Climate Accountability Scorecard

Insufficient Progress from Fossil Fuel Companies

www.ucsusa.org/climatescorecard

Appendix C: Planning for a World Free from Carbon Pollution

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Union of Concerned Scientists

TABLE 1. **Planning for a World Free from Carbon Pollution Scoring Guide**

Planning	
Company-wide commitments and targets to reduce greenhouse gas emissions	
Advanced (+2)	Company meets all of the criteria for "good," and: 1. The company has near-term benchmark and long-term transition metrics to measure progress toward the long-term goal, involving a credible plan to ultimately reduce the net greenhouse gas emissