

The Climate Accountability Scorecard

*Ranking Major Fossil Fuel Companies on
Climate Deception, Disclosure, and Action*
www.ucsusa.org/climatescorecard

Appendix: Fully Disclosing Climate Risks

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Scoring Guide

TABLE 1. Fully Disclosing Climate Risks Scoring Guide

Regulatory Risks	
Disclosure of regulatory risks discloses of laws and regulations that will affect it, and discloses the impact of complying with those existing or proposed laws and regulations. ¹	
Advanced (+2)	<p>Company meets all of the criteria for “good” disclosure, and includes:</p> <ol style="list-style-type: none"> 1. An assessment of whether these laws and regulations will have, or are reasonably likely to have, a material impact on the company’s liquidity, capital resources, or results of operations; as well as the basis for the company’s conclusions 2. Any material estimated capital expenditures for environmental control facilities 3. How the company will respond
Good (+1)	Company provides a detailed analysis of existing and proposed laws and regulations relating to climate change and their possible effects on the company, including potential financial impacts (quantified, when feasible).
Fair (0)	Company identifies specific existing and proposed laws and regulations relating to climate change that may affect the company, but does not address how it in particular will be affected by those regulations.
Poor (-1)	Company mentions the general existence of risk associated with current or proposed laws relating to climate change, but does not identify specific laws or regulations and/or does not identify effects particular to the company (as opposed to effects that could apply to the sector as a whole).
Egregious (-2)	Company does not disclose its regulatory risks.
Physical Risks	
Disclosure of physical risks: The company discloses physical risks it faces that are caused by or exacerbated by climate change and how the company plans to address these risks.	
Advanced (+2)	<p>Company meets all of the criteria under “good,” and also discloses:</p> <ol style="list-style-type: none"> 1. An assessment of whether these physical risks “will have, or are reasonably likely to have, a material impact on the company’s liquidity, capital resources or results of operations,” as well as the basis for the company’s conclusions (SEC 2010) 2. Past physical impacts, if material

Good (+1)	<p>Company discusses the physical climate-related risks it faces, with some specific details, including at least one of the following:</p> <ol style="list-style-type: none"> 1. The operational segments and/or specific company facilities that might be impacted 2. The magnitude and time frames of the anticipated impacts (quantified, when feasible) 3. How the company plans to respond to physical impacts
Fair (0)	<p>Company acknowledges physical risks it faces and includes some discussion of climate change as a contributor to those risks, but with few or no details about the nature of those risks, their magnitude, or how they may impact the company.</p>
Poor (-1)	<p>Company generally acknowledges physical risks it faces, such as weather, but does not include discussion of climate change as a contributor to those risks.</p>
Egregious (-2)	<p>Company does not disclose its physical risks.</p>
Market and Other Risks and Opportunities	
Disclosure of market and other indirect risks and opportunities: The company discloses indirect risks associated with climate change, such as impacts on demand or reputation, and how the company will anticipate and respond to these risks.	
Advanced (+2)	<p>Company provides a detailed analysis of how its financial condition or operations may be affected by climate-related developments in the marketplace, including all points under “good” disclosure, as well as:</p> <ol style="list-style-type: none"> 1. Impacts on suppliers and customers (e.g., changes in demand for new and existing products and services due to their greenhouse gas emissions profiles) 2. Impacts on the company’s reputation 3. Magnitude of the anticipated risks and opportunities (quantified, when feasible) 4. Basis for the company’s conclusions
Good (+1)	<p>Company provides some details or examples of how it may be affected by indirect risks and opportunities, including:</p> <ol style="list-style-type: none"> 1. An assessment of whether identified risks and opportunities will have, or are reasonably likely to have, a material impact on the company’s liquidity, capital resources, or results of operations 2. Key variables and other qualitative and quantitative factors (e.g., financial data, anticipated external macro-economic conditions, interest rate, or economic growth trends), which are particular to and necessary for an understanding and evaluation of the individual company
Fair (0)	<p>Company provides some details or examples of how it may be affected by indirect risks and opportunities from climate change, but provides limited analysis of their potential financial impacts for the company.</p>
Poor (-1)	<p>Company broadly mentions shifting market and other indirect risks and opportunities from climate change, but does not specify potential impacts on the company.</p>
Egregious (-2)	<p>Company does not disclose its market or indirect risks.</p>
Corporate Governance	
Disclosure of corporate governance on climate-related risks by board and senior management: The company	

discloses how its board and executives will monitor and manage climate-related risks.	
Advanced (+2)	Company meets all four of the criteria under “good” disclosure.
Good (+1)	Company discloses some details of corporate governance on greenhouse gas emissions management and climate risks and opportunities, including disclosing at least two of the following: <ol style="list-style-type: none"> 1. How the board is engaged on climate risks and opportunities 2. Which executives are in charge of addressing these risks and opportunities 3. Whether and how executive compensation is tied to meeting corporate climate objectives 4. How senior management and the board monitor and gauge the effectiveness of the company’s climate change strategies and goals
Fair (0)	Company mentions or makes generic statements about climate-related environmental governance.
Poor (-1)	Company mentions or makes generic statements about environmental governance, but does not specifically describe climate-related governance.
Egregious (-2)	Company provides no disclosure of corporate governance on climate issues.

1 Where the necessity and certainty of eventual regulatory action to address global climate goals is clear, the absence of a specific regulatory proposal should not relieve companies of their disclosure obligations.

DATA SOURCES: 2016 SEC 10-KS OR 20-FS AND CDP DISCLOSURES, IF DISCUSSED IN SEC FILINGS

TABLE 2. Fully Disclosing Climate Risks Scoring Bands

Area Aggregate Score	Definition	Point range
Advanced	Company is demonstrating best practice in the area	+6 - +8
Good	Company is meeting emerging societal expectations in this area	+3 - +5
Fair	Company’s performance in this area is neither positive nor negative	(-2) - +2
Poor	Company is falling short of emerging societal expectations in this area	(-5) - (-3)
Egregious	Company is acting very irresponsibly in this area	(-8) - (-6)

Arch Coal

DISCLOSURE OF REGULATORY RISKS

SCORE:

Good (+1): Company provides a detailed analysis of existing and proposed laws and regulations relating to climate change and their possible effects on the company, including potential financial impacts (quantified, when feasible).

RATIONALE:

Arch Coal provides a detailed analysis of existing and proposed laws and regulations relating to climate change and their possible effects on the company, including potential financial impacts (quantified, when feasible) (Arch Coal Inc. 2016).

SOURCE DATA

- “While coal’s prospects with regard to natural gas should improve, the effects of new regulations on the use of coal, particularly regarding carbon dioxide emissions and climate change impacts, are evolving. EIA’s Annual Energy Outlook forecast does not reflect the impact of carbon regulations **such as the Clean Power Plan** on domestic coal consumption for power generation. However, EIA has published an analysis on the effects the Clean Power Plan would have on domestic coal consumption. EIA believes that even though the regulation targets coal use in power generation, coal will maintain a critical role for power generation in the U.S.” (p. 11)
- “For example, in order to obtain a federal coal lease, an environmental impact statement must be prepared to assist the BLM in determining the potential environmental impact of lease issuance, including any collateral effects from the mining, transportation and burning of coal, which may in some cases include a review of impacts on climate change. **The authorization, permitting and implementation requirements imposed by federal, state and local authorities may be costly and time consuming and may delay commencement or continuation of mining operations.** In the states where we operate, the applicable laws and regulations also provide that a mining permit or modification can be delayed, refused or revoked if officers, directors, shareholders with specified interests or certain other affiliated entities with specified interests in the applicant or permittee have, or are affiliated with another entity that has, outstanding permit violations. Thus, past or ongoing violations of applicable laws and regulations could provide a basis to revoke existing permits and to deny the issuance of additional permits.” (p. 24)
- “*Clean Air Act.* The federal Clean Air Act and similar state and local laws that regulate air emissions affect coal mining directly and indirectly. Direct impacts on coal mining and processing operations include Clean Air Act permitting requirements and emissions control requirements relating to particulate matter which may include controlling fugitive dust. The Clean Air Act also indirectly affects coal mining operations, for example, by extensively regulating the emissions of fine particulate matter measuring 2.5 micrometers in diameter or smaller, sulfur dioxide, nitrogen oxides, mercury and other compounds emitted by coal-fueled power plants and industrial boilers, which are the largest end-users of our coal. Continued tightening of the already stringent regulation of emissions is likely, such as the Mercury and Air Toxics Standard (MATS), finalized in 2011 and discussed in more detail below. In addition, the U.S. Environmental Protection Agency, which we refer to as EPA, has issued regulations on additional emissions, such as greenhouse gases (GHG), from new, modified, reconstructed and existing electric generating units, including coal-fired plants. Other GHG regulations apply to industrial boilers (see discussion of Climate Change, below). **These regulations could eventually reduce the demand for coal.**” (p. 26)
- “Interstate Commerce: EPA received public comment on the rule in January 2016 and will issue a final rule in the near future. It is likely the final rule will increase the pressure to install controls or shut down units, which may further adversely affect the demand for coal.” (p. 28)
- “*Climate Change.* Carbon dioxide, which is considered to be a greenhouse gas, is a by-product of burning coal. Global climate issues, including with respect to greenhouse gases such as carbon dioxide and the relationship that greenhouse gases may have with perceived global warming, continue to attract significant public and scientific attention. For example, the Fourth and Fifth Assessment Reports of the Intergovernmental Panel on Climate Change have expressed concern about the impacts of human activity, especially from fossil fuel combustion, on global climate issues. As a result of the public

and scientific attention, several governmental bodies increasingly are focusing on global climate issues and, more specifically, levels of emissions of carbon dioxide from coal combustion by power plants. Future regulation of greenhouse gas emissions in the United States could occur pursuant to future U.S. treaty obligations, statutory or regulatory changes and the federal, state or local level or otherwise.

Demand for coal also may be impacted by international efforts to reduce emissions from greenhouse gases. For example, in December 2015, representatives of 195 nations reached a landmark climate accord that will, for the first time, commit participating countries to lowering greenhouse gas emissions. Further, the United States and a number of international development banks, such as the World Bank, the European Investment Bank and European Bank for Reconstruction and Development, have announced that they will no longer provide financing for the development of new coal-fueled power plants, subject to very narrow exceptions.”

- “Although the U.S. Congress has considered various legislative proposals that would address global climate issues and greenhouse gas emissions, no such federal proposals have been adopted into law to date. In the absence of U.S. federal legislation on these topics, the U.S. Environmental Protection Agency (the “EPA”) has been the primary source of federal oversight, although future **regulation of greenhouse gases and global climate matters in the United States could occur pursuant to future U.S. treaty obligations, statutory or regulatory changes under the Clean Air Act, federal adoption of a greenhouse gas regulatory scheme or otherwise.**” (p. 29)
- “In 2007, the U.S. Supreme Court held that the EPA has authority under the Clean Air Act to regulate carbon dioxide emissions from automobiles and can decide against regulation only if the EPA determines that carbon dioxide does not significantly contribute to climate change and does not endanger public health or the environment. Although the Supreme Court’s holding did not expressly involve the EPA’s authority to regulate greenhouse gas emissions from stationary sources, such as coal-fueled power plants, the EPA since has determined on its own that it has the authority to regulate greenhouse gas emissions from power plants, and the EPA has published a formal determination that six greenhouse gases, including carbon dioxide, endanger both the public health and welfare of current and future generations. In 2014, the EPA proposed a sweeping rule, known as the “Clean Power Plan,” to cut carbon emissions from existing electric generating units, including coal-fired power plants. A final version of the Clean Power Plan was adopted in August 2015. The final version of the Clean Power Plan aims to reduce carbon dioxide emissions from electrical power generation by 32% within 15 years relative to 2005 levels through reduction of emissions from coal-burning power plants and increased use of renewable energy and energy conservation methods. Under the Clean Power Plan, states are free to reduce emissions by various means and must submit emissions reduction plans to the EPA by September 2016 or, with an approved extension, September 2018. If a state has not submitted a plan by then, the Clean Power Plan authorizes the EPA to impose its own plan on that state. In order to determine a state’s goal, the EPA has divided the country into three regions based on connected regional electricity grids. States are to implement their plans by focusing on (i) increasing the generation efficiency of existing fossil fuel plants, (ii) substituting lower carbon dioxide emitting natural gas generation for coal-powered generation and (iii) substituting generation from new zero carbon dioxide emitting renewable sources for fossil fuel powered generation. States are permitted to use regionally available low carbon generation sources when substituting for in-state coal generation and coordinate with other states to develop multi-state plans. Following the adoption, 27 states sued the EPA, claiming that the EPA overstepped its legal authority in adopting the Clean Power Plan. In February 2016, the U.S. Supreme Court ordered the EPA to halt enforcement of the Clean Power Plan until a lower court rules on the lawsuit and until the Supreme Court determines whether or not to hear the case. If the Supreme Court does decide to hear the case, then the stay would remain in effect until the Supreme Court rules. **If the Clean Power Plan ultimately is upheld in its current form, it is projected to significantly curtail the construction of new coal-fired power plants and have a materially adverse impact on the demand for coal nationally.**”
- “Several U.S. states have enacted legislation establishing greenhouse gas emissions reduction goals or requirements or joined regional greenhouse gas reduction initiatives. Some states also have enacted legislation or regulations requiring electricity suppliers to use renewable energy sources to generate a certain percentage of power or that provide financial incentives to electricity suppliers for using renewable energy sources. For example, nine northeastern states currently are members of the Regional Greenhouse Gas Initiative, which is a mandatory cap-and-trade program established in 2005 to cap regional carbon dioxide emissions from power plants. Six midwestern states and one Canadian province entered into the Midwestern Regional Greenhouse Gas Reduction Accord to establish voluntary regional greenhouse gas reduction

targets and develop a voluntary multi-sector cap-and-trade system to help meet the targets, although it has been reported that the members no longer are actively pursuing the group's activities. Lastly, California and Quebec remain members of the Western Climate Initiative, which was formed in 2008 to establish a voluntary regional greenhouse gas reduction goal and develop market-based strategies to achieve emissions reductions, and those two jurisdictions have adopted their own greenhouse gas cap-and-trade regulations. Several states and provinces that originally were members of these organizations, as well as some current members, have joined the new North America 2050 initiative, which seeks to reduce greenhouse gas emissions and create economic opportunities aside from cap-and-trade programs. Any particular state, or any of these or other regional group, may have or adopt in the future rules or policies that cause some users of coal to switch from coal to a lower carbon fuel. **There can be no assurance at this time that a carbon dioxide cap-and-trade-program, a carbon tax or other regulatory or policy regime, if implemented by any one or more states or regions in which our customers operate or at the federal level, will not affect the future market for coal in those states or regions and lower the overall demand for coal.**" (p.30)

- "We expect that many of the new power plants needed in the United States to meet increasing demand for electricity generation will be fueled by natural gas because gas-fired plants are cheaper to construct and permits to construct these plants are easier to obtain as natural gas is seen as having a lower environmental impact than coal-fueled generation. In addition, state and federal mandates for increased use of electricity from renewable energy sources also have an impact on the market for our coal. Several states have enacted legislative mandates requiring electricity suppliers to use renewable energy sources to generate a certain percentage of power. There have been numerous proposals to establish a similar uniform, national standard although none of these proposals have been enacted to date. Possible advances in technologies and incentives, such as tax credits, to enhance the economics of renewable energy sources could make these sources more competitive with coal. **Any reduction in the amount of coal consumed by electric power generators could reduce the price of coal that we mine and sell, thereby reducing our revenues and materially and adversely affecting our business and results of operations.**" (p. 41)
- "The Clean Power Plan, under review by U.S. courts, would severely limit emissions of carbon dioxide which would adversely affect our ability to sell coal." (p. 47)
- "***The demand for our products or our securities, as well as the number and quantity of viable financing alternatives, may be significantly impacted by increased regulation or other scrutiny of topics related to coal combustion.*** Global climate issues and topics related to greenhouse gas emissions, such as the impact of fossil fuel combustion, continue to attract increasing public scrutiny. Legislative or regulatory efforts at the international, federal, state or local level to control emissions from the combustion of coal may result in electricity generators increasingly using fuel sources other than coal or closures of coal-fueled power plants. In addition, certain banks and other financing sources have taken actions to limit available financing for the development of new coal-fueled power plants, which also may adversely impact the future global demand for coal. Further, there have been recent efforts by members of the general financial and investment communities, such as investment advisors, sovereign wealth funds, public pension funds, universities and other groups, to divest themselves and to promote the divestment of securities issued by companies involved in the fossil fuel extraction market, such as coal producers. Those entities also have been pressuring lenders to limit financing available to such companies. These efforts may adversely affect the market for our securities and our ability to access capital and financial markets in the future. Any future laws, regulations or other policies of the nature described above may adversely impact our business in material ways. The degree to which any particular law, regulation or policy impacts us will depend on several factors, including the substantive terms involved, the relevant time periods for enactment and any related transition periods. We routinely attempt to evaluate the potential impact on us of any proposed laws, regulations or policies, which requires that we make several material assumptions. From time to time, we determine that the impact of one or more such laws, regulations or policies, if adopted and ultimately implemented as proposed, may result in materially adverse impacts on our operations, financial condition or cash flow; however, we often are not able to reasonably quantify such impacts. **In general, however, it is likely that any future laws, regulations or other policies aimed at reducing greenhouse gas emissions will negatively impact demand for our coal.**"
- "***Our failure to obtain and renew permits necessary for our mining operations could negatively affect our business.***

Mining companies must obtain numerous permits that impose strict regulations on various environmental and operational matters in connection with coal mining. These include permits issued by various federal, state and local agencies and regulatory bodies. The permitting rules, and the interpretations of these rules, are complex, change frequently and are often subject to discretionary interpretations by the regulators, all of which may make compliance more difficult or impractical, and may possibly preclude the continuance of ongoing operations or the development of future mining operations. The public, including non-governmental organizations, anti-mining groups and individuals, have certain statutory rights to comment upon and submit objections to requested permits and environmental impact statements prepared in connection with applicable regulatory processes, and otherwise engage in the permitting process, including bringing citizens' lawsuits to challenge the issuance of permits, the validity of environmental impact statements or performance of mining activities. Accordingly, required permits may not be issued or renewed in a timely fashion or at all, or permits issued or renewed may be conditioned in a manner that may restrict our ability to efficiently and economically conduct our mining activities, any of which would materially reduce our production, cash flow and profitability. (p.48)"

- "New legislation or administrative regulations or new judicial interpretations or administrative enforcement of existing laws and regulations, including proposals related to the protection of the environment that would further regulate and tax the coal industry, may also require us to change operations significantly or incur increased costs. Such changes could have a material adverse effect on our financial condition and results of operations." (p. 49) (Arch Coal Inc. 2016).

DISCLOSURE OF PHYSICAL RISKS

SCORE:

Poor (-1): Company generally acknowledges physical risks it faces, such as weather, but does not include discussion of climate change as a contributor to those risks.

RATIONALE:

Arch Coal generally acknowledges physical risks to the company, including "adverse weather and natural disasters, such as heavy rains or snow, flooding and other natural events," but does not include discussion of climate change as a contributor to those risks (Arch Coal Inc. 2016).

SOURCE DATA

- "We mine coal at underground and surface mining operations. Certain factors beyond our control, including those listed below, could disrupt our coal mining operations, adversely affect production and shipments and increase our operating costs:
adverse weather and natural disasters, such as heavy rains or snow, flooding and other natural events affecting operations, transportation or customers" (p. 42) (Arch Coal Inc. 2016).

DISCLOSURE OF MARKET AND OTHER INDIRECT RISKS AND OPPORTUNITIES

SCORE:

Poor (-1): Company broadly mentions shifting market and other indirect risks and opportunities from climate change, but does not specify potential impacts on the company.

RATIONALE:

Arch Coal broadly mentions shifts in technology and changes in demand as indirect risks, but does not specify potential impacts on the company (Arch Coal, Inc. 2016).

SOURCE DATA

"Possible advances in technologies and incentives, such as tax credits, to enhance the economics of renewable energy sources could make these sources more competitive with coal. Any reduction in the amount of coal consumed by electric power generators could reduce the price of coal that we mine and sell, thereby **reducing our revenues and materially and adversely affecting our business and results of operations.**" (p. 41) (Arch Coal Inc. 2016).

ARCH COAL CONTINUED

DISCLOSURE OF CORPORATE GOVERNANCE ON CLIMATE-RELATED RISKS BY BOARD AND SENIOR MANAGEMENT

SCORE:

Egregious (-2): Company provides no disclosure of corporate governance on climate issues.

RATIONALE:

Arch Coal provides no disclosure of corporate governance on climate issues.

SOURCE DATA

Arch Coal provides no disclosure of corporate governance on climate issues.

FULLY DISCLOSING CLIMATE RISKS SCORE: POOR (-3)

BP

DISCLOSURE OF REGULATORY RISKS

SCORE:

Good (+1): Company provides a detailed analysis of existing and proposed laws and regulations relating to climate change and their possible effects on the company, including potential financial impacts (quantified, when feasible).

RATIONALE:

BP provides a detailed analysis of existing and proposed laws and regulations relating to climate change and their possible effects on the company, including potential financial impacts (quantified, when feasible) (BP PLC 2016).

SOURCE DATA

- “Meeting the climate challenge requires efforts by all – governments, companies and consumers. We believe governments must lead by providing a clear, stable and effective climate policy framework, including putting a price on carbon – one that treats all carbon equally. **We expect that greenhouse gas (GHG) policy will have an increasing impact on our businesses, operating costs and strategic planning, but may also offer opportunities for the development of lower-carbon technologies and businesses.** There is a growing number of emission pricing schemes globally, including in Europe, California and China, additional monitoring regulations in the US, and more focus on reducing flaring and methane emissions in many jurisdictions. [...] Climate change and carbon pricing – public policies could increase costs and reduce future revenue and strategic growth opportunities. **Changes in laws, regulations and obligations relating to climate change could result in substantial capital expenditure, taxes and reduced profitability. In the future, these could potentially impact our assets, revenue generation and strategic growth opportunities.**” (p. 53)
- “Current and proposed fuel and product specifications, emission controls (including control of vehicle emissions), climate change programmes and regulation of unconventional oil and gas extraction under a number of environmental laws may have a significant effect on the production, sale and profitability of many of BP’s products. [...] Significant legislation and regulation in the US and the EU affecting our businesses and profitability includes the following:
United States
 - The Clean Air Act (CAA) regulates air emissions, permitting, fuel specifications and other aspects of our production, distribution and marketing activities. Stricter limits on sulphur in fuels will affect us in future, as will actions on greenhouse gas (GHG) emissions and other air pollutants. The revised lower ambient air quality standard for ozone, finalized by the Environmental Protection Agency (EPA) in October 2015, as well as proposed new restrictions on methane and volatile organic emissions and on gas flaring, will affect our US operations in the future. States may also have separate, stricter air emission laws in addition to the CAA.
 - The Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007 affect our US fuel markets by, among other things, imposing renewable fuel mandates and imposing GHG emissions thresholds for certain renewable fuels. States such as California also impose additional carbon fuel standards as well as Low Emission Vehicle (LEV) and Zero Emission Vehicle (ZEV) standards imposed on vehicle manufacturers. These regulations will have an impact on fuel demand and product mix in California and those states adopting LEV and ZEV standards. [...]
 - The Outer Continental Shelf Land Act and other statutes give the Department of Interior (DOI) and the Bureau of Land Management (BLM) authority to regulate operations and air emissions on offshore and onshore operations on federal lands subject to DOI authority. New stricter regulations on operational practices, equipment and testing have been imposed on our operations in the Gulf of Mexico and elsewhere following the Deepwater Horizon oil spill.European Union
 - In October 2014, the European Council agreed on new climate and energy targets for the period up to 2030. Specifically, Member States have agreed to a 40% reduction in GHG emissions below 1990 levels and to a 27%

share of renewable energy in final energy consumption. Specific EU legislation and agreements required to achieve these goals are not yet in place.

- The 2008 EU Climate and Energy Package is expected to remain in place until 2020 and includes an updated EU Emissions Trading System (EU ETS) Directive (see Greenhouse gas regulation below), the EU Fuel Quality Directive and the Renewable Energy Directive.
- The EU Fuel Quality Directive affects our production and marketing of transport fuels. Revisions adopted in 2009 mandate reductions in the life cycle GHG emissions per unit of energy and tighter environmental fuel quality standards for petrol and diesel.
- The Renewable Energy Directive requires Member States to have 10% (by energy content) of final transportation fuel to be derived from renewable energy, such as biofuels and renewable electricity. This target must be met by the end of 2020.
- The Energy Efficiency Directive (EED) was adopted in 2012. It requires EU Member States to implement an indicative 2020 energy saving target and apply a framework of measures as part of a national energy efficiency programme, including mandatory industrial energy efficiency surveys. This directive has been implemented in the UK by the Energy Savings Opportunity Scheme Regulations 2014, which affects our offshore and onshore assets. The ISO50001 standard is being implemented by organizations in some EU states to meet some elements of the Energy Efficiency Directive.
- The Industrial Emissions Directive (IED) 2010 provides the framework for granting permits for major industrial sites. It lays down rules on integrated prevention and control of air, water and soil pollution arising from industrial activities. This may result in requirements for BP to further reduce its emissions, particularly its air and water emissions. As part of the IED framework, additional emission limit values are informed by the sector specific and cross-sector Best Available Technology (BAT) Conclusions, such as the BAT Conclusions for the refining sector and for combustion.
- The National Emission Ceiling Directive 2001 is currently being revised and subsequent source-control measures by Member States may be required to meet national emissions targets. These may result in further emission reduction requirements.
- The EU regulation on ozone depleting substances (ODS) 2009 requires BP to reduce the use of ODS and phase out use of certain ODSs. BP continues to replace ODS in refrigerants and/or equipment in the EU and elsewhere, in accordance with the Montreal Protocol and related legislation. In addition, the EU regulation on fluorinated greenhouse gases with high global warming potential (the F-gas Regulations) came into force on 1 January 2015. The F-gas Regulations require a phase-out of certain hydrofluorocarbons, based on global warming potential.
- European regulations also establish passenger car performance standards for CO₂ tailpipe emissions (European Regulation (EC) No 443/2009). From 2020 onwards, the European passenger fleet emissions target is 95 grams of CO₂ per kilometre. This target will be achieved by manufacturing fuel efficient vehicles and vehicles using alternative, low carbon fuels such as hydrogen and electricity. In addition, vehicle emission test cycles and vehicle type approval procedures are being updated to improve accuracy of emission and efficiency measurements. Consequently, product mix and overall levels of demand will be impacted.
- European vehicle CO₂ emission regulations also impact the fuel efficiency of vans. By 2020, the EU fleet of newly registered vans must meet a target of 147 grams of CO₂ per kilometre, which is 19% below the 2012 fleet average. [...]

Greenhouse gas regulation

In 2011, parties to the UN Framework Convention on Climate Change (Framework Convention) at the Conference of the Parties (COP17) in Durban agreed to several measures. One was a ‘roadmap’ for negotiating a legal framework for action on climate change by 2015 that would involve all countries by 2020 and would close the ‘ambition gap’ between existing GHG reduction pledges and what is required to achieve the goal of limiting global temperature rise to 2°C. Another was a second commitment period for the Kyoto Protocol to begin immediately after the first period. An amendment was subsequently adopted at the 2012 conference of parties in Doha (COP18) establishing a second commitment period to run until the end of 2020. However, it did not include the US, Canada, Japan and Russia and thus covers only about 15% of global emissions.

The 2014 conference in Lima (COP20) adopted the Lima Call for Climate Action. This included the elements of a negotiating text for a new international agreement, as specified in Durban in 2011, that would be finalized at COP21 in Paris in December 2015. This text covers long-term ambitions and pathways and a framework for reaching it. COP20 also agreed on the rules for providing and assessing information about each country's 'Intended Nationally Determined Contributions' towards reaching the overall ambition. The world's three largest emitters – China, the US and the EU – have all announced their intentions to limit their GHG emissions.

In December 2015, 195 nations at the United Nations climate change conference in Paris (COP21) adopted the Paris Agreement, for implementation post-2020. This will come into force when it has been ratified by at least 55 of the parties to the Framework Convention, representing at least 55% of global GHG emissions. For the first time this binds all participants to its provisions and encourages voluntary contributions by developing countries. The Paris Agreement aims to hold global average temperature rise to well below 2°C above pre-industrial levels and to pursue efforts to limit temperature rise to 1.5°C above pre-industrial levels. There is no quantitative long-term emissions goal but countries aim to reach global peaking of GHG emissions as soon as possible and to undertake rapid reductions thereafter to achieve a balance between human caused emissions and natural absorption in the second half of this century. The Paris Agreement places binding commitments on all parties, from 2020, to make Nationally Determined Contributions (NDCs) and pursue domestic measures aimed at achieving the objectives of their NDCs. Developed country NDCs should include absolute emission reduction targets, and developing countries are encouraged to move over time towards them. The Paris Agreement places binding commitments on countries, starting by 2023, to report on their emissions and progress made on their NDCs; undergo international review of collective progress; and submit new, more ambitious NDCs every five years. The Paris Agreement extends the existing goal for climate finance to a minimum of \$100 billion after 2025.

More stringent national and regional measures can be expected in the future. These measures could increase BP's production costs for certain products, increase demand for competing energy alternatives or products with lower-carbon intensity, and affect the sales and specifications of many of BP's products. Current and announced measures and developments potentially affecting BP's businesses include the following:

- The EU has agreed to an overall GHG reduction target of 20% by 2020. To meet this, a 'Climate and Energy Package' of regulatory measures was adopted that includes: a collective national reduction target for emissions not covered by the EU ETS; binding national renewable energy targets to double usage of renewable energy sources in the EU including at least a 10% share of renewable energy in the transport sector; a legal framework to promote carbon capture and storage (CCS); and a revised EU ETS Phase 3. EU ETS revisions included a GHG reduction of 21% from 2005 levels; a significant increase in allowance auctioning; an expansion in the scope of the EU ETS to encompass more industrial sectors (including the petrochemicals sector) and gases; no free allocation for electricity generation (including that which is self-generated off-shore) or production, but benchmarked free allocation for energy-intensive and trade-exposed industrial sectors. EU ETS revisions also included the adoption of a Market Stability Reserve to reduce the supply of auctioned allowances. This will take effect in 2019 and could potentially lead to higher carbon costs. EU Energy efficiency policy is currently implemented via national energy efficiency action plans and the Energy Efficiency Directive adopted in 2012. The EU has also agreed to the 2030 Climate and Energy Policy framework with a goal of at least a 40% reduction in GHGs from 1990 and measures to achieve a 27% share of renewable energy and a 27% increase in energy efficiency. The GHG reduction target is to be achieved by a 43% reduction of emissions from sectors covered by the EU ETS, and a 30% GHG reduction by Member States for all other GHG emissions.
- Canada's highest emitting province, Alberta, has regulations targeting large final emitters (sites with over 100,000 tonnes of carbon dioxide equivalent per annum) with intensity targets of 2% improvement per year up to 20%. Compliance is possible via direct reductions, the purchase of offsets or the payment of C\$20/tonne to a technology fund which will escalate to \$30/tonne in 2017. A new policy direction has just been announced for post-2018 where performance relative to a best in sector benchmark (to be determined) will now determine the volume of emissions subject to a cost (\$30/tonne escalating in real terms) or use of other compliance mechanisms such as offsets.
- In the US, the EPA continues to pursue regulatory measures to address GHGs under the CAA.

- EPA regulations impose light, medium and heavy duty vehicle emissions standards for GHGs and permitting requirements for certain large GHG stationary emission sources. The EPA and the National Highway Traffic Safety Administration are considering a proposed rulemaking to extend and tighten GHG emission and fuel efficiency standards until 2027. **This will have an impact on BP's product mix and overall demand.**
- Under the GHG mandatory reporting rule (GHGMRR), annual reports on GHG emissions must be filed. In addition to direct emissions from affected facilities, **producers and importers/ exporters of petroleum products, certain natural gas liquids and GHGs are required to report product volumes and notional GHG emissions as if these products were fully combusted.**
- The EPA proposed regulations establishing GHG emission limits for new and modified power plants in September 2013. In June 2014, the EPA proposed a 'Clean Energy Plan' Regulation that establishes GHG reduction requirements, at a state or regional level, for existing power plants. The new and modified power plant rule was finalized in August 2015 while the existing power plant rule was finalized in October 2015. Legal challenges to both rules have been filed by a number of US States; utility, coal, and mining companies; and the US Chamber of Commerce. These rules are important due to potential impacts on electricity prices, reliability of electricity supply, precedents for similar rules targeting other sectors and potential impacts on combined heat and power installations.
- In January 2015, the US government announced plans to reduce methane emissions from the oil and gas sector by 40-45% from 2012 levels by 2025. In September 2015, the EPA proposed rules aimed at limiting methane emissions from the oil and natural gas sector in the US with plans to finalize these rules in early 2016. In January 2016, the BLM released proposed rules aimed at limiting methane emissions on federal lands from new, modified and existing sources in the oil and gas sector. **If implemented as proposed, these EPA and BLM rules will require further actions by our US upstream businesses to manage methane emissions.**

A number of additional state and regional initiatives in the US will affect our operations. California implemented a low-carbon fuel standard in 2010. The California cap and trade programme started in January 2012 with the first auctions of carbon allowances held in November 2012 and obligations commencing from 2013. The California cap and trade programme was broadened to include transport fuels on 1 January 2015.

- In the November 2014 US-China joint announcement on climate change addressing post-2020 actions, which was reaffirmed by the countries' respective presidents in 2015, the US committed to reducing its GHG emissions by 26-28% below its 2005 level by 2025. Achieving these reductions will require expanded efforts to reduce emissions, which likely will include regulatory measures. China announced it intends to achieve a peak in CO₂ emissions around 2030, with the intention to try to peak earlier and to increase the non-fossil fuel share of all energy to around 20% by 2030. Currently, China has targets to reduce carbon intensity of GDP 40-45% below 2005 levels by 2020 and increase the share of non-fossil fuels in total energy consumption from 7.5% in 2005 to 15% by 2020.
- China is operating emission trading pilot programmes in five cities and two provinces. A number of BP joint venture* companies in China are participating in these schemes. A nationwide carbon emissions trading market is expected to be launched in 2017 following the above seven pilot programmes.
- China has also adopted more stringent vehicle tailpipe emission standards and vehicle efficiency standards to address air pollution and GHG emissions. These standards will have an impact on transportation fuel product mix and overall demand.
- South Africa has delayed implementation of a carbon tax on carbon intensive emitters until 2017.

For information on the **steps that BP is taking in relation to climate change issues** and for details of BP's GHG reporting see Environment and society on page 46." (BP PLC 2016).

DISCLOSURE OF PHYSICAL RISKS

SCORE:

Poor (-1): Company generally acknowledges physical risks it faces, such as weather, but does not include discussion of climate change as a contributor to those risks.

RATIONALE:

BP generally acknowledges physical risks to the company, including “adverse weather conditions,” but does not include discussion of climate change as a contributor to those risks (BP PLC 2016).

SOURCE DATA

- “We may be required to curtail, delay or cancel drilling operations because of a variety of factors, including unexpected drilling conditions, pressure or irregularities in geological formations, equipment failures or accidents, adverse weather conditions and compliance with governmental requirements” (BP PLC 2016).

DISCLOSURE OF MARKET AND OTHER INDIRECT RISKS AND OPPORTUNITIES**SCORE:**

Fair (0): Company provides some details or examples of how it may be affected by indirect risks and opportunities from climate change, but provides limited analysis of their potential financial impacts for the company.

RATIONALE:

The company discusses projected future demand for fossil fuels as well as risks and opportunities related to renewable energy, but provides limited analysis of the potential financial impacts of changes in the energy market for the company (BP PLC 2016c).

SOURCE DATA

“Over the next few decades, we think oil and natural gas are likely to continue to play a significant part in meeting demand for energy. They currently account for around 56% of total energy consumption, and we believe they will decrease to about 54% in 2035. For comparison, under the International Energy Agency’s most ambitious climate policy scenario (the 450 scenario^a), **oil and gas would still make up 50% of the energy mix in 2030 and 44% in 2040 – assuming carbon capture and storage is widely deployed.**

Oil is a good source of energy for transportation as it has a high energy density. That means vehicles go further on less weight and volume of fuel than alternatives. Also, oil’s liquid form makes it easy to move around, globally and locally. For these reasons, we expect oil to still account for almost 90% of transportation fuels in 2035 – compared with 94% today. Temporary policy support is needed to help commercialize lower-carbon options and technologies, but they will ultimately need to become commercially self-sustaining, supported only by a carbon price. Natural gas is likely to play an increasing role in meeting global energy demand, because it’s available at scale, relatively low cost and lower carbon than other fossil fuels. By 2035 gas is expected to provide 26% of global energy, placing it on a par with oil and coal. 11 **BP has the largest operated renewables business among our oil and gas peers. Our activities are focused on biofuels and onshore wind.**

Biofuels business model and strategy

Biofuels can be blended into traditional transport fuels without significant engine modifications to existing fuel-delivery systems. BP is working to produce biofuels that are low cost, low carbon, scalable and competitive without subsidies. Our main activity is in Brazil, where we operate three sugar cane mills producing bioethanol and sugar, and exporting power made from sugar cane waste to the local grid. We use our expertise and technology capabilities to drive continuing improvements in operational efficiency. Our strategy is enabled by:

- Safe and reliable operations – continuing to drive improvements in personal, process and transport safety.
- Competitive sourcing – concentrating our efforts in Brazil, which has one of the most cost-competitive biofuel feedstocks currently available in the world.
- Low carbon – producing bioethanol supported by low-carbon power generated from burning sugar cane waste. These processes reduce life-cycle GHG emissions by around 70% compared with gasoline.
- Domestic and international markets – selling bioethanol domestically in Brazil and also to international markets such as the US and Europe through our integrated supply and trading function.

