first cash equity transaction with SolarCity. John Hancock is investing \$227 million in a diversified portfolio of residential, commercial and industrial solar power projects that collectively represent 201 megawatts of generation capacity.⁸⁶

It is important to note that the analytical approach used by Ceres, however, did not allow for a full characterization of insurers' investments in clean energy. For instance, some utilities rely heavily on renewable energy sources, yet the BICS classification system does not offer a way to determine the amount that utilities have invested in renewable energy compared with fossil-fuel assets. Moreover, renewable energy investments may be structured as limited partnerships or Yieldcos⁸⁷ that are reported in Schedule BA of an insurer's Annual Financial Statement, which Ceres did not endeavor to analyze.⁸⁸ Due to these limitations, our estimate of the value of insurers' clean energy holdings is potentially underestimated.

Some insurance groups are actively increasing investments in clean energy, and certain global insurers have made public commitments to additional investments. For example, **Aviva** recently committed to an additional \$3.9 billion of investments in clean energy by 2020, while **AXA** has committed to investing an additional 3 billion euros in green infrastructure, including clean energy and green bonds.^{89, 90} Swiss insurer **Zurich** also committed to investing \$2 billion in green bonds.⁹¹

Certain U.S. insurers have also publicized investments in clean energy. For instance, **MetLife** reports investments of \$3.5 billion in renewable energy projects since 2003.⁹² **Prudential** and **AIG** report over \$3 billion and \$2 billion, respectively, invested in renewable energy projects.⁹³

86 SolarCity and John Hancock Announce \$227 Million Cash Equity Financing, May 2, 2016. Retrieved online at <http://www.solarcity.com/newsroom/press/solarcity-and-john-hancock-announce-227-million-cash-equity-financing>

87 For more information on Yieldcos, please see Marley Urdanick's *Renewable Energy Project Finance, A Deeper Look into Yieldco Structuring*, 09/03/2014 published by the National Renewable Energy Laboratory, <https://financere.nrel.gov/finance/content/deeper-look-yieldco-structuring>

88 For information on NAIC Schedule BA filings: *2015 NAIC Quarterly Statement Instructions*, National Association of Insurance Commissioners, 2015, http://www.naic.org/documents/committees_e_app_blanks_revisions_15_instructions_quarterly_1411_health.pdf

89 Alex Morales, "Aviva Targets \$3.9 Billion of Renewable Energy Investments," *Bloomberg News*, July 24, 2015, www.bloomberg.com/news/articles/2015-07-24/aviva-targets-gbp2-5b-of-renewables-investments-over-5-years

90 "Axa to Sell Coal Assets and Put €3Bn into Green Investments," *Irish Times*, May 23, 2015: www.irishtimes.com/business/financial-services/axa-to-sell-coal-assets-and-put-3bn-into-green-investments-1.2222774

91 James Shotter, "Zurich Plans to Invest 2Bn in Green Bonds as Sector Grows," *Financial Times*, July 13, 2014, <http://www.ft.com/intl/cms/s/0/997fa148-08ff-11e4-9d3c-00144feab7de.html#axzz43V7R6T9d>

92 Josh Wiener, e-mail message to Ceres, April 13, 2016.

93 "2014 Corporate Citizenship Report," AIG, <http://www.aig.com/about-us/citizenship> and "Green Investments," Prudential, <http://corporate.prudential.com/view/page/corp/31822>

While these commitments are a clear step in the right direction, insurers' collective investments in these projects do not currently match the pace and scale of the clean energy transition now underway. (A total of \$330 billion was invested in clean energy during 2015 as referenced earlier in this report). The sheer size of insurers' energy sector investments to-date indicates significant room for much larger commitments to clean energy financing. As insurers seek to scale up, it will be increasingly important to be able to more accurately track their clean energy investments, and also identify and address potential financial and regulatory barriers.

Insurers face additional carbon asset risk exposure through their fund investments. Due to difficulties analyzing the composition of the majority of fund holdings, Ceres' analysis did not endeavor to classify the entirety of the forty insurance groups' investments in funds. However, where the composition of funds was accessible, Ceres estimated the proportion in target sectors, thereby capturing additional investments in coal, oil and gas, and utilities beyond what was reported in insurers' individual holdings. Ultimately, it is critical for insurers and regulators to understand the composition of these funds, since the forty insurance groups analyzed held \$1.4 trillion in funds, representing 27 percent of the total value of the insurers' invested assets.

Only \$423 billion (30 percent of the \$1.4 trillion invested in funds) was classified. This is because only some funds make sector data available. For Ceres' analysis, the percentage of the fund held in oil and gas was multiplied by the total value of the fund. Through this approach, Ceres identified an additional \$25 billion invested in oil and gas, \$9 billion in utilities, and \$347 million in coal; all above and beyond insurers' direct investments. These are substantial amounts. When considering insurers' investments in funds, it is also important to recognize that insurers have less direct control over the sector composition of the funds, and therefore diminished opportunity to identify and reduce potential carbon asset risk as compared to insurers' direct company investments.

3 • SUMMARY

This analysis represents an initial effort to conduct an in-depth, sector-based review of these forty U.S. insurance groups' fossil fuel holdings. That this level of analysis can be done on insurers' investments based on publicly available data is an important finding of its own, especially as emphasis on disclosure by companies and investors of their climate change-related risks increases. For both insurers and regulators, this is a crucial first step in understanding the potential for carbon asset risk-related losses in insurers' portfolios.

This analysis indicates that investments in the energy and utility sectors by U.S. insurance groups are substantial. As highlighted above, the forty insurance groups analyzed had \$459 billion invested oil and gas, utilities and coal at the end of 2014. Furthermore, additional investments in these sectors would likely be found through deeper explorations of the insurance groups' fund investments and additional investment schedules of the insurers' Annual Financial Statements.

While in the context of an insurer's overall portfolio their energy sector concentration risk is perhaps unlikely to lead to an insurer's insolvency, carbon asset risk could impact an insurance company's financial stability from greater volatility in investment performance, income streams and consistency of earnings. Insurers in particular need to be aware of and manage these risks since the broad effects of climate change can put further pressure on the stability of insurers' earnings. For example, property and casualty insurers face losses from climate change on the underwriting side of their balance sheet, as well as their investments. Additionally, life and annuity insurers are long-term investors, putting them at increasing risk if an entire sector suffers over the course of that investment. In both cases, the current low-interest rate environment and persistent soft premium market increase the importance of stability and reliability in insurers' investments.

For all institutional investors a sector-based analysis is a first step to understanding a portfolio's carbon asset risk exposure. Following this, a more granular analysis would need to be undertaken as the extent of risk exposure is determined not only by sector classification, but by a number of additional factors, including the amount and credit quality of the investments, the type and seniority of the financial stake, and the characteristics of the investee company. All of these factors would need to be assessed together in order to effectively understand and manage the risks. Because of this, it is crucial that insurers, industry regulators, and market oversight bodies work together to keep abreast of these prospective risks and to ensure that they are appropriately managed. The following section identifies key industry stakeholders and elaborates on how these entities could contribute to ensuring strong carbon asset risk management.

State insurance departments are the backbone of the industry's market oversight. They oversee companies by regulating insurers' market conduct practices and solvency, among other duties.⁹⁴ The National Association of Insurance Commissioners (NAIC) is the U.S. insurance standard-setting and regulatory body that is governed collectively by the chief insurance regulators from the fifty states, the District of Columbia and five U.S. territories. Through the NAIC, regulators establish requirements and protocols, and coordinate their regulatory oversight responsibilities.

Clearly, insurance regulators have a unique role to play in ensuring that the industry understands and manages its exposure to carbon asset risk. This will likely require that regulators, along with the NAIC, develop new approaches, expertise, and metrics so they can sufficiently analyze and address carbon asset risk across insurers' investment portfolios. The following section outlines the different roles that that NAIC and state insurance regulators could play and offers specific suggestions for how both levels of industry oversight can ensure that companies are assessing and managing potential exposures to carbon asset risk.

1 • NAIC CAPITAL MARKETS AND INVESTMENT ANALYSIS OFFICE

The NAIC's Capital Markets & Investment Analysis Office supports state insurance regulators and is composed of three primary groups focused on various aspects of insurance company investments: the Securities Valuation Office (SVO); the Capital Markets Bureau (CMB); and the Structured Securities Group.⁹⁵ The functions of the SVO and CMB are of particular relevance to the issue of U.S. insurers' exposure to carbon asset risk, and therefore merit further explication.

NAIC Securities Valuation Office (SVO)

The NAIC SVO is responsible for quality assessment and valuation of all securities owned by state regulated insurance companies, with some important caveats.⁹⁶ In 2004, the NAIC adopted the Filing Exempt (FE) rule, which grants an insurer exemption from filing certain securities with the NAIC SVO that are already being monitored by an authorized credit rating agency and that have been assigned a current credit rating which has been converted to the equivalent NAIC designation.⁹⁷

Because of the FE rule, the NAIC SVO relies heavily on the methodologies and credit quality assessments of the rating agencies, such as Standard & Poor's, Moody's Investors Service, and Fitch Ratings. Yet, it is unclear to what extent the rating agencies consider carbon asset risk and, more specifically, the risk of stranded fossil fuel assets within their respective credit quality assessment processes for oil and gas companies. The current prolonged low price of oil demonstrates that fossil fuel companies face higher credit risk when supply outstrips demand. According to Deloitte, a third of the world's publicly traded oil companies (175 companies) with more than \$150 billion of collective debt are at high risk of bankruptcy in 2016.⁹⁸

94 "Overview," Insurance Information Institute, <http://www.iii.org/article/overview>

95 "Capital Markets & Investment Analysis Office," National Association of Insurance Commissioners, <http://www.naic.org/svo.htm>

96 Ibid.

97 In some instances state insurance regulators require insurers to submit securities for SVO review that otherwise qualify for FE treatment. Similarly, insurers sometimes voluntarily submit securities for SVO review that otherwise qualify for FE treatment. Please see the following source for more information on this point: http://www.naic.org/cjpr_topics/topic_rating_agencies.htm.

With regard to insurers' bond holdings (approximately two thirds of the industry's investments) the SVO's credit designations range from highest to lowest credit quality, e.g. a designation of 'NAIC 1' is assigned to the highest credit quality investments, and 'NAIC 6' denotes obligations that are at, or near default. These SVO credit designations also correspond to credit rating agencies' alphanumeric rating scales. For example, in terms of rating public bonds, NAIC 1 is equivalent to Standard & Poor's AAA to A- ratings range, while NAIC 2 is equivalent to S&P's BBB+ to BBB- ratings.

98 Deloitte Center for Energy Solutions, *The Crude Downturn for Exploration & Production Companies*, 2015, <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/energy-resources/us-er-crude-downturn.pdf>

The future of the major international oil companies (IOCs)—BP, Chevron, ExxonMobil, Shell and Total—is in doubt. The business model that sustained them during the 20th century is no longer fit for purpose.⁹⁹

**Paul Stevens, Chatham House
The Royal Institute of International
Affaires, May 2016**

Therefore, state regulators may desire to better understand the degree to which the credit rating agencies consider carbon asset risk in their credit assessments and instruct NAIC SVO staff to engage in such a study. Otherwise, due to their reliance on the rating agencies, the NAIC could overlook prospective risks embedded in insurers' investments in fossil fuel companies.

For securities not rated by credit rating agencies, the NAIC SVO conducts its own credit review and assigns either a NAIC designation or a unit price to each investment not covered by the FE rule. In light of carbon asset risk, state insurance regulators should also consider whether improvements could be made to the SVO staff's credit assessment of all oil and gas, coal, and electric power securities that do not fall under the FE rule, keeping in mind the carbon asset risk factors outlined earlier in this report.

The NAIC SVO employs a staff of sector analysts that monitor companies and trends across all major industries. The Mining, Metals and Minerals analysts (SIC classification 1000 - 1499), Petroleum Refining and Related Industries analysts (SIC classification 2900 - 2999) and Electric/Gas/Utility Services analysts (SIC Classification 4900 - 4991) monitor the industries that are most directly affected by carbon risk factors. State insurance regulators might consider requesting that the Capital Markets & Investment Analysis Office periodically stress test the companies most exposed to carbon asset risk to determine their ability to withstand shocks related to major shifts in market demand and commodity prices. For example, the Bank of Montreal, Canada's fourth largest bank, announced in January 2016 that it would stress test its oil and gas loans to evaluate the possible financial implications of oil prices at \$25 a barrel.¹⁰⁰

NAIC Capital Markets Bureau (CMB)

Another key unit within the NAIC Capital Markets & Investment Analysis Office is the Capital Markets Bureau (CMB), which monitors significant developments and trends relevant to the insurance sector. The CMB publishes special reports, some of which are available to the public, on issues that could affect insurers' investment results. It does not appear that the CMB has yet considered carbon asset risk factors when it conducts its analysis of insurers' fossil fuel investments. The CMB's February 2015 report, *The Current Oil Shock: Modest Impact on Insurance Industry Investment Portfolios*¹⁰¹ concluded that insurance companies' exposure to the oil and gas industry is immaterial and that the sector's overall exposure to slumping oil prices is likely to be manageable. The CMB analysis is based on the understanding that oil and gas supply will outpace demand only temporarily and that commodity prices will rebound strongly in the mid-to-longer term. It does not appear to contemplate a wider range of carbon asset risk factors, e.g. the CMB report mentions that, "One would expect demand to increase over the long term because consumers, lulled into complacency by low prices, will worry less about conservation and fuel efficiency." State insurance regulators might want to direct the CMB to conduct additional independent research and analysis on the potential impact of carbon asset risk factors on specific insurers and/or insurance groups, which could impact insurer investment performance and even possibly companies' risk-based capital requirements.

As shown by Ceres' analysis, concentrations range between insurance groups in terms of their overall investments in fossil fuels and utilities. Whether or not a particular insurance group (or insurance company within the group) has material carbon asset risk exposure cannot be assessed until the holdings are first quantified, and then analyzed at a more granular level. The CMB could play an important role in this process since it analyzes insurers' (and insurance groups') investment portfolios, highlighting areas of potential concern. For instance, the CMB

99 Paul Stevens, *International Oil Companies: The Death of the Old Business Model*, Chatham House, The Royal Institute of International Affairs, May 5, 2016, <https://www.chathamhouse.org/publication/international-oil-companies-death-old-business-model#sthash.FwZe2BTp.dpuf>.

100 CBCNews, *BMO stress testing oil and gas loan portfolio at \$25 a barrel*, January 12, 2016, <http://www.cbc.ca/news/business/bmo-stress-testing-oil-1.3400258>

101 National Association of Insurance Commissioners, *Capital Markets Special Report*, http://www.naic.org/capital_markets_archive.htm

could include an analysis of a specific insurer's overall holdings in coal, oil and gas, and electric power industries to identify portfolios with higher concentrations. State insurance regulators could also direct the CMB to conduct detailed asset reviews to identify insurers with significant carbon asset risk exposure. Such information could supplement the financial analysis and examination processes, and provide state insurance regulators with detailed information for further investigation of an insurer's particular investment methodologies and related risk analyses.

2 • INSURER FINANCIAL SUPERVISION

Risk-based capital (RBC) requirements

The NAIC's risk-based capital (RBC) requirements, first implemented in the early 1990s, operate as an early warning system for U.S. insurance regulators. The RBC formula calculates the minimum amount of statutory capital required to support an insurer's overall business operations (based on considerations of size and risk profile) in order to avoid regulatory action. The RBC formulas do not cover every risk exposure, focusing instead on major risk areas, with the emphasis varying based on the particular type of insurance company. Within the RBC formula, asset risk factors include the following:

- ➔ Default of principal and interest on bonds;
- ➔ Default and passed dividends of preferred stock;
- ➔ Decrease in fair market value for common stock.

Components of the RBC formula are impacted by the NAIC credit designations (and draws substantially on the investment risk expertise of the SVO) because the asset risk factors or charges increase inversely to the credit quality of an insurer's assets. For example, poorer NAIC credit designations receive a higher risk factor charge.

The current, prolonged slump in oil prices offers a preview of how insurers' portfolios could be impacted by any combination of carbon asset risk factors. Given the mounting risks associated with the fossil fuel sector, related assets could warrant higher capital and surplus requirements. For example, if the credit quality of certain oil or coal corporate bonds held by an insurer falls below investment grade, the asset risk would increase. This could potentially drive higher capital charges. If oil and gas prices remain highly volatile, and some securities are sold at a loss or losses are deemed other than temporary, an insurer must recognize the loss as a direct charge to capital.

Since carbon asset risk has the potential to increase an insurer's portfolio risks related to its carbon intensive investments, closer scrutiny of potential implications on risk-based capital requirements is recommended. Furthermore, in light of prospective risk considerations related to carbon-intensive assets, state insurance regulators might wish to consider enhancements to the RBC formula to include fossil fuel sector concentration risk. While it is noted that the RBC formula is already quite detailed as it pertains to investment risks, fossil fuel concentration risk is not included. Therefore it seems both important and feasible to evaluate the merits of updating the formula to aid in identifying insurers that may be weakly capitalized relative to their carbon risk exposure.

NAIC Investment Risks Interrogatories

Multi-state insurers (and some single state insurers) regulated by state insurance departments are required to file electronically to the NAIC using the NAIC's Annual and Quarterly Statement Blanks. One of the filings due annually in April is the Supplemental Investment Risks Interrogatories. This filing is a source of information about an insurer's investment exposures,

such as the company's largest exposures to single issuer/borrower/investments, foreign investments and foreign-currency-denominated investments. This information is publicly available to policyholders, insurers, regulators, creditors, and other stakeholders.

However, the Supplemental Investment Risks Interrogatories filing does not require the insurer to determine and disclose its largest sector concentration risks, such as for the oil, gas, and coal industries. This omission may occur in part because state insurance departments do not have an officially recognized source for industry sector classification schemes. In fact, there are many credible sources available today with different strengths including: Bloomberg Industry Classification System (BICS); FactSet Industry and Sector Classifications (RBICS); Dow Jones/FTSE Industry Classification Benchmark (ICB); MSCI/S&P Global Industry Classification Standard (GICS); North American Industry Classification System (NAICS); and Standard Industrial Classification (SIC). In addition, new approaches that classify companies using both "brown and green" metrics in relation to climate change are also being developed. Two examples are the Sustainable Industry Classification System™ (SICS™) and the Low Carbon Economy Industrial Classification System from FTSE.

State insurance regulators, working through the NAIC, should consider adopting a source for industry sector classifications. An industry sector classification system, universally adopted by state regulators and the NAIC, would provide greater clarity, consistency and quality control, all necessary for accurate carbon asset risk assessments. Secondly, regulators should consider requiring insurers to disclose their concentration risks, such as carbon-based assets, within their Supplemental Investment Risks Interrogatories. Regulators may also need to set and enforce expectations to ensure the thoroughness and accuracy of insurers' fossil fuel sector analyses on both an individual and group basis.

Financial Examinations

During 2013, the NAIC's *Financial Condition Examiners Handbook* was revised to include consideration of climate change risk in the development of a diversified and stable investment portfolio. Additionally, enhancements to the Examination Repositories were made that provide guidance to examiners on questions to ask insurers about the potential impact of climate change on company solvency. As discussed above, revisions to the Investment Risks Interrogatories to include information regarding an insurer's energy sector investments and its management of potential carbon asset risk could be used to help examiners more efficiently assess this risk consideration. If fossil fuel sector concentration levels are high in an insurer's investment portfolio, or the risks do not appear proportionate to the nature, scale, and complexity of a particular insurer or group, state insurance regulators might consider using the financial examination process to review the detailed risk register and determine whether this emerging risk is being identified and prioritized.

Insurer Own Risk and Solvency Assessment (ORSA)

The International Association of Insurance Supervisors (IAIS), an international standard setting body responsible for developing principles and standards for the supervision of the insurance industry, created an Insurance Core Principle (ICP 16) on Enterprise Risk Management for Solvency Purposes. Standards within the ICP suggest that supervisors should require insurers to conduct an Own Risk and Solvency Assessment (ORSA) regularly to assess the adequacy of their risk management and current and future solvency position. The standards also suggest that supervisors should require an insurer's ORSA to encompass all reasonably foreseeable and relevant material risks, including market risks.

Does the company consider the impact of climate change risks when determining its investment strategy and/or monitoring the risks in its investment portfolio?¹⁰²

NAIC Financial Condition Examiners Handbook, Exhibit Y - Examination Interviews.

102 NAIC Center for Insurance Policy Research (CIPR), *Climate Change and Risk Disclosure*, December 23, 2015, http://www.naic.org/cipr_topics/topic_climate_risk_disclosure.htm

U.S. regulators clearly see value in including elements of this principle and standard in the U.S. solvency framework, as evidenced by the NAIC's adoption of the NAIC Risk Management and Own Risk and Solvency Assessment Model Act #505. As of January 13, 2016, a total of thirty-five states have adopted the Model Act and two additional states are considering its adoption. The NAIC also developed the *NAIC ORSA Guidance Manual* to help insurers and insurance groups with their ORSA filings. Carbon asset risk is clearly an emerging risk consideration, yet it is unknown whether chief risk officers of individual insurance companies or insurance groups have identified and prioritized it as part of their ORSA reviews. This analysis might impact the capital projections of some insurers, which could prompt companies to develop plans to mitigate risk exposure over a given period. State insurance regulators should encourage insurers' chief risk officers to assess CAR as part of their ORSA process, which could be evidenced within their respective risk registers.