We are also investing in the development and commercialization of biobutanol, in conjunction with our partner DuPont. Compared with other biofuels, biobutanol has the potential to be blended with fuels in higher proportions, and be easier to

transport, store and manage. We are also investigating a number of chemical applications for this advanced biofuel. [...]
We are among the top wind energy producers in the US. Our focus is on safe operations and optimizing performance. BP holds interests in 16 onshore wind farms in the US, and BP is the operator of 14 of these. Our net generating capacity« from this portfolio, based on our financial stake, was 1,556 megawatts (MW) of electricity at 31 December 2015. Meeting the climate challenge requires efforts by all – governments, companies and consumers. We believe governments must lead by providing a clear, stable and effective climate policy framework, including putting a price on carbon – one that treats all carbon equally. We expect that greenhouse gas (GHG) policy will have an increasing impact on our businesses, operating costs and strategic planning, but may also offer opportunities for the development of lower-carbon technologies and businesses. There is a growing number of emission pricing schemes globally, including in Europe, California and China, additional monitoring regulations in the US, and more focus on reducing flaring and methane emissions in many jurisdictions.

DISCLOSURE OF CORPORATE GOVERNANCE ON CLIMATE-RELATED RISKS BY BOARD AND SENIOR MANAGEMENT

SCORE:

Egregious (-2): Company provides no disclosure of corporate governance on climate issues.

RATIONALE:

BP provides no disclosure of corporate governance on climate issues.

SOURCE DATA

BP provides no disclosure of corporate governance on climate issues.

FULLY DISCLOSING CLIMATE RISKS SCORE: FAIR (-2)

Chevron

DISCLOSURE OF REGULATORY RISKS

SCORE:

Good (+1): Company provides a detailed analysis of existing and proposed laws and regulations relating to climate change and their possible effects on the company, including potential financial impacts (quantified, when feasible).

RATIONALE:

The company provides a detailed analysis of existing and proposed laws and regulations relating to climate change and their possible effects on the company, including potential financial impacts (quantified, when feasible) (Chevron Corporation 2016).

SOURCE DATA

- **“Regulation of greenhouse gas (GHG) emissions could increase Chevron’s operational costs and reduce demand for Chevron’s hydrocarbon and other products. Continued attention to issues concerning GHG emissions and climate change and potential mitigation through legislation and regulation could have a material impact on the company’s operations and financial results.**

International agreements (e.g., the Paris Accord and the Kyoto Protocol) and national (e.g., carbon tax, cap and trade or efficiency standards), regional and state legislation (e.g., California's AB32 or other low carbon fuel standards) and regulatory measures (e.g., the U.S. Environmental Protection Agency's methane performance standards) to limit or reduce GHG emissions are currently in various stages of discussion or implementation and it is difficult to predict with certainty their timing and outcome. These and other GHG emissions related laws and regulations and the effects of operating in a potentially carbon constrained environment may **result in increased and substantial capital, compliance, operating and maintenance costs and could, among other things, reduce demand for hydrocarbons and the company’s hydrocarbon-based products, make the company’s products more expensive, and adversely affect the company’s sales volumes, revenues and margins.** 42/195

Consideration of GHG issues and the responses to those issues through international agreements and national, regional or state legislation or regulations are integrated into the company’s strategy and planning, capital investment reviews, and risk management tools and processes, where applicable. They are also factored into the company’s long range supply, demand and energy price forecasts. These forecasts reflect long range effects from renewable fuel penetration, energy efficiency standards, climate related policy actions, and demand response to oil and natural gas prices. The actual level of expenditure required to comply with new or potential GHG emissions laws and regulations and amount of additional investments in new or existing technology or facilities, such as carbon dioxide injection, is difficult to predict with certainty and is expected to vary depending on the actual laws and regulations enacted in a jurisdiction, the company’s activities in it and market conditions. 42 and 43/195

The ultimate effect of international agreements and national, regional and state legislation and regulatory measures to limit GHG emissions on the company’s financial performance will depend on a number of factors including, among others, the sectors covered, the greenhouse gas emissions reductions required, the extent to which Chevron would be entitled to receive emission allowance allocations or would need to purchase compliance instruments on the open market or through auctions, the price and availability of emission allowances and credits, and the company’s ability to recover the costs incurred through the pricing of the company’s products.” (p. 44)

- “The company is subject to various international, federal, state and local environmental, health and safety laws, regulations and market based programs. These laws, regulations and programs continue to evolve and are expected to increase in both number and complexity over time and govern not only the manner in which the company conducts its operations, but also the products it sells. For example, international agreements (e.g., the Paris Accord and the Kyoto Protocol) and national (e.g., carbon tax, cap-and-trade, or efficiency standards), regional, and state legislation (e.g., California's AB32 or other low carbon fuel standards) and regulatory measures (e.g., the U.S. Environmental Protection Agency's methane performance standards) to limit or reduce greenhouse gas (GHG) emissions are currently in various stages of discussion or

implementation. Consideration of GHG issues and the responses to those issues through international agreements and national, regional or state legislation or regulation are integrated into the company's strategy, planning and capital investment reviews, where applicable. They are also factored into the company's long-range supply, demand and energy price forecasts. These forecasts reflect long-range effects from renewable fuel penetration, energy efficiency standards, climate-related policy actions, and demand response to oil and natural gas prices. In addition, legislation and regulations intended to address hydraulic fracturing also continue to evolve at the international, national and state levels." (p. 84) (Chevron Corporation 2016).

DISCLOSURE OF PHYSICAL RISKS

SCORE:

Poor (-1): Company generally acknowledges physical risks it faces, such as weather, but does not include discussion of climate change as a contributor to those risks.

RATIONALE:

Chevron generally acknowledges physical risks to the company, such as storm frequency and severity, sea level rise, air and water temperature increases, and other factors, but does not include discussion of climate change as a contributor to those risks (Chevron Corporation 2016).

SOURCE DATA

"Chevron's risk management systems are designed to assess potential physical and other risks to its operations and assets and to plan for their resiliency. While capital investment reviews and decisions involve uncertainty analysis, which incorporates potential ranges of physical risks such as storm severity and frequency, sea level rise, air and water temperature, precipitation, fresh water access, wind speed, and earthquake severity, among other factors, it is difficult to predict with certainty the timing, frequency or severity of such events, any of which could have a material adverse effect on the company's results of operations or financial condition" (p. 40). (Chevron Corporation 2016).

DISCLOSURE OF MARKET AND OTHER INDIRECT RISKS AND OPPORTUNITIES

SCORE:

Fair (0): Company provides some details or examples of how it may be affected by indirect risks and opportunities from climate change, but provides limited analysis of their potential financial impacts for the company.

RATIONALE:

The company identifies changing consumer preferences and increased competition from renewable energy as risks facing the, but provides limited analysis of their potential financial impacts (Chevron Corporation 2016e).

SOURCE DATA

- International agreements (e.g., the Paris Accord and the Kyoto Protocol) and national (e.g., carbon tax, cap and trade or efficiency standards), regional and state legislation (e.g., California's AB32 or other low carbon fuel standards) and regulatory measures (e.g., the U.S. Environmental Protection Agency's methane performance standards) to limit or reduce GHG emissions are currently in various stages of discussion or implementation and it is difficult to predict with certainty their timing and outcome. These and other GHG emissions related laws and regulations and **the effects of operating in a potentially carbon constrained environment** may result in increased and substantial **capital, compliance, operating and maintenance costs** and could, among other things, **reduce demand for hydrocarbons and the company's hydrocarbon-based products, make the company's products more expensive, and adversely affect the company's sales volumes, revenues and margins.** (p. 42)
- "Consideration of GHG issues and the responses to those issues through international agreements and national, regional or state legislation or regulations are integrated into the company's strategy and planning, capital investment reviews, and risk management tools and processes, where applicable. They are also factored into the company's long range supply, demand and energy price forecasts. These forecasts reflect long range effects from **renewable fuel penetration**, energy

efficiency standards, climate related policy actions, and **demand response to oil and natural gas prices**. The actual level of expenditure required to comply with new or potential GHG emissions laws and regulations and amount of additional investments in new or existing technology or facilities, such as carbon dioxide injection, is difficult to predict with certainty and is expected to vary depending on the actual laws and regulations enacted in a jurisdiction, the company's activities in it and market conditions." (p. 43) (Chevron Corporation 2016).

DISCLOSURE OF CORPORATE GOVERNANCE ON CLIMATE-RELATED RISKS BY BOARD AND SENIOR MANAGEMENT

SCORE:

Egregious (-2): Company provides no disclosure of corporate governance on climate issues.

RATIONALE:

Chevron provides no disclosure of corporate governance on climate issues.

SOURCE DATA

Chevron provides no disclosure of corporate governance on climate issues.

FULLY DISCLOSING CLIMATE RISKS SCORE: FAIR (-2)

ConocoPhillips

DISCLOSURE OF REGULATORY RISKS

SCORE:

Good (+1): Company provides a detailed analysis of existing and proposed laws and regulations relating to climate change and their possible effects on the company, including potential financial impacts (quantified, when feasible).

RATIONALE:

ConocoPhillips provides a detailed analysis of existing and proposed laws and regulations relating to climate change and their possible effects on the company, including potential financial impacts (quantified, when feasible) (ConocoPhillips 2016).

SOURCE DATA

- “Our businesses are subject to numerous laws and regulations relating to the protection of the environment. These laws and regulations continue to increase in both number and complexity and affect our operations with respect to, among other things:
 - The discharge of pollutants into the environment.
 - Emissions into the atmosphere, such as nitrogen oxides, sulfur dioxide, mercury and **greenhouse gas emissions**.
 - **Carbon taxes**.”
- “We have incurred and will continue to incur **substantial capital, operating and maintenance, and remediation expenditures as a result of these laws and regulations**. To the extent these expenditures, as with all costs, are not ultimately reflected in the prices of our products and services, our business, financial condition, results of operations and cash flows in future periods could be materially adversely affected.

Demand for our products may also be adversely affected by conservation plans and efforts undertaken in response to global climate change, including plans developed in connection with the recent Paris climate conference in December 2015. Many governments also provide, or may in the future provide, tax advantages and other subsidies to support the use and development of alternative energy technologies. **Our operations and the demand for our products could be materially impacted by the development and adoption of these technologies.** 26

The ultimate financial impact arising from environmental laws and regulations is neither clearly known nor easily determinable as new standards, such as air emission standards, water quality standards and stricter fuel regulations, continue to evolve. However, **environmental laws and regulations, including those that may arise to address concerns about global climate change, are expected to continue to have an increasing impact on our operations in the United States and in other countries in which we operate. Notable areas of potential impacts include air emission compliance and remediation obligations in the United States and Canada.** 63

Climate Change

There has been a broad range of proposed or promulgated state, national and international laws focusing on greenhouse gas (GHG) reduction. These proposed or promulgated laws apply or could apply in countries where we have interests or may have interests in the future. Laws in this field continue to evolve, and while it is not possible to accurately estimate either a timetable for implementation or our future compliance costs relating to implementation, **such laws, if enacted, could have a material impact on our results of operations and financial condition.** Examples of legislation or precursors for possible regulation that do or could affect our operations include:

- European Emissions Trading Scheme (ETS), the program through which many of the European Union (EU) member states are implementing the Kyoto Protocol. Our cost of compliance with the EU ETS in 2015 was approximately \$0.4 million (net share pre-tax).
- In Canada during 2015, the Alberta government amended the regulations of the Climate Change and Emissions Act. The regulations now require any existing facility with emissions equal to or greater than 100,000 metric tonnes of carbon dioxide or equivalent per year to reduce its net emissions intensity from its baseline. The reduction is increasing from the current 12 percent in 2015, to 15 percent in 2016 and to 20 percent in 2017. We

- also incur a carbon tax for emissions from fossil fuel combustion in our British Columbia operations. The total cost of compliance with these regulations in 2015 was approximately \$4.7 million.
- The U.S. Supreme Court decision in *Massachusetts v. EPA*, 549 U.S. 497, 127 S.Ct. 1438 (2007), confirming that the EPA has the authority to regulate carbon dioxide as an “air pollutant” under the Federal Clean Air Act.
 - The U.S. EPA’s announcement on March 29, 2010 (published as “Interpretation of Regulations that Determine Pollutants Covered by Clean Air Act Permitting Programs,” 75 Fed. Reg. 17004 (April 2, 2010)), and the EPA’s and U.S. Department of Transportation’s joint promulgation of a Final Rule on April 1, 2010, that triggers regulation of GHGs under the Clean Air Act, may trigger more climate-based claims for damages, and may result in longer agency review time for development projects.
 - The U.S. EPA’s announcement on January 14, 2015, outlining a series of steps it plans to take to address methane and smog-forming volatile organic compound emissions from the oil and gas industry. The current U.S. administration has established a goal of reducing the 2012 levels in methane emissions from the oil and gas industry by 40 to 45 percent by 2025.
 - Carbon taxes in certain jurisdictions. Our cost of compliance with Norwegian carbon tax legislation in 2015 was approximately \$31 million (net share pre-tax).
 - The agreement reached in Paris in December 2015 at the 21st Conference of the Parties to the United Nations Framework on Climate Change, setting out a new process for achieving global emission reductions.