Climate Risk Disclosure

In 2009, several state insurance regulators began collecting climate risk information from insurers through the annual *NAIC Climate Risk Disclosure Survey* so they could evaluate how insurers are assessing and managing climate change related risks across the enterprise. In 2012, approximately 87 percent of the U.S. insurance market was affected by mandatory climate risk disclosure through this survey.

An analysis of the survey responses conducted by Ceres found that barely 10 percent of the insurers overall—38 of 330 companies—had issued public climate risk management statements articulating the company's understanding of climate science and its implications for core underwriting and investment portfolios.¹⁰³ Ceres is now reviewing the 2014 reporting year surveys. While it is too early to predict overall results, some positive responses stand out. Building on this progress, it would be timely to improve the effectiveness of the *NAIC Climate Risk Disclosure Survey*. One suggestion would be to require insurers to disclose investment data specifically focused on their fossil fuel holdings, and actions they may have undertaken to identify and reduce carbon asset risk. This would be particularly important information for insurance company investors as the *NAIC Climate Risk Disclosure Survey* is currently the only comprehensive source of publically available information on the extent to which an insurer is managing its climate related exposures.

Has the company considered the impact of climate change on its investment portfolio?

The potential long-term effects of climate change are considered in a number of ways across the asset classes where NWL actively invests on behalf of its clients. For corporate bond and equity investments, we review a company's policy and practice to manage climate change and environmental risks in order to assess their potential impact on overall credit worthiness. We also actively monitor industry sectors that are more sensitive to climate change and environmental risks.

Nationwide's response in the 2014 NAIC Climate Risk Disclosure Survey

The SEC is a potential source of public information about how insurers are managing their climate-related risks, including carbon asset risk. In 2010, the SEC implemented new climate change disclosure guidance for public companies, which led to improved disclosure at the time. However, a 2014 Ceres analysis¹⁰⁴ found that the specificity of climate disclosure within companies' 10-K filings has declined markedly since this guidance was issued. Furthermore, 41 percent of S&P 500 companies do not disclose any information about climate change within their 10-Ks. The lack of disclosure is at odds with a report released in February 2016 by the Sustainability Accounting Standards Board (SASB), which found that 93 percent of U.S.-listed companies are affected by climate risk.¹⁰⁵ It is unclear how the SEC will address the poor quality of climate risk disclosure going forward.

103 See Ceres *Insurer Climate Risk Disclosure Survey Report and Scorecard: 2014 Findings and Recommendations*

104 Jim Coburn and Jackie Cook, "Cool Response: The SEC & Corporate Climate Change Reporting," Ceres, February 2014, <https://www.ceres.org/resources/reports/cool-response-the-sec-corporate-climate-change-reporting/view>

105 "93 Percent of US-Listed Companies 'Affected by Climate Risk,'" *Environmental Finance*, February 10, 2016, <https://www.environmental-finance.com/content/news/93-of-us-listed-companies-affected-by-climate-risk.html>

The new requirements from the California Department of Insurance (DOI)—summarized on page twenty-two of this report—could improve carbon asset risk disclosure for many of the largest U.S. insurers. These disclosures will help the California DOI, along with investors and the public, assess the degree of financial risk posed by carbon asset risk to insurers’ investment portfolios. However, since other state insurance departments have not yet followed suit, some percentage of U.S. insurers will not be subject to this requirement. Since an insurer that fails to manage its carbon asset risk may adversely affect investors and the public, it is suggested that other state insurance regulators should consider following California’s example and require all insurers to disclose their carbon-based investments on an annual basis.

5 Summary of Recommendations

The global commitment to greenhouse gas reduction, along with long-term market trends and clean energy technological advances, are expected to spur rapid growth in renewable energy. As a consequence, fossil fuel companies will confront the growing risk that some of their assets will lose value before the end of their expected economic life. In this context, Ceres' analysis and findings suggest that carbon asset risk may be a potential threat to insurers' investment portfolios. This issue is relevant to all insurance industry stakeholders. The 2008 financial collapse—the result of unrecognized systemic risks and complex financial markets interconnections—underscored how rapidly and dramatically insurers' capital positions can shift. A key lesson drawn from the financial crisis is that insurers benefit from conservative investment strategies that take into account potentially underestimated credit and liquidity risks, i.e. the possibility of portfolios quickly losing value and the resultant impaired ability to exit a position.

Since 2009, insurers have come under markedly sharper scrutiny, with the NAIC collaborating with industry regulators to implement a number of reforms. In a similar vein, regulators have also demonstrated leadership on the issue of climate change-related risks through the implementation of new disclosure requirements and revised examination processes. To ensure financial stability in a time of growing exposure to carbon asset risk, insurance companies, regulators, the NAIC, and key market oversight bodies should now consider a number of new actions to make carbon asset risk management part of existing insurer financial supervision and market oversight.

1 • INSURANCE COMPANIES/GROUPS

1. An insurer's board of directors should govern the company's climate change risk management strategy, specifically including potential risk related to carbon assets in the insurer's investment portfolio.
2. Insurers should include the company's carbon asset risk management strategy in their overall investment policy statements (IPS) and review and update these on a regular basis.
3. Climate change risk, including carbon asset risk, needs to be assessed as part of the insurer's overall ERM and/or ORSA process. Expertise from the underwriting and risk management groups should be shared with the investment groups (and vice versa) through, for example, a cross-functional climate risk management team.
4. Insurers will need expertise on climate risk (developed internally or accessed from outside the organization), particularly carbon asset risk, so that they can evaluate investments at the portfolio, asset class, sector and company level. More specific actions include:
 - At the broad sector level, investments in fossil fuels and fossil fuel-intensive utilities should be analyzed immediately.
 - Insurers should also examine their investments in individual companies within those sectors, as investee companies can have very different risk profiles due to unique characteristics, operating conditions, and management strategies.
 - The insurer should leverage energy sector and company specific insights between its underwriting and investment functions and identify potential exposure to correlated risks (affecting both the insurer's assets and liabilities).
 - A comprehensive evaluation of the insurer's carbon asset risk should be done that includes the nature of the financial instrument (whether corporate loan, project finance, or equity), its position in the capital stack, and its duration as an investment.

- Insurers should consider the short and long-term potential impact of climate change on their total portfolio (e.g. using a portfolio stress test) and the implications this may have on asset allocation and top-down portfolio risk management strategy.

In sum, insurers need to know how the fossil fuel companies they are invested in—and particularly energy company boards, which are accountable for overseeing these companies—are evaluating the future of demand and the potential for their assets to become stranded. A constructive dialogue between insurers and fossil fuel companies should focus on the extent to which an oil and gas company is adequately preparing for changing market dynamics, managing its carbon asset risk, and the potential threat it poses to investment returns and income streams. Engagement by insurers comes at a critical time as the recent decline in oil prices, which is squeezing company earnings, is also elevating concerns about future spending in expensive, risky projects that will likely be unprofitable in a carbon constrained world.