The United States, some additional form of regulation may be forthcoming in the future at the federal and state levels with respect to GHG emissions. Such regulation could take any of several forms that may result in the creation of additional costs in the form of taxes, the restriction of output, investments of capital to maintain compliance with laws and regulations, or required acquisition or trading of emission allowances. We are working to continuously improve operational and energy efficiency through resource and energy conservation throughout our operations.

Compliance with changes in laws and regulations that create a GHG emission trading scheme or GHG reduction policies could significantly increase our costs, reduce demand for fossil energy derived products, impact the cost and availability of capital and increase our exposure to litigation. Such laws and regulations could also increase demand for less carbon intensive energy sources, including natural gas. The ultimate impact on our financial performance, either positive or negative, will depend on a number of factors, including but not limited to:

- Whether and to what extent legislation or regulation is enacted.
- The timing of the introduction of such legislation or regulation.
- The nature of the legislation (such as a cap and trade system or a tax on emissions) or regulation.
- The price placed on GHG emissions (either by the market or through a tax).
- The GHG reductions required.
- The price and availability of offsets.
- The amount and allocation of allowances.
- Technological and scientific developments leading to new products or services.
- Any potential significant physical effects of climate change (such as increased severe weather events, changes in sea levels and changes in temperature).
- Whether, and the extent to which, increased compliance costs are ultimately reflected in the prices of our products and services.” (p. 65). (ConocoPhillips 2016).

DISCLOSURE OF PHYSICAL RISKS

SCORE:

Fair (0): Company acknowledges physical risks it faces and includes some discussion of climate change as a contributor to those risks, but with few or no details about the nature of those risks, their magnitude, or how they may impact the company.

RATIONALE:

ConocoPhillips acknowledges physical risks facing the company, such as “more severe or frequent weather conditions,” and includes some discussion of climate change as a contributor to those risks. But it provides few or no details about the nature of those risks, their magnitude, or their potential impact on the company (ConocoPhillips 2016).

SOURCE DATA

- “Although our business operations are designed and operated to accommodate expected climatic conditions, **to the extent there are significant changes in the Earth’s climate**, such as more severe or frequent weather conditions in the markets we serve or the areas where our assets reside, **we could incur increased expenses, our operations could be materially impacted, and demand for our products could fall.**” (p. 26) (ConocoPhillips 2016).
- “The ultimate impact on our financial performance, either positive or negative, will depend on a number of factors, including but not limited to:
 - Any potential significant physical effects of climate change (such as increased severe weather events, changes in sea levels and changes in temperature)” (p. 65) (ConocoPhillips 2016)

DISCLOSURE OF MARKET AND OTHER INDIRECT RISKS AND OPPORTUNITIES

SCORE:

Fair (0): Company provides some details or examples of how it may be affected by indirect risks and opportunities from climate change, but provides limited analysis of their potential financial impacts for the company.

RATIONALE:

The company identifies energy conservation, development of new technologies, reduced demand for fossil fuels, cost and availability of capital, and exposure to litigation as risks facing the company, but provides limited analysis of their potential financial impacts (ConocoPhillips 2016).

SOURCE DATA

- “Demand for our products may also be adversely affected by conservation plans and efforts undertaken in response to global climate change, including plans developed in connection with the recent Paris climate conference in December 2015. Many governments also provide, or may in the future provide, tax advantages and other subsidies to support the use and development of alternative energy technologies. **Our operations and the demand for our products could be materially impacted by the development and adoption of these technologies.**” (p. 26)
- Compliance with changes in laws and regulations that create a GHG emission trading scheme or GHG reduction policies could significantly increase our costs, **reduce demand for fossil energy derived products, impact the cost and availability of capital and increase our exposure to litigation.** Such laws and regulations could also **increase demand for less carbon intensive energy sources, including natural gas.** (p. 65)

DISCLOSURE OF CORPORATE GOVERNANCE ON CLIMATE-RELATED RISKS BY BOARD AND SENIOR MANAGEMENT

SCORE:

Egregious (-2): Company provides no disclosure of corporate governance on climate issues.

RATIONALE:

ConocoPhillips provides no disclosure of corporate governance on climate issues.

SOURCE DATA

FULLY DISCLOSING CLIMATE RISKS SCORE: FAIR (-1)

CONSOL Energy

DISCLOSURE OF REGULATORY RISKS

SCORE:

Good (+1): Company provides a detailed analysis of existing and proposed laws and regulations relating to climate change and their possible effects on the company, including potential financial impacts (quantified, when feasible).

RATIONALE:

CONSOL Energy provides a detailed analysis of existing and proposed laws and regulations relating to climate change and their possible effects on the company, including potential financial impacts (quantified, when feasible) (CONSOL Energy Inc. 2016).

SOURCE DATA

- “These risks, contingencies and uncertainties relate to, among other matters, the following:
 - coal users switching to other fuels in order to comply with various environmental standards related to coal combustion emissions;
 - the impact of potential, as well as any adopted environmental regulations including any relating to greenhouse gas emissions on our operating costs as well as on the market for natural gas and coal and for our securities; 3**Compliance with these laws has substantially increased the cost of gas production and mining of coal for all domestic gas and coal producers.** The possibility exists that new legislation or regulations may be adopted which would have a significant impact on our gas and coal mining operations or our customers' ability to use our gas and coal and **may require us or our customers to change their operations significantly or incur substantial costs.** [...] Environmental Laws
Clean Air Act and Related Regulations. The federal Clean Air Act (CAA) and corresponding state laws and regulations regulate air emissions primarily through permitting and/or emissions control requirements. This affects natural gas production and processing operations as well as coal mining, coal handling, and processing.
We are required to obtain pre-approval for construction or modification of certain facilities, to meet stringent air permit requirements, or to use specific equipment, technologies or best management practices to control emissions. On August 16, 2012, the U.S. Environmental Protection Agency (EPA) published final revisions to the New Source Performance Standards (NSPS) to regulate emissions of volatile organic compounds (VOCs) and sulfur dioxide (SO₂) from various oil and gas exploration, production, processing and transportation facilities. Additionally, revisions were made to the National Emission Standards for Hazardous Air Pollutants (NESHAPS) to further regulate emissions from the oil and natural gas production sector and the transmission and storage of natural gas. Section 111 of the CAA authorized the EPA to develop technology based standards which apply to specific categories of stationary sources. On September 18, 2015, the EPA proposed updates to the New Source Performance Standards (NSPS) that would create new standards for the regulation of methane and VOC emission sources.
Apart from issues with respect to the supply of products we produce, demand can fluctuate widely due to a number of matters beyond our control, including:
the impact of domestic and foreign governmental laws and regulations, including environmental and climate change regulations and regulations affecting the coal mining industry and coal-fired power plants, and delays in the receipt of, failure to receive, failure to maintain or revocation of necessary governmental permits” (p. 30)
- “Apart from actual and potential regulation of emissions, waste water, and solid wastes from coal-fired plants, **state and federal mandates for increased use of electricity from renewable energy sources could have an impact on the market for our coal.** Several states have enacted legislative mandates requiring electricity suppliers to use renewable energy sources to generate a certain percentage of power. There have been numerous proposals to establish a similar uniform, national standard although none of these proposals have been enacted to date. Possible advances in technologies and incentives, such as tax credits, to enhance the economics of renewable energy sources could make these sources more competitive with coal. Any reductions in the amount of coal consumed by domestic electric power generators as a result of

current or new standards for the emission of impurities or incentives to switch to alternative fuels or renewable energy sources could reduce the demand for our coal, thereby reducing our revenues and adversely affecting our business and results of operations.” (p. 33)

- **“Regulation of greenhouse gas emissions may increase our operating costs and reduce the value of our natural gas and coal assets and such regulation as well as uncertainty concerning such regulation could adversely impact the market for natural gas and coal as well as for our securities.**

While climate change legislation in the U.S. is unlikely in the next several years, the issue of global climate change continues to attract considerable public and scientific attention with widespread concern about the impacts of human activity, especially the emissions of greenhouse gases (GHGs) such as carbon dioxide and methane. Combustion of fossil fuels, such as the natural gas and coal we produce, results in the creation of carbon dioxide emissions into the atmosphere by natural gas and coal end-users, such as coal-fired electric power generation plants. Numerous proposals have been made and are likely to continue to be made at the international, national, regional and state levels of government that are intended to limit emissions of GHGs. Several states have already adopted measures requiring reduction of GHGs within state boundaries. Other states have elected to participate in voluntary regional cap-and-trade programs like the Regional Greenhouse Gas Initiative (RGGI) in the northeastern U.S.

The EPA, under the Climate Action Plan, has elected to regulate GHGs under the Clean Air Act (CAA) to limit emissions of carbon dioxide (CO₂) from coal-fired and natural gas-fired power plants. On September 20, 2013, the EPA re-proposed New Source Performance Standards (NSPS) for CO₂ from new power plants and on June 2, 2014, the EPA re-proposed NSPS for CO₂ from existing and modified/reconstructed power plants, which rescinded the rules that were originally proposed in 2012. On August 3, 2015, the EPA finalized the Carbon Pollution Standards to cut carbon emissions from new, modified and reconstructed power plants, which became effective on October 23, 2015. In another proposed rulemaking related to CO₂ emissions, on June 2, 2014, the EPA proposed the Clean Power Plan Rule to cut carbon emissions from existing power plants. Under this proposed rule, the EPA would create emission guidelines for states to follow in developing plans to address greenhouse gas emissions from existing fossil fuel-fired electric generating units. Specifically, the EPA is proposing state-specific rate-based goals for CO₂ emissions from the power sector, as well as guidelines for states to follow in developing plans to achieve the state-specific goals. On August 3, 2015, the EPA finalized the Clean Power Plan Rule to cut carbon pollution from existing power plants, which became effective on December 22, 2015. States, industry and labor organizations have filed at least 17 petitions for review in the D.C. Circuit Court of Appeals requesting that the Court stay implementation of the rule.

Internationally, the Kyoto Protocol, which set binding emission targets for developed countries (which was not ratified by the United States) was nominally extended past its expiration date of December 2012 with a requirement for a new legal construct to be put into place by 2015. In December 2015, the United Nations Climate Change Conference was held and an agreement was reached between the countries participating in the conference, including the United States, to limit global warming to less than 2 degrees Celsius (3.6° Fahrenheit) compared to pre-industrial levels. This agreement, known as the Paris Agreement, calls for zero net anthropogenic greenhouse gas emission to be reached during the second half of the 21st century. Each party is to prepare a plan on its contributions to reach this goal; each plan is to be filed in a publicly available registry. To become effective, at least 55 countries, representing at least 55 percent of global greenhouse emissions, must sign the agreement in New York between April 22, 2016 and April 21, 2017, and adopt it within their own legal systems through ratification, acceptance, approval or accession.

Additionally, coalbed methane must be expelled from our underground coal mines for mining safety reasons. Coalbed methane has a greater GHG effect than carbon dioxide. Our natural gas operations capture coalbed methane from our underground coal mines, although some coalbed methane is vented into the atmosphere when the coal is mined. **If regulation of GHG emissions does not exempt the release of coalbed methane, we may have to further reduce our methane emissions, pay higher taxes, incur costs to purchase credits that permit us to continue operations as they now exist at our underground coal mines or perhaps curtail coal production.**

Adoption of comprehensive legislation or regulation focusing on GHG emission reductions for the United States or other countries where we sell coal (including by adopting plans to implement the Paris Agreement), or the inability of utilities to obtain financing in connection with coal-fired plants, may make it more costly to operate fossil fuel fired (especially coal-fired) electric power generation plants and make fossil fuels less attractive for electric utility power plants in the future.

Depending on the nature of the regulation or legislation, natural gas-fueled power generation could become more economically attractive than coal-fueled power generation, substantially increasing the demand for natural gas. Apart from actual regulation, uncertainty over the extent of regulation of GHG emissions may inhibit utilities from investing in the building of new coal-fired plants to replace older plants or investing in the upgrading of existing coal-fired plants. Any reduction in the amount of coal or possibly natural gas consumed by domestic electric power generators as a result of actual or potential regulation of greenhouse gas emissions could decrease demand for our fossil fuels, thereby reducing our revenues and materially and adversely affecting our business and results of operations. **We or our customers may also have to invest in carbon dioxide capture and storage technologies in order to burn coal or natural gas and comply with future GHG emission standards.**”

- “In addition, there is the possibility that we could incur substantial costs as a result of violations under environmental laws. Any additional laws, regulations and other legal requirements enacted or adopted by federal, state and local authorities, as well as foreign authorities or new interpretations of existing legal requirements by regulatory bodies relating to the protection of the environment could further affect our costs of operations and competitive position.” (p. 38)
- “The imposition of new environmental initiatives and regulations could include restrictions on our ability to conduct hydraulic fracturing operations or to dispose of waste resulting from such operations. The EPA has commenced a study of the potential environmental impacts of hydraulic fracturing activities and a final report was to be issued in 2015 along with stated accompanying regulation.” (p. 39) (CONSOL Energy, Inc. 2016)

DISCLOSURE OF PHYSICAL RISKS

SCORE:

Poor (-1): Company generally acknowledges physical risks it faces, such as weather, but does not include discussion of climate change as a contributor to those risks.

RATIONALE:

CONSOL Energy generally acknowledges physical risks to the company, such as “adverse weather conditions,” but does not include discussion of climate change as a contributor to those risks (CONSOL Energy Inc. 2016).

SOURCE DATA

- “Demand for our coal by our principal customers is affected by many factors including: [...] natural/weather disasters; and political changes in international governments. [...]
- The operating risks that may have a significant impact on our gas operations include: adverse weather conditions;” (CONSOL Energy, Inc. 2016).

DISCLOSURE OF MARKET AND OTHER INDIRECT RISKS AND OPPORTUNITIES

SCORE:

Fair (0): Company provides some details or examples of how it may be affected by indirect risks and opportunities from climate change, but provides limited analysis of their potential financial impacts for the company.

RATIONALE:

CONSOL Energy identifies reduced demand for fossil fuels, difficulty obtaining financing for coal-fired power plants, and fossil fuel divestment as risks facing the company, but offers limited analysis of their potential financial impacts (CONSOL Energy Inc. 2016).

SOURCE DATA

- “The characteristics of coal may make it costly for electric power generators and other coal users to comply with various environmental standards regarding the emissions of impurities released when coal is burned which could cause utilities to replace coal-fired power plants with alternative fuels. In addition, various incentives have been proposed to encourage the generation of electricity from renewable energy sources. **A reduction in the use of coal for electric power generation could decrease the volume of our domestic coal sales and adversely affect our results of operations.**” (p. 32)

- “Apart from actual and potential regulation of emissions, waste water, and solid wastes from coal-fired plants, state and federal mandates for increased use of electricity from renewable energy sources could have an impact on the market for our coal. Several states have enacted legislative mandates requiring electricity suppliers to use renewable energy sources to generate a certain percentage of power. There have been numerous proposals to establish a similar uniform, national standard although none of these proposals have been enacted to date. Possible advances in technologies and incentives, such as tax credits, to enhance the economics of renewable energy sources could make these sources more competitive with coal. Any reductions in the amount of coal consumed by domestic electric power generators as a result of current or new standards for the emission of impurities or incentives to switch to alternative fuels or renewable energy sources could reduce the demand for our coal, thereby reducing our revenues and adversely affecting our business and results of operations.” (p. 33)
- “Apart from governmental regulation, **investment banks based both domestically and internationally have announced that they have adopted climate change guidelines for lenders.** The guidelines require the evaluation of carbon risks in the financing of electric power generation plants which **may make it more difficult for utilities to obtain financing for coal-fired plants.** In addition, banks have also adopted more stringent lending requirements of surface coal operations which may make it more difficult to obtain financing by coal operators.”
- “Adoption of comprehensive legislation or regulation focusing on GHG emission reductions for the United States or other countries where we sell coal (including by adopting plans to implement the Paris Agreement), or **the inability of utilities to obtain financing in connection with coal-fired plants, may make it more costly to operate fossil fuel fired (especially coal-fired) electric power generation plants and make fossil fuels less attractive for electric utility power plants in the future.** Depending on the nature of the regulation or legislation, natural gas-fueled power generation could become more economically attractive than coal-fueled power generation, substantially increasing the demand for natural gas. Apart from actual regulation, uncertainty over the extent of regulation of GHG emissions may inhibit utilities from investing in the building of new coal-fired plants to replace older plants or investing in the upgrading of existing coal-fired plants. **Any reduction in the amount of coal or possibly natural gas consumed by domestic electric power generators as a result of actual or potential regulation of greenhouse gas emissions could decrease demand for our fossil fuels, thereby reducing our revenues and materially and adversely affecting our business and results of operations. We or our customers may also have to invest in carbon dioxide capture and storage technologies in order to burn coal or natural gas and comply with future GHG emission standards.**
In addition, there have also been efforts in recent years affecting the investment community, including investment advisors, sovereign wealth funds, public pension funds, universities and other groups, **promoting the divestment of fossil fuel equities and also pressuring lenders to limit funding to companies engaged in the extraction of fossil fuel reserves.** The impact of such efforts **may adversely affect the demand for and price of securities issued by us, and impact our access to the capital and financial markets.**” (CONSOL Energy, Inc. 2016).

DISCLOSURE OF CORPORATE GOVERNANCE ON CLIMATE-RELATED RISKS BY BOARD AND SENIOR MANAGEMENT

SCORE:

Egregious (-2): Company provides no disclosure of corporate governance on climate issues.

RATIONALE:

CONSOL Energy provides no disclosure of corporate governance on climate issues.

SOURCE DATA

FULLY DISCLOSING CLIMATE RISKS SCORE: FAIR (-2)

ExxonMobil

DISCLOSURE OF REGULATORY RISKS

SCORE:

Poor (-1): Company mentions the general existence of risk associated with current or proposed laws relating to climate change, but does not identify specific laws or regulations and/or does not identify effects particular to the company (as opposed to effects that could apply to the sector as a whole).

RATIONALE:

ExxonMobil mentions the general existence of risk associated with current or proposed laws relating to climate change, but does not cite specific laws or regulations (ExxonMobil Corporation 2016).

SOURCE DATA

- “Climate change and greenhouse gas restrictions. Due to concern over the risk of climate change, a number of countries have adopted, or are considering the adoption of, regulatory frameworks to reduce greenhouse gas emissions. These include adoption of **cap and trade regimes, carbon taxes, restrictive permitting, increased efficiency standards, and incentives or mandates for renewable energy**. These requirements could **make our products more expensive, lengthen project implementation times, and reduce demand for hydrocarbons, as well as shift hydrocarbon demand toward relatively lower-carbon sources such as natural gas**. Current and pending greenhouse gas regulations may also **increase our compliance costs, such as for monitoring or sequestering emissions.**” (p. 3)
- “Government sponsorship of alternative energy. Many governments are providing tax advantages and other subsidies to support alternative energy sources or are mandating the use of specific fuels or technologies. Governments are also promoting research into new technologies to reduce the cost and increase the scalability of alternative energy sources.”
- “International accords and underlying regional and national regulations covering greenhouse gas emissions continue to evolve with uncertain timing and outcome, making it difficult to predict their business impact. **For many years, the Corporation has taken into account policies established to reduce energy-related greenhouse gas emissions in its long-term *Outlook for Energy*, which is used as a foundation for assessing the business environment and business strategies and investments.** The climate accord reached at the recent Conference of the Parties (COP 21) in Paris set many new goals, and while many related policies are still emerging, **the *Outlook for Energy* continues to anticipate that such policies will increase the cost of carbon dioxide emissions over time.** For purposes of the *Outlook for Energy*, **we continue to assume that governments will enact policies that impose rising costs on energy-related CO₂ emissions, which we assume will reach an implied cost in OECD nations of about \$80 per tonne in 2040.** China and other leading non-OECD nations are expected to trail OECD policy initiatives. Nevertheless, as people and nations look for ways to reduce risks of global climate change, they will continue to need practical solutions that do not jeopardize the affordability or reliability of the energy they need. Thus, all practical and economically viable energy sources, both conventional and unconventional, will be needed to continue meeting global energy needs – because of the scale of worldwide energy demand. The information provided in the Long-Term Business Outlook includes ExxonMobil’s internal estimates and forecasts based upon internal data and analyses as well as publicly available information from external sources including the International Energy Agency” (p. 42) (ExxonMobil Corporation 2016).

DISCLOSURE OF PHYSICAL RISKS

SCORE:

Fair (0): Company acknowledges physical risks it faces and includes some discussion of climate change as a contributor to those risks, but with few or no details about the nature of those risks, their magnitude, or how they may impact the company.

RATIONALE:

The company identifies uncertainties that “climate change and weather events may potentially introduce” as risks to the company, but provides few details about the nature of those risks, their magnitude, or their potential impact on the company. ExxonMobil mentions that design steps are taken to help protect facilities from severe weather events, but this discussion does not specifically mention planning for climate change (ExxonMobil Corporation 2016).

SOURCE DATA

- “Our consideration of changing weather conditions and inclusion of safety factors in design covers the engineering uncertainties that climate change and other events may potentially introduce. Our ability to mitigate the adverse impacts of these events depends in part upon the effectiveness of our robust facility engineering as well as our rigorous disaster preparedness and response and business continuity planning.”
- “Preparedness. Our operations may be disrupted by severe weather events, natural disasters, human error, and similar events. For example, hurricanes may damage our offshore production facilities or coastal refining and petrochemical plants in vulnerable areas. Our facilities are designed, constructed, and operated to withstand a variety of extreme climatic and other conditions, with safety factors built in to cover a number of engineering uncertainties, including those associated with wave, wind, and current intensity, marine ice flow patterns, permafrost stability, storm surge magnitude, temperature extremes, extreme rain fall events, and earthquakes. Our consideration of changing weather conditions and inclusion of safety factors in design covers the engineering uncertainties that climate change and other events may potentially introduce. Our ability to mitigate the adverse impacts of these events depends in part upon the effectiveness of our robust facility engineering as well as our rigorous disaster preparedness and response and business continuity planning.” (p. 4) (ExxonMobil Corporation 2016).

DISCLOSURE OF MARKET AND OTHER INDIRECT RISKS AND OPPORTUNITIES

SCORE:

Fair (0): Company provides some details or examples of how it may be affected by indirect risks and opportunities from climate change, but provides limited analysis of their potential financial impacts for the company

RATIONALE:

The company identifies competition from renewable energy, changing consumer preferences, and changing technology as risks that it faces, but provides limited analysis of their potential financial impacts (ExxonMobil Corporation 2016).

SOURCE DATA

- “Other demand-related factors. Other factors that may affect the demand for oil, gas, and petrochemicals, and therefore impact our results, include technological improvements in energy efficiency; seasonal weather patterns, which affect the demand for energy associated with heating and cooling; **increased competitiveness of alternative energy sources** that have so far generally not been competitive with oil and gas without the benefit of government subsidies or mandates; and **changes in technology or consumer preferences that alter fuel choices, such as toward alternative fueled or electric vehicles.**” (p. 2)
- “Research and development. To maintain our competitive position, especially in light of the technological nature of our businesses and the need for continuous efficiency improvement, **ExxonMobil’s research and development organizations must be successful and able to adapt to a changing market and policy environment, including developing technologies to help reduce greenhouse gas emissions.**” (p. 4)
- “However, the desire to address the risks of climate change – at both an individual and government level – is likely to produce significant changes in global energy supply as consumers shift toward energy sources that help curb CO₂ emissions. Outlook for Energy” (p. 55)
- “Government sponsorship of alternative energy. Many governments are providing tax advantages and other subsidies to support alternative energy sources or are mandating the use of specific fuels or technologies. Governments are also promoting research into new technologies to reduce the cost and increase the scalability of alternative energy sources. We are conducting our own research efforts into alternative energy, such as through sponsorship of the Global Climate and Energy Project at Stanford University and research into liquid products from algae and biomass that can be further

converted to transportation fuels. **Our future results may depend in part on the success of our research efforts and on our ability to adapt and apply the strengths of our current business model to providing the energy products of the future in a cost-competitive manner.** See “Management Effectiveness” below.” (p.3)

Demand for electricity around the world is likely to increase approximately 65 percent from 2014 to 2040, led by growth in developing countries. Consistent with this projection, power generation is expected to remain the largest and fastest-growing major segment of global energy demand. **Meeting the expected growth in power demand will require a diverse set of energy sources.** Today, coal-fired generation provides about 40 percent of the world’s electricity, but by 2040 its share is likely to decline to about 30 percent, in part as a result of policies to improve air quality and reduce greenhouse gas emissions and the risks of climate change. From 2014 to 2040, the amount of electricity generated using natural gas, nuclear power, and renewables are all likely to double. By 2040, coal, natural gas and renewables are projected to be generating approximately the same share of electricity worldwide, although significant differences will exist across regions reflecting a wide range of factors including the cost and availability of energy types.” (p. 41)

- International accords and underlying regional and national regulations covering greenhouse gas emissions continue to evolve with uncertain timing and outcome, making it difficult to predict their business impact. For many years, the Corporation has taken into account policies established to reduce energy-related greenhouse gas emissions in its long-term *Outlook for Energy*, which is used as a foundation for assessing the business environment and business strategies and investments. The climate accord reached at the recent Conference of the Parties (COP 21) in Paris set many new goals, and while many related policies are still emerging, **the *Outlook for Energy* continues to anticipate that such policies will increase the cost of carbon dioxide emissions over time.** For purposes of the *Outlook for Energy*, **we continue to assume that governments will enact policies that impose rising costs on energy-related CO₂ emissions, which we assume will reach an implied cost in OECD nations of about \$80 per tonne in 2040.** China and other leading non-OECD nations are expected to trail OECD policy initiatives. Nevertheless, **as people and nations look for ways to reduce risks of global climate change, they will continue to need practical solutions that do not jeopardize the affordability or reliability of the energy they need. Thus, all practical and economically viable energy sources, both conventional and unconventional, will be needed to continue meeting global energy needs** – because of the scale of worldwide energy demand. The information provided in the Long-Term Business Outlook includes ExxonMobil’s internal estimates and forecasts based upon internal data and analyses as well as publicly available information from external sources including the International Energy Agency.” (p.42) (ExxonMobil Corporation 2016).