Ultimately, insurers need to be able to make informed strategic choices, aligned with each company’s investment policy statement, to reduce potential carbon asset risk exposure. This will include avoiding or managing carbon asset risk when making new investments as well as managing risks for investments already in the insurer’s existing portfolio. An insurer may decide to:

- ➔ Not hold assets with a specific carbon asset risk profile;
- ➔ Require a higher risk premium for future investments in oil, gas, and coal;
- ➔ Change the financing structure to limit carbon asset risk exposure;
- ➔ Engage as concerned shareholders with companies exposed to carbon asset risk to encourage the company to address and mitigate its carbon asset risk.

2 • STATE INSURANCE REGULATORS

- 1. Risk-Based Capital Formula:** Because of the potential risks related to carbon-intensive assets, state insurance regulators should consider evaluating the benefits of a proposal to develop a methodology to assign RBC asset risk charges to insurers with higher fossil fuel sector investment concentrations.
- 2. NAIC Investment Risk Interrogatories:** Insurance regulators, working through the NAIC, should adopt a universally recognized source for industry sector classifications and require insurers to disclose investment concentration risks, such as fossil fuels, within their Supplemental Investment Risks Interrogatories. Additionally, regulators will likely need to set and enforce expectations to ensure the thoroughness and accuracy of insurers’ fossil fuel sector analyses on an individual and group basis.
- 3. Insurer Risk-Focused Surveillance**
 - **Financial Examinations:** Based on data submitted through insurers’ Supplemental Investment Risk Interrogatories, if fossil fuel sector concentration levels are high and do not appear proportionate to the nature, scale, and complexity of a particular insurer or group, state insurance regulators should use the financial examination process to review the detailed risk register and determine whether the insurer is appropriately managing its exposure to carbon asset risk.
 - **Insurer Own Risk Solvency Assessments:** Regulators should evaluate insurers’ consideration of carbon asset risk exposure as part of the ORSA process (i.e. Was the risk identified within the risk register and/or considered as an emerging risk?)

4. **NAIC Valuation of Securities Task Force:** Regulators on the NAIC's Valuation of Securities Task Force should review the Securities Valuation Office's treatment of carbon asset risk in its ratings actions. It should consider whether the SVO policies ought to be updated, consistent with Task Force Charges B and D.¹⁰⁶
5. **Climate Risk Disclosure (Public Information):** Since an insurer that fails to manage its exposure to carbon asset risk may adversely impact investors and the public, other state insurance regulators should consider implementing a data call, similar to the one announced by the California DOI, requiring all insurers to disclose their carbon-based investments on an annual basis. The goals and outcomes would be to:
 - Require more transparent disclosure of sector concentrations by insurer and insurance group;
 - Publish insurers' carbon asset risk exposure information—both financial and strategic—on each state insurance department website.

Alternatively, it is recommended the *NAIC Climate Risk Disclosure Survey* be revised to require insurers to disclose investment data specifically focused on their fossil fuel holdings, and actions they may have undertaken to identify and reduce carbon asset risk.

3 • NAIC CAPITAL MARKETS AND INVESTMENT ANALYSIS OFFICE

1. NAIC Securities Valuation Office (SVO)

- State insurance regulators should consider whether improvements should be made to the SVO staff's credit assessment of all insurers' coal, oil and gas, and utility securities not falling under the (Filing Exempt) FE rule, keeping in mind the carbon asset risk factors outlined in section two of this report.
- Given regulators' reliance on authorized credit rating agencies, the NAIC SVO should consider working directly with the credit rating agencies to better understand how much they take carbon asset risk into account in credit assessments. Based on a more complete understanding of the current status, the SVO could provide state insurance regulators with an overall assessment of the degree to which the credit rating agencies are including carbon asset risk in their credit ratings of oil and gas, coal and utility companies and recommend possible approaches to address deficiencies.
- State insurance regulators might also consider requesting that the NAIC's Capital Markets & Investment Analysis Office engage in a more active and transparent role in stress testing insurance companies' investment portfolio exposure to these sectors on behalf of state insurance regulators.

2. NAIC Capital Markets Bureau (CMB)

- Regulators should consider directing the CMB to conduct additional independent research and analysis on the potential impact on insurance sector portfolios of the full range of carbon asset risk factors. These factors are longer-term in nature and could impact insurer investment performance and risk-based capital requirements.
- The CMB should consider including an analysis of insurers' overall holdings in the oil and gas, coal, and utility industries to identify over-exposed portfolios. State insurance regulators could also direct the CMB to conduct detailed asset reviews to identify insurers with substantial carbon asset risk exposure.
- State insurance regulators might also consider requesting that the NAIC stress test insurers investment portfolio exposure to these sectors for the NAIC membership and relevant stakeholders.

¹⁰⁶ "Valuation of Securities (E) Task Force 2016 Charges," National Association of Insurance Commissioners, February 5, 2016, http://www.naic.org/committees_e_vos.htm

4 • FINANCIAL STABILITY BOARD (FSB) TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURE

The carbon risks faced by coal, oil and gas, and utilities that rely on these fuel sources may be transferred to insurers as institutional investors that hold a financial stake in these carbon-intensive businesses. Therefore insurance companies need to assess their own carbon asset risk and implement strategies to address their potential exposure. Ceres suggests that the FSB include the following disclosure guidance, applicable to all insurers, to improve the transparency, granularity, and scope of information about insurers' investments.

1. Insurers should disclose how potential carbon asset risk is being addressed by the organization's governance and risk management processes, i.e. by:
 - Describing the company's carbon asset risk management strategy, including key processes and procedures, stress testing, and regular monitoring of carbon asset risk;
 - Providing information to demonstrate that the company's carbon asset risk strategy has been incorporated into the organization's board approved investment policy statements (IPS) and ERM framework.
2. Insurers should disclose fossil fuel investment data and results of portfolio stress tests by:
 - Disclosing comprehensive financial data that shows the company's investments in the most exposed energy sub-sectors, including oil and gas, coal and utilities;
 - Providing results of the company's assessment of its potential carbon asset risk and information on the tools used, such as in-house due diligence, outside expert opinion and analysis, scenario analysis, stress testing, and forecasting.
3. Insurers should disclose specific actions being taken to manage and reduce their potential carbon asset risk, including:
 - Qualitative and quantitative information on actions taken to reduce potential carbon asset risk to the company's financial stability, i.e. reduce volatility in investments and income streams;
 - Likely impact of these actions on the insurer's financial stability, including:
 - Capital adequacy and risk-weighted capital.
 - Liquidity considerations, such as the ability to meet current and future commitments.

Insurance Groups Analyzed

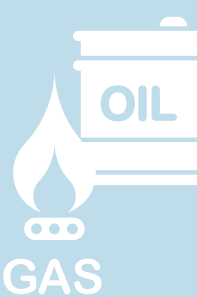

| Insurance Group Analyzed | Number of Legal Entities (Based on A.M. Best Data) |
|---|---|
| ACE Limited | 20 |
| Aegon N.V. | 6 |
| Aflac | 3 |
| American International Group, Inc. | 27 |
| Allianz SE | 19 |
| The Allstate Corporation | 23 |
| American Family Insurance | 18 |
| American Financial Group Inc. | 31 |
| Ameriprise Financial, Inc. | 4 |
| Amtrust Financial Services, Inc. | 16 |
| Auto-Owners Insurance | 6 |
| AXA | 8 |
| Berkshire Hathaway | 57 |
| CNA Financial | 12 |
| Chubb Limited | 11 |
| Erie Insurance Group | 6 |
| Genworth Financial | 9 |
| The Hartford Financial Services Group, Inc. | 22 |
| Jackson National Life Insurance Company | 3 |
| John Hancock Financial | 3 |
| Liberty Mutual Group | 57 |
| Lincoln National Corporation | 3 |
| Massachusetts Mutual Life Insurance Company | 3 |
| MetLife, Inc. | 22 |
| Nationwide Mutual Insurance Company | 42 |
| New York Life Insurance Company | 3 |
| Northwestern Mutual Life Insurance Company | 2 |
| Pacific Life Insurance Company | 2 |
| The Principal Financial Group | 2 |
| Progressive Corporation | 40 |
| Prudential Financial, Inc. | 7 |
| QBE Insurance Group Limited | 19 |
| Sammons Financial Group | 2 |
| State Farm Insurance | 12 |
| Teachers Insurance and Annuity Association | 2 |
| The Travelers Companies | 46 |
| United Services Automobile Association | 9 |
| Voya Financial | 6 |
| W.R. Berkley Corporation | 25 |
| Zurich Insurance Group | 68 |

Bloomberg Industry Classification Definitions & Methodology

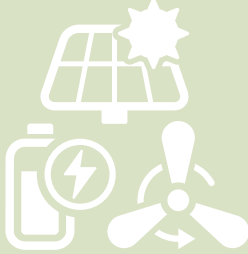
Ceres’ sector-based analysis of exposures to carbon asset risk in insurers’ investment portfolios used the Bloomberg Industry Classification System (BICS) to classify holdings in target sectors. This system is developed and maintained by Bloomberg L.P and covers both publicly traded and private companies across multiple asset classes, including common and preferred stock, corporate and government bonds, funds, and money market accounts.

Bloomberg classifies companies by identifying primary business activities as measured by source of revenue. Bloomberg then groups companies according to the end markets these businesses service. Secondary considerations for classification include operating income and assets. Additional measures, such as market perceptions, are also considered if a strong consensus exists within the market or when quantitative measures are insufficient to determine the company’s primary classification.

In order to classify holdings by sector, Ceres used Bloomberg’s automated portfolio function (PORT <GO>), allowing for the classification of holding into the four target sectors used in this analysis: **Oil & Gas, Coal, Alternate Sources, and Utilities**. The table below provides further details of how holdings are classified into each of the target sectors.¹⁰⁷

| BICS Classification Tree | Ceres Report Sector Analysis |
|---|---|
| 1. Energy: | |
| <p>Oil, Gas & Coal</p> <ul style="list-style-type: none"> • Integrated Oils • Exploration & Production <ul style="list-style-type: none"> Crude Oil & Natural Gas E&P Oil & Natural Gas Marketing & Trading Royalty Income – Oil & Gas • Midstream – Oil & Gas (Pipeline) <ul style="list-style-type: none"> Oil & Liquid Rich Gas Pipelines Dry Natural Gas Pipelines Liquefied Natural Gas (LNG) • Midstream – Oil & Gas MLP (Pipeline) • Refining & Marketing <ul style="list-style-type: none"> Petroleum Refining Petroleum Marketing • Oil & Gas Services & Equip <ul style="list-style-type: none"> Drilling & Drilling Support Oilfield Services & Equipment |  |
| <ul style="list-style-type: none"> • Coal Operations <ul style="list-style-type: none"> Coal Mining Other Petroleum & Coal Prods • Coal Operations <ul style="list-style-type: none"> Coal Mining Other Petroleum & Coal Prods |  |

¹⁰⁷ Okada, Junichi (2015): BICS Hierarchy Revision 2014, 3/30/2015, Version 5, [available through Bloomberg Professional], or Chong, Jackson (2014): BICS Brochure, 9/29/2014, Version 1, [available through Bloomberg Professional]

| BICS Classification Tree | Ceres Report Sector Analysis |
|--|--|
| 1. Energy: | |
| <p>Renewable Energy</p> <ul style="list-style-type: none"> • Biofuels • Renewable Energy Equipment <ul style="list-style-type: none"> Solar Energy Equipment Wind Energy Equipment Geothermal Energy Equipment Hydro Energy Equipment Marine Energy Equipment Fuel Cells & Industrial Batteries Smart Grid Equipment CCS Equipment Other Renewable Energy Equip • Renewable Energy Project Development <ul style="list-style-type: none"> Development & Construction Operations & Maintenance Special Maint & Construction |  <p>ALTERNATIVE ENERGY</p> |
| 2. Utilities | |
| <p>Utilities</p> <ul style="list-style-type: none"> • Integrated Utilities • Power Generation <ul style="list-style-type: none"> Fossil Electric Generation Nuclear Power Generation Renewable Energy Generation Other Power Generation Operations • Utility Networks¹⁰⁸ <ul style="list-style-type: none"> Electricity Networks Gas Utilities District Heating & Cooling Power Storage • Electric & Gas Marketing & Trading <ul style="list-style-type: none"> Energy Trading Electricity Marketing Gas Marketing Other Electric & Gas Marketing & Trading |  <p>ELECTRIC & GAS UTILITIES</p> |

108 In the BICS classification system water utilities are included within the utility networks. However, these holdings have been excluded from this analysis.

This analysis provides an initial quantification of actual investments in the oil and gas, utilities and coal sectors of the largest U.S. insurers. The figures should be considered understated, as there are additional investments not included in this analysis that would need to be considered in a comprehensive evaluation of insurers' carbon asset risk. The following actions are suggestions for a more comprehensive view of this risk:

- ➔ **Consider the whole portfolio:** Ceres' approach classified investments listed in NAIC Schedule D of insurers' statutory Annual Financial Statement, which covers common stocks, preferred stocks, and bonds. However, insurers have investments beyond those listed in Schedule D, including real estate, mortgage loans on real estate, derivatives, joint ventures, partnerships, and limited liability companies. This analysis did not include these investments. Due to the exclusion of these additional schedules, the total values reported for an insurer's investments in each sector are likely understated within the context of an insurer's entire investment portfolio.
- ➔ **Consider the maturity date of bonds:** A key consideration in assessing exposure within insurance companies is the maturity dates of the issuances. Bonds that may mature in the next few years will likely face less risk than those set to mature many years from now since climate and carbon asset risk are still developing. In order to fully understand the scope of risk to their bond portfolio, insurers will need to evaluate this aspect as well when looking at their sector concentration risks.
- ➔ **Identify sources of risk within all funds:** Within the NAIC Schedule D category of common stock, many insurers have substantial investments in funds (e.g. exchange traded funds, mutual funds), some as high as 90 percent of their equity investments. Unfortunately, it is difficult to electronically evaluate the composition of many such funds in order to identify holdings in the target sectors.¹⁰⁹ This analysis attempted to capture the extent to which insurers are exposed to investments in target sectors through their investments in funds where possible, but approximately 70 percent of these total holdings in funds were not easily classifiable or were unclassifiable, resulting in an under-estimation of the total investments insurers have made in the coal, oil and gas, and utilities sectors. The portion of funds that were unclassifiable varied by insurance group—some insurers had portfolios where 100 percent of the funds were classifiable, while other fund portfolios could not be classified at all—leaving it difficult to make valid comparisons across insurance groups.
- ➔ **Quantify portfolio risks facing individual insurers within a group:** This analysis focused on quantifying the fossil fuel sector-based risks at the group level. However, it would also be informative to understand carbon asset risk exposure at the level of each insurance company or legal entity. The diversification that occurs from the aggregation of legal entities could obscure instances where one insurer within the larger group may have larger exposure to carbon asset risk than the group as a whole. This is particularly important for regulators to consider, as insolvencies most often happen at the legal entity level rather than at the group level.