DISCLOSURE OF CORPORATE GOVERNANCE ON CLIMATE-RELATED RISKS BY BOARD AND SENIOR MANAGEMENT

SCORE:

Egregious (-2): Company provides no disclosure of corporate governance on climate issues.

RATIONALE:

ExxonMobil provides no disclosure of corporate governance on climate issues.

SOURCE DATA

FULLY DISCLOSING CLIMATE RISKS SCORE: POOR (-3)

Peabody Energy

DISCLOSURE OF REGULATORY RISKS

SCORE:

Fair (0): Company identifies specific existing and proposed laws and regulations relating to climate change that may affect the company, but does not address how it in particular will be affected by those regulations.

RATIONALE:

Peabody Energy provides a comprehensive list of regulations potentially affecting the company, but does not discuss the implications of regulations if they are adopted (Peabody Energy Corporation 2016).

SOURCE DATA

- “In the U.S., Congress has considered legislation addressing global climate issues and greenhouse gas emissions, but to date nothing has been enacted. While it is possible that the U.S. will adopt legislation in the future, the timing and specific requirements of any such legislation are uncertain. In the absence of new U.S. federal legislation, the EPA is undertaking steps to regulate greenhouse gas emissions pursuant to the Clean Air Act. In response to the 2007 U.S. Supreme Court ruling in *Massachusetts v. EPA*, the EPA has commenced several rulemaking projects as described under “Regulatory Matters-U.S. - Environmental Laws and Regulations.” In particular, on August 3, 2015, the EPA announced the final rules (which were published in the Federal Register on October 23, 2015) for regulating carbon dioxide emissions from existing and new fossil fuel-fired EGUs. EPA has set emission performance rates for existing plants to be phased in over the period from 2022 through 2030. This rule is intended to reduce carbon dioxide emissions from the 2005 baseline by 28% in 2025 and 32% in 2030. EPA has also set standards applying to new, modified and reconstructed sources beginning in 2015.” (p. 17)
- “A number of states in the U.S. have adopted programs to regulate greenhouse gas emissions. For example, 10 northeastern states (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont) entered into the Regional Greenhouse Gas Initiative (RGGI) in 2005, which is a mandatory cap-and-trade program to cap regional carbon dioxide emissions from power plants. In 2011, New Jersey announced its withdrawal from RGGI effective January 1, 2012. Six midwestern states (Illinois, Iowa, Kansas, Michigan, Minnesota and Wisconsin) and one Canadian province have entered into the Midwestern Regional Greenhouse Gas Reduction Accord (MGGRA) to establish voluntary regional greenhouse gas reduction targets and develop a voluntary multi-sector cap-and-trade system to help meet the targets. It has been reported that, while the MGGRA has not been formally suspended, the participating states are no longer pursuing it. Seven western states (Arizona, California, Montana, New Mexico, Oregon, Utah and Washington) and four Canadian provinces entered into the Western Climate Initiative (WCI) in 2008 to establish a voluntary regional greenhouse gas reduction goal and develop market-based strategies to achieve emissions reductions. However, in November 2011, the WCI announced that six states had withdrawn from the WCI, leaving California and four Canadian provinces as the remaining members. Of those five jurisdictions, only California and Quebec have adopted greenhouse gas cap-and-trade regulations to date and both programs have begun operating. Many of the states and provinces that left WCI, RGGI and MGGRA, along with many that continue to participate, have joined the new North America 2050 initiative, which seeks to reduce greenhouse gas emissions and create economic opportunities in ways not limited to cap-and-trade programs.
In the U.S., several states have enacted legislation establishing greenhouse gas emissions reduction goals or requirements. In addition, several states have enacted legislation or have in effect regulations requiring electricity suppliers to use renewable energy sources to generate a certain percentage of power or that provide financial incentives to electricity suppliers for using renewable energy sources. Some states have initiated public utility proceedings that may establish values for carbon emissions. In a proceeding before the Minnesota Public Utilities Commission, a decision by an Administrative Law Judge is expected in April 2016 in which she will either recommend acceptance or rejection of (1) the Federal Social Cost of Carbon, (2) a different externality value or (3) maintenance of the current externality value.

We participated in the Department of Energy's Voluntary Reporting of Greenhouse Gases Program until its suspension in May 2011, and regularly disclose in our Corporate and Social Responsibility Report the quantity of emissions per ton of coal produced by us in the U.S. The vast majority of our emissions are generated by the operation of heavy machinery to extract and transport material at our mines and fugitive emissions from the extraction of coal.

In 2013, the U.S. and a number of international development banks, including the World Bank, the European Investment Bank and the European Bank for Reconstruction and Development, announced that they would no longer provide financing for the development of new coal-fueled power plants or would do so only in narrowly defined circumstances. Other international development banks, such as the Asian Development Bank and the Japanese Bank for International Cooperation, have continued to provide such financing.

The Kyoto Protocol, adopted in December 1997 by the signatories to the 1992 United Nations Framework Convention on Climate Change (UNFCCC), established a binding set of greenhouse gas emission targets for developed nations. The U.S. signed the Kyoto Protocol but it has never been ratified by the U.S. Senate. Australia ratified the Kyoto Protocol in December 2007 and became a full member in March 2008. There were discussions to develop a treaty to replace the Kyoto Protocol after the expiration of its commitment period in 2012, including at the UNFCCC conferences in Cancun (2010), Durban (2011), Doha (2012) and Paris (2015). At the Durban conference, an ad hoc working group was established to develop a protocol, another legal instrument or an agreed outcome with legal force under the UNFCCC, applicable to all parties. At the Doha meeting, an amendment to the Kyoto Protocol was adopted, which included new commitments for certain parties in a second commitment period, from 2013 to 2020. In December 2012, Australia signed on to the second commitment period. During the UNFCCC conference in Paris, France in late 2015, an agreement was adopted calling for voluntary emissions reductions contributions after the second commitment period ends in 2020. The agreement will enter into force upon ratification and execution by 55 countries that account for at least 55% of global greenhouse gas emissions.

Australia's Parliament passed carbon pricing legislation in November 2011. The first three years of the program involved the imposition of a carbon tax that commenced in July 2012 and a mandatory greenhouse gas emissions trading program commencing in 2015. On July 16, 2014, Australia's Parliament repealed the legislation, which was retrospectively abolished from July 1, 2014.

Enactment of laws or passage of regulations by the U.S. or some of its states or by other countries regarding emissions from the mining of coal, or other actions to limit such emissions, are **not expected to have a material adverse effect on our results of operations, financial condition or cash flows.**" (p. 18)

- "Enactment of laws or passage of regulations regarding emissions from the combustion of coal by the U.S., some of its states or other countries, or other actions to limit such emissions, could result in electricity generators switching from coal to other fuel sources. Further, policies limiting available financing for the development of new coal-fueled power stations could adversely impact the global demand for coal in the future. **The potential financial impact on us of future laws, regulations or other policies will depend upon the degree to which any such laws or regulations force electricity generators to diminish their reliance on coal as a fuel source. That, in turn, will depend on a number of factors,** including the specific requirements imposed by any such laws, regulations or other policies, the time periods over which those laws, regulations or other policies would be phased in, the state of commercial development and deployment of CCS technologies and the alternative markets for coal. From time to time, we attempt to analyze the potential impact on the Company of as-yet-unadopted, potential laws, regulations and policies. Such analyses require that we make significant assumptions as to the specific provisions of such potential laws, regulations and policies. These analyses sometimes show that **certain potential laws, regulations and policies, if implemented in the manner assumed by the analyses, could result in material adverse impacts on our operations, financial condition or cash flow, in view of the significant uncertainty surrounding each of these potential laws, regulations and policies. We do not believe that such analyses reasonably predict the quantitative impact that future laws, regulations or other policies may have on our results of operations, financial condition or cash flows.**" (p. 19)
- "The possibility exists that new legislation or regulations and orders, including without limitation related to the environment or employee health and safety may be adopted and may materially adversely affect our mining operations, our cost structure or our customers' ability to use coal. New legislation or administrative regulations (or new interpretations by the relevant government of existing laws and regulations), including proposals related to the protection

of the environment or the reduction of greenhouse gas emissions that would further regulate and tax the coal industry, may also require us or our customers to change operations significantly or incur increased costs. Some of our coal supply agreements contain provisions that allow a purchaser to terminate its contract if legislation is passed that either restricts the use or type of coal permissible at the purchaser’s plant or results in specified increases in the cost of coal or its use. These factors and legislation, if enacted, could have a material adverse effect on our financial condition and results of operations.” (p. 26)

- “Concerns about the environmental impacts of coal combustion, including perceived impacts on global climate issues, are resulting in increased regulation of coal combustion in many jurisdictions, unfavorable lending policies by government-backed lending institutions and development banks toward the financing of new overseas coal-fueled power plants and divestment efforts affecting the investment community, which could significantly affect demand for our products or our securities.

Global climate issues continue to attract public and scientific attention. Numerous reports, such as the Fourth (and, more recently, the Fifth) Assessment Report of the Intergovernmental Panel on Climate Change, have also engendered concern about the impacts of human activity, especially fossil fuel combustion, on global climate issues. In turn, increasing government attention is being paid to global climate issues and to emissions of what are commonly referred to as greenhouse gases, including emissions of carbon dioxide from coal combustion by power plants.” (p. 34)

- “As discussed in more detail in the section entitled “Regulatory Matters - U.S. - Environmental Laws and Regulations,” on August 3, 2015, the EPA announced the final rules (which were published in the Federal Register on October 23, 2015) for regulating carbon dioxide emissions from existing fossil fuel-fired EGUs. The EPA expects the rule to have a significant impact on demand for coal-fired electricity generation in the U.S. and, depending upon the implementation methods adopted by the various states, we believe the rule could have a material adverse effect on our results of operations, financial condition and cash flows in future periods. On February 9, 2016, the U.S. Supreme Court granted a motion to stay the implementation of the rule until its legal challenges are resolved.” (p. 69)

- “**Proposed NSPS for Fossil Fuel Fired Electric Utility Generating Units (EGUs).** On April 13, 2012, the EPA published for comment a proposed NSPS for emissions of carbon dioxide for new, modified and reconstructed fossil fuel fired EGUs (proposed NSPS for new power plants). On September 20, 2013, the EPA revoked its April 13, 2012 proposal and issued a new proposed NSPS for new power plants, using section 111(b) of the CAA. On January 8, 2014, the reproposal was published in the Federal Register. In the February 26, 2014 Federal Register, the EPA issued a Notice of Data Availability (NODA) and technical support document in support of the proposed NSPS for new power plants. After extensions, the public comment period for the repropoed NSPS and the NODA closed on May 9, 2014. The EPA released the final rule on August 3, 2015, and published it in the Federal Register on October 23, 2015.

The final rule requires that newly constructed fossil fuel-fired steam generating units achieve an emission standard for carbon dioxide of 1,400 lb CO₂/MWh_{gross}. The standard is based on the performance of a supercritical pulverized coal boiler implementing partial carbon capture and storage (CCS). **Modified and reconstructed fossil fuel fired steam generating units must implement the most efficient generation achievable through a combination of best operating practices and equipment upgrades, to meet an emission standard consistent with best historical performance. Reconstructed units must implement the most efficient generating technology based on the size of the unit** (supercritical steam conditions for larger units, to meet a standard of 1,800 lb CO₂/MWh_{gross}, and subcritical conditions for smaller units to meet a standard of 2,000 lb CO₂/MWh_{gross}.)

Coal prices are dependent upon factors beyond our control, including:

- weather patterns and natural disasters
- competition within our industry and the availability, quality and price of alternative fuels, including natural gas, fuel oil, nuclear, hydroelectric, wind, biomass and solar power
- **governmental regulations and taxes**, including those establishing air emission standards for coal-fueled power plants or mandating or subsidizing increased use of electricity from renewable energy sources
- technological developments, including those related to alternative energy sources, those intended to convert coal-to-liquids or gas and those aimed at capturing, using and storing carbon dioxide” (p. 21) (Peabody Energy Corporation 2016).

DISCLOSURE OF PHYSICAL RISKS**SCORE:**

Egregious (-2): Company does not disclose its physical risks.

RATIONALE:

Company does not disclose its physical risks.

SOURCE DATA

Company does not disclose its physical risks.

DISCLOSURE OF MARKET AND OTHER INDIRECT RISKS AND OPPORTUNITIES**SCORE:**

Poor (-1): Company broadly mentions shifting market and other indirect risks and opportunities from climate change, but does not specify potential impacts on the company.

RATIONALE:

Peabody Energy mentions competition with alternative fuels, technological developments, divestment, and lack of funding availability as risks, but does not consistently discuss the potential impacts on the company of these risks (Peabody Energy Corporation 2016).

SOURCE DATA

- “Peabody Energy mentions climate-related market risk to the company only in broad, general terms, in the context of sector-wide impacts.
Coal prices are dependent upon factors beyond our control, including:
 - **weather patterns and natural disasters**
 - **competition within our industry and the availability, quality and price of alternative fuels**, including natural gas, fuel oil, nuclear, hydroelectric, wind, biomass and solar power
 - governmental regulations and taxes, including those establishing air emission standards for coal-fueled power plants or mandating or subsidizing increased use of electricity from renewable energy sources
 - **technological developments**, including those related to alternative energy sources, those intended to convert coal-to-liquids or gas and those aimed at capturing, using and storing carbon dioxide” (p. 21).
- “There have also been efforts in recent years affecting the investment community, including investment advisors, sovereign wealth funds, public pension funds, universities and other groups, promoting the **divestment of fossil fuel equities and also pressuring lenders to limit funding to companies engaged in the extraction of fossil fuel reserves**. The impact of such efforts **may adversely affect the demand for and price of securities issued by us, and impact our access to the capital and financial markets**” (p. 35).
- “In 2013, the U.S. and a number of international development banks, including the World Bank, the European Investment Bank and the European Bank for Reconstruction and Development, announced that they would **no longer provide financing for the development of new coal-fueled power plants or would do so only in narrowly defined circumstances**. Other international development banks, such as the Asian Development Bank and the Japanese Bank for International Cooperation, have continued to provide such financing.” (Peabody Energy Corporation 2016).

DISCLOSURE OF CORPORATE GOVERNANCE ON CLIMATE-RELATED RISKS BY BOARD AND SENIOR MANAGEMENT**SCORE:**

Egregious (-2): Company provides no disclosure of corporate governance on climate issues.

RATIONALE:

Peabody provides no disclosure of corporate governance on climate issues.

PEABODY CONTINUED

SOURCE DATA

Peabody provides no disclosure of corporate governance on climate issues.

FULLY DISCLOSING CLIMATE RISKS SCORE: POOR (-5)

Royal Dutch Shell

DISCLOSURE OF REGULATORY RISKS

SCORE:

Poor (-1): Company mentions the general existence of risk associated with current or proposed laws relating to climate change, but does not identify specific laws or regulations and/or does not identify effects particular to the company (as opposed to effects that could apply to the sector as a whole).

RATIONALE:

Shell mentions the general existence of risk associated with current or proposed laws relating to climate change, but does not identify specific laws or regulations (Royal Dutch Shell PLC 2016).

SOURCE DATA

- “There are a number of factors that could affect the future operations of Shell and could cause those results to differ materially from those expressed in the forward-looking statements included in this Report, including (without limitation): (j) legislative, fiscal and regulatory developments including regulatory measures addressing climate change; [...] Rising climate change concerns have led and could lead to additional legal and/or regulatory measures which **could result in project delays or cancellations, a decrease in demand for fossil fuels and additional compliance obligations, and therefore could adversely impact our costs and/or revenue.**

There is continued and increased attention to climate change from all sectors of society. This attention has led, and we expect it to continue to lead, to additional regulations designed to reduce greenhouse gas (GHG) emissions and potential demand for fossil fuels. Furthermore, **we expect that a growing share of our GHG emissions will be subject to regulation, resulting in increased compliance costs and operational restrictions.** If our GHG emissions rise alongside our ambitions to increase the scale of our business, our regulatory burden will increase proportionally.

We also expect that GHG regulation will focus more on suppressing demand for fossil fuels. This could result in lower revenue. In addition, we expect that GHG emissions from flaring will rise where no gas-gathering systems are in place. We intend to continue to work with our partners to find ways to capture the gas that is flared. However, governmental support is fundamental to ensure the success of individual initiatives. There is no assurance that we will be able to obtain government support.

If we are unable to find economically viable, as well as publicly acceptable, solutions that reduce our GHG emissions and/or GHG intensity for new and existing projects or products, we could experience additional costs or financial penalties, delayed or cancelled projects, and/or reduced production and reduced demand for hydrocarbons, which could have a material adverse effect on our operational performance, earnings, cash flows and financial condition.” (p. 9) (Royal Dutch Shell PLC 2016).

DISCLOSURE OF PHYSICAL RISKS

SCORE:

Poor (-1): Company generally acknowledges physical risks it faces, such as weather, but does not include discussion of climate change as a contributor to those risks.

RATIONALE:

The company generally acknowledges physical risks, such as weather, but does not include discussion of climate change as a contributor to those risks (Royal Dutch Shell PLC 2016).

SOURCE DATA

“The nature of our operations exposes the communities in which we work and us to a wide range of health, safety, security and environment risks. The health, safety, security and environment (HSSE) risks to which we are potentially exposed cover a wide spectrum, given the geographic range, operational diversity and technical complexity of Shell’s daily

operations. We have operations, including oil and gas production, transport and shipping of hydrocarbons, and refining, in difficult geographies or climate zones, as well as environmentally sensitive regions, such as the Arctic or maritime environments, especially in deep water. These and other operations expose the communities in which we work and us to the risk, among others, of major process safety incidents, effects of natural disasters, earth tremors, social unrest, personal health and safety lapses, and crime. If a major HSSE risk materialises, such as an explosion or hydrocarbon spill, this could result in injuries, loss of life, environmental harm, disruption to business activities and, depending on their cause and severity, material damage to our reputation, exclusion from bidding on mineral rights and eventually loss of licence to operate. In certain circumstances, liability could be imposed without regard to Shell’s fault in the matter. Requirements governing HSSE matters often change and are likely to become more stringent over time. The operator could be asked to adjust its future production plan, as we have seen in the Netherlands, impacting production and costs. We could incur significant additional costs in the future complying with such requirements or as a result of violations of, or liabilities under, HSSE laws and regulations, such as fines, penalties, cleanup costs and third-party claims.” (p. 16) (Royal Dutch Shell PLC 2016).

DISCLOSURE OF MARKET AND OTHER INDIRECT RISKS AND OPPORTUNITIES

SCORE:

Fair (0): Company provides some details or examples of how it may be affected by indirect risks and opportunities from climate change, but provides limited analysis of their potential financial impacts for the company.

RATIONALE:

The company identifies the potential for diminished demand for fossil fuels in addition to project delays or cancellations due to regulation of greenhouse gas emissions as risks that it faces, but it provides limited analysis of these risks’ potential financial impacts (Royal Dutch Shell PLC 2016).

SOURCE DATA

- “There are a number of factors that could affect the future operations of Shell and could cause those results to differ materially from those expressed in the forward-looking statements included in this Report, including (without limitation): (j) legislative, fiscal and regulatory developments including regulatory measures addressing climate change; [...] Rising climate change concerns have led and could lead to additional legal and/or regulatory measures which could result in **project delays or cancellations, a decrease in demand for fossil fuels** and additional compliance obligations, and therefore could **adversely impact our costs and/or revenue**. We also expect that GHG regulation will focus more on **suppressing demand for fossil fuels**. This could result in lower revenue. In addition, we expect that GHG emissions from flaring will rise where no gas-gathering systems are in place. We intend to continue to work with our partners to find ways to capture the gas that is flared. However, governmental support is fundamental to ensure the success of individual initiatives. There is no assurance that we will be able to obtain government support. If we are unable to find economically viable, as well as publicly acceptable, solutions that reduce our GHG emissions and/or GHG intensity for new and existing projects or products, we could experience additional costs or financial penalties, delayed or cancelled projects, and/or reduced production and reduced demand for hydrocarbons, which could have a material adverse effect on our operational performance, earnings, cash flows and financial condition.” (p. 9)
- “To test the resilience of new projects, we assess potential costs associated with GHG emissions when evaluating all new investments. Our approach applies a uniform project screening value (PSV) of \$40 (real terms) per tonne of carbon dioxide (CO₂) equivalent to the total GHG emissions of each investment. This PSV is generally applied when evaluating our new projects around the world to test their resilience across a range of future scenarios. The project development process features a number of checks that may require development of detailed GHG and energy management plans. **High-emitting projects undergo additional sensitivity testing, including the potential for future CCS projects. Projects in the most GHG-exposed asset classes have GHG intensity targets that reflect standards sufficient to allow them to compete and prosper in a more CO₂ regulated future. These processes can lead to projects being stopped, designs**

being changed, and potential GHG mitigation investments being identified, in preparation for when regulation would make these investments commercially compelling.

We have evaluated our portfolio under the *450 Scenario*. The IEA's projected GHG regulation is expected to result in **lower demand for some of our products and potential impairments to some of our less energy-efficient assets**. However, **we could also see certain benefits as a robust global CO₂ price would make some forms of energy, such as natural gas and renewables, more competitive compared with coal**. A robust CO₂ price would also help encourage the development of CCS. Our preliminary view, looking at 2030, is that the aggregate impact under the IEA's *450 Scenario* would be positive overall for us compared with our own outlook. This is primarily due to the higher oil and gas prices assumed by the IEA. While the IEA assumes significant global CO₂ costs of \$100/tonne (in real terms) in 2030, our portfolio sensitivity to oil and gas prices significantly exceeds our sensitivity to CO₂ costs associated with our GHG emissions.

While the IEA assumes significant GHG regulatory costs by 2030, the net impact on us will be influenced by developments in the allocation of free allowances under CO₂ pricing regimes as well as the ability to recover the increased costs from customers. The outlook for these critical elements differs by region and asset type. We actively monitor and model such influences, using our own estimates of developments in global GHG regulation rather than the external reference point of the IEA's *450 Scenario*, to better represent country-level policy granularity.

Accordingly, we have also evaluated the resilience of our portfolio using our own business-case model that assumes an average global temperature increase of 2-3°C by 2100. This model uses our best estimates for future oil and gas prices and expected trends in GHG policies, including existing and proposed regulations. Using our model, **we expect our existing portfolio to remain relatively resilient in 2030, primarily as a result of our significant gas reserves and the relative energy efficiency of certain of our portfolio assets**. While our model assumes lower overall regulatory costs associated with our CO₂ emissions in 2030 than the IEA estimate of \$100/tonne, we also expect lower oil and gas prices, which projects a less positive outcome than under the IEA's *450 Scenario*.

Based on the above analysis, we believe current oil, gas and CO₂ prices are too low to stimulate the fossil fuel substitution necessary to meet the *Paris Agreement* goal of limiting the average global temperature increase to well below 2°C" (Royal Dutch Shell PLC 2016).

DISCLOSURE OF CORPORATE GOVERNANCE ON CLIMATE-RELATED RISKS BY BOARD AND SENIOR MANAGEMENT

SCORE:

Poor (-1): Company provides no disclosure of corporate governance on climate issues.

RATIONALE:

Climate change was identified as a key topic discussed by the board's Corporate and Social Responsibility Committee in 2015, but specific climate-related governance was not described (Royal Dutch Shell PLC 2016).

SOURCE DATA

"The current members of the Corporate and Social Responsibility Committee are Hans Wijers (Chairman of the Committee with effect from May 20, 2015), Sir Nigel Sheinwald and Patricia A. Woertz. Charles O. Holliday stood down as Chairman of the Committee and Gerrit Zalm stood down as a member of the Committee on May 19, 2015, and December 31, 2015, respectively. The Committee met five times during the year; the Committee members' attendances are shown on page 71.

The Committee has a mandate to maintain a comprehensive overview of the policies and performance of the subsidiaries of the Company with respect to the Shell General Business Principles and the Shell Code of Conduct, as well as major issues of public concern. Conclusions and recommendations made by the Committee are reported directly to executive management and the Board.

The Committee fulfils its responsibilities by reviewing the management of health, safety, security, environmental and social impacts of projects and operations. It does this through a series of reviews of performance, audit findings and other specific areas, such as maritime and process safety. It also monitors major issues of public concern and Shell's strategy to

address them, especially in respect of environmental and social issues. In addition, it provides input into the Shell Sustainability Report and reviews a draft of the report before publication.

The key topics discussed by the Committee in 2015 were climate change and the energy transition, however the Committee also reviewed a number of other topical issues including Alaska, Nigeria and seismic activity in Groningen, the Netherlands” (Royal Dutch Shell PLC 2016).

FULLY DISCLOSING CLIMATE RISKS SCORE: POOR (-3)

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