109 Bloomberg terminals do not provide insight into the composition of privately traded funds; so many funds were unclassifiable through that mechanism. Furthermore, some funds were comprised of investments in additional funds, rendering them unclassifiable with the resources available.

- ➔ **Identify other sources of risk:** In addition, there are other sources of carbon asset risk to insurers' investment portfolios that are outside of the scope of this paper. However, these risk considerations should be taken into account in any insurers' comprehensive analysis of carbon asset risk in their portfolio. Some specific examples include:
 - a. **Sovereign and municipal bonds:** This analysis addresses investments in municipal bonds solely from the perspective of direct investments in utility projects. It is also important to understand the risks associated with investing in any sovereign or municipal bond where the country or municipality is heavily reliant on oil, gas or coal revenues. For example, any significant disruption in the oil and gas market could impact default risks for countries such as Russia or Venezuela or states such as Alaska or North Dakota that are dependent on fossil fuel revenues.¹¹⁰
 - b. **Investments in other carbon intensive sectors:** In addition to the sectors targeted in this report, there are other key sectors to consider when evaluating the overall climate and carbon asset risk to an investment portfolio. Fossil fuel end users such as the transportation sector are similarly susceptible to changes that disrupt the oil and gas sector. Additionally, sectors such as metals and mining or cement production can face risk due to the carbon intensity of their operations.

110 Jack Farhy and Shawn Donnan, "IMF and World Bank Move to Forestall Oil-Led Defaults," *Financial Times*, January 27, 2016: www.ft.com/cms/s/0/9759f42a-c51b-11e5-b3b1-7b2481276e45.html#axzz3yxMcpHcB

Detail of Insurance Group Bond Holdings in Oil & Gas (12/31/2014)

| Insurance Group | Total Cash & Invested Assets U.S. \$ Millions* | Total Bond Investment (From Schedule D, less Parents & Affiliates) U.S. \$ Millions | Bond Value Invested in Oil & Gas U.S. \$ Millions | Percent of Total Bond Value Invested in Oil & Gas |
|---------------------|---|--|---|---|
| Ameriprise | \$110,641 | \$25,023 | \$3,091 | 12.4% |
| Lincoln National | \$218,836 | \$84,999 | \$9,993 | 11.8% |
| Voya Financial | \$188,120 | \$80,127 | \$8,766 | 10.9% |
| Northwestern Mutual | \$213,871 | \$137,491 | \$13,628 | 9.9% |
| Allianz | \$125,801 | \$88,824 | \$8,284 | 9.3% |
| Jackson National | \$187,690 | \$50,990 | \$4,539 | 8.9% |
| John Hancock | \$261,693 | \$70,028 | \$6,169 | 8.8% |
| Allstate | \$75,637 | \$58,792 | \$4,831 | 8.2% |
| Nationwide | \$161,425 | \$60,625 | \$4,976 | 8.2% |
| Pacific Life | \$61,885 | \$35,998 | \$2,872 | 8.0% |
| Genworth | \$65,609 | \$50,004 | \$3,921 | 7.8% |
| USAA | \$46,263 | \$37,927 | \$2,957 | 7.8% |
| Erie | \$13,938 | \$9,462 | \$734 | 7.8% |
| AXA | \$164,187 | \$41,529 | \$3,105 | 7.5% |
| Principal | \$147,810 | \$55,131 | \$4,037 | 7.3% |
| AIG | \$332,238 | \$233,043 | \$16,153 | 6.9% |
| Prudential | \$490,245 | \$225,173 | \$14,116 | 6.3% |
| Mass Mutual | \$187,288 | \$94,235 | \$5,397 | 5.7% |
| New York Life | \$221,928 | \$166,079 | \$9,413 | 5.7% |
| CNA | \$39,769 | \$38,293 | \$1,967 | 5.1% |
| TIAA Family | \$241,117 | \$201,490 | \$10,345 | 5.1% |
| Aflac** | \$99,114 | \$105,134 | \$5,212 | 5.0% |
| MetLife | \$570,547 | \$309,340 | \$13,504 | 4.4% |
| Aegon | \$192,391 | \$75,806 | \$3,155 | 4.2% |
| Amtrust | \$2,362 | \$2,314 | \$95 | 4.1% |
| Zurich | \$65,034 | \$46,874 | \$1,894 | 4.0% |
| Berkshire Hathaway | \$161,033 | \$11,596 | \$467 | 4.0% |
| American Family | \$16,661 | \$12,391 | \$477 | 3.8% |
| Liberty Mutual | \$57,422 | \$51,015 | \$1,903 | 3.7% |
| Hartford | \$200,612 | \$91,964 | \$3,421 | 3.7% |
| American Financial | \$35,016 | \$30,965 | \$975 | 3.1% |
| Travelers | \$61,944 | \$57,718 | \$1,766 | 3.1% |
| State Farm | \$200,645 | \$137,437 | \$3,872 | 2.8% |
| Auto Owners | \$17,662 | \$14,421 | \$359 | 2.5% |
| Chubb | \$29,102 | \$26,924 | \$574 | 2.1% |
| Sammons | \$52,913 | \$49,523 | \$1,039 | 2.1% |
| ACE | \$21,865 | \$19,738 | \$389 | 2.0% |
| W.R. Berkley | \$13,320 | \$11,367 | \$204 | 1.8% |
| QBE | \$4,185 | \$2,272 | \$35 | 1.5% |
| Progressive | \$17,020 | \$14,101 | \$24 | 0.2% |

* Total Cash and Invested Assets figures sourced from NAIC data and matched to legal entities covered in AM Best investment data. Please note that Total Cash and Invested Assets figures use Book Adjusted Carrying Value for bonds, while Total Bond Investment and Bond Value Invested in target sector figures use Fair Market Value. Because of this, these values are not perfectly comparable, but they can provide a general perspective of the size of the bond portfolio or the investments in target sectors as compared to the total investment portfolio.

** The larger value for Aflac's Total Bond Investments compared to their Total Cash and Invested Assets is likely due to the difference in accounting measures used to calculate these figures (see footnote above).

Detail of Insurance Group Bond Holdings in Utilities (12/31/14)

| Insurance Group | Total Cash & Invested Assets U.S. \$ Millions* | Total Bond Investment (From Schedule D, less Parents & Affiliates) U.S. \$ Millions | Bond Value Invested in Utilities U.S. \$ Millions | Percent of Total Bond Value Invested in Utilities |
|---------------------|---|--|---|---|
| John Hancock | \$261,693 | \$70,028 | \$11,731 | 16.8% |
| Pacific Life | \$61,885 | \$35,998 | \$5,761 | 16.0% |
| Lincoln National | \$218,836 | \$84,999 | \$12,282 | 14.4% |
| Ameriprise | \$110,641 | \$25,023 | \$2,807 | 11.2% |
| Northwestern Mutual | \$213,871 | \$137,491 | \$14,742 | 10.7% |
| Genworth | \$65,609 | \$50,004 | \$4,941 | 9.9% |
| New York Life | \$221,928 | \$166,079 | \$15,965 | 9.6% |
| TIAA Family | \$241,117 | \$201,490 | \$19,343 | 9.6% |
| Jackson National | \$187,690 | \$50,990 | \$4,661 | 9.1% |
| Allstate | \$75,637 | \$58,792 | \$5,343 | 9.1% |
| Voya Financial | \$188,120 | \$80,127 | \$6,800 | 8.5% |
| Chubb | \$29,102 | \$26,924 | \$2,245 | 8.3% |
| Berkshire Hathaway | \$161,033 | \$11,596 | \$936 | 8.1% |
| Aflac** | \$99,114 | \$105,134 | \$8,436 | 8.0% |
| Allianz | \$125,801 | \$88,824 | \$7,086 | 8.0% |
| USAA | \$46,263 | \$37,927 | \$2,927 | 7.7% |
| AXA | \$164,187 | \$41,529 | \$3,199 | 7.7% |
| Prudential | \$490,245 | \$225,173 | \$16,780 | 7.5% |
| Liberty Mutual | \$57,422 | \$51,015 | \$3,738 | 7.3% |
| Principal | \$147,810 | \$55,131 | \$4,025 | 7.3% |
| State Farm | \$200,645 | \$137,437 | \$9,106 | 6.6% |
| CNA | \$39,769 | \$38,293 | \$2,501 | 6.5% |
| Erie | \$13,938 | \$9,462 | \$615 | 6.5% |
| AIG | \$332,238 | \$233,043 | \$14,598 | 6.3% |
| Nationwide | \$161,425 | \$60,625 | \$3,735 | 6.2% |
| W.R. Berkley | \$13,320 | \$11,367 | \$696 | 6.1% |
| MetLife | \$570,547 | \$309,340 | \$18,114 | 5.9% |
| American Family | \$16,661 | \$12,391 | \$643 | 5.2% |
| Aegon | \$192,391 | \$75,806 | \$3,908 | 5.2% |
| Hartford | \$200,612 | \$91,964 | \$4,639 | 5.0% |
| American Financial | \$35,016 | \$30,965 | \$1,500 | 4.8% |
| Zurich | \$65,034 | \$46,874 | \$2,020 | 4.3% |
| Mass Mutual | \$187,288 | \$94,235 | \$3,734 | 4.0% |
| Auto Owners | \$17,662 | \$14,421 | \$528 | 3.7% |
| ACE | \$21,865 | \$19,738 | \$722 | 3.7% |
| Travelers | \$61,944 | \$57,718 | \$1,762 | 3.1% |
| Amtrust | \$2,362 | \$2,314 | \$46 | 2.0% |
| Sammons | \$52,913 | \$49,523 | \$888 | 1.8% |
| Progressive | \$17,020 | \$14,101 | \$70 | 0.5% |
| QBE | \$4,185 | \$2,272 | \$0 | 0.0% |

* Total Cash and Invested Assets figures sourced from NAIC data and matched to legal entities covered in AM Best investment data. Please note that Total Cash and Invested Assets figures use Book Adjusted Carrying Value for bonds, while Total Bond Investment and Bond Value Invested in target sector figures use Fair Market Value. Because of this, these values are not perfectly comparable, but they can provide a general perspective of the size of the bond portfolio or the investments in target sectors as compared to the total investment portfolio.

** The larger value for Aflac's Total Bond Investments compared to their Total Cash and Invested Assets is likely due to the difference in accounting measures used to calculate these figures (see footnote above).

Detail of Insurance Group Bond Holdings in Coal (12/31/14)

| Insurance Group | Total Cash & Invested Assets U.S. \$ Millions* | Total Bond Investment (From Schedule D, less Parents & Affiliates) U.S. \$ Millions | Bond Value Invested in Coal U.S. \$ Millions | Percent of Total Bond Value Invested in Coal |
|---------------------|---|--|--|--|
| Northwestern Mutual | \$213,871 | \$137,491 | \$253 | 0.18% |
| Ameriprise | \$110,641 | \$25,023 | \$40 | 0.16% |
| ACE | \$21,865 | \$19,738 | \$21 | 0.11% |
| Allstate | \$75,637 | \$58,792 | \$53 | 0.09% |
| Lincoln National | \$218,836 | \$84,999 | \$72 | 0.09% |
| TIAA Family | \$241,117 | \$201,490 | \$167 | 0.08% |
| Pacific Life | \$61,885 | \$35,998 | \$29 | 0.08% |
| New York Life | \$221,928 | \$166,079 | \$102 | 0.06% |
| Prudential | \$490,245 | \$225,173 | \$139 | 0.06% |
| Mass Mutual | \$187,288 | \$94,235 | \$56 | 0.06% |
| Nationwide | \$161,425 | \$60,625 | \$32 | 0.05% |
| MetLife | \$570,547 | \$309,340 | \$155 | 0.05% |
| Genworth | \$65,609 | \$50,004 | \$25 | 0.05% |
| AIG | \$332,238 | \$233,043 | \$101 | 0.04% |
| Allianz | \$125,801 | \$88,824 | \$33 | 0.04% |
| Principal | \$147,810 | \$55,131 | \$21 | 0.04% |
| American Financial | \$35,016 | \$30,965 | \$10 | 0.03% |
| Voya Financial | \$188,120 | \$80,127 | \$24 | 0.03% |
| Liberty Mutual | \$57,422 | \$51,015 | \$11 | 0.02% |
| Erie | \$13,938 | \$9,462 | \$2 | 0.02% |
| Aegon | \$192,391 | \$75,806 | \$13 | 0.02% |
| Travelers | \$61,944 | \$57,718 | \$10 | 0.02% |
| John Hancock | \$261,693 | \$70,028 | \$10 | 0.01% |
| CNA | \$39,769 | \$38,293 | \$5 | 0.01% |
| Berkshire Hathaway | \$161,033 | \$11,596 | \$1 | 0.01% |
| Chubb | \$29,102 | \$26,924 | \$2 | 0.01% |
| Hartford | \$200,612 | \$91,964 | \$4 | 0.00% |
| Jackson National | \$187,690 | \$50,990 | \$2 | 0.00% |
| Zurich | \$65,034 | \$46,874 | \$1 | 0.00% |
| AXA | \$164,187 | \$41,529 | \$1 | 0.00% |
| Amtrust | \$2,362 | \$2,314 | \$0 | 0.00% |
| QBE | \$4,185 | \$2,272 | \$0 | 0.00% |
| W.R. Berkley | \$13,320 | \$11,367 | \$0 | 0.00% |
| American Family | \$16,661 | \$12,391 | \$0 | 0.00% |
| Progressive | \$17,020 | \$14,101 | \$0 | 0.00% |
| Auto Owners | \$17,662 | \$14,421 | \$0 | 0.00% |
| USAA | \$46,263 | \$37,927 | \$0 | 0.00% |
| Sammons | \$52,913 | \$49,523 | \$0 | 0.00% |
| Aflac** | \$99,114 | \$105,134 | \$0 | 0.00% |
| State Farm | \$200,645 | \$137,437 | \$0 | 0.00% |

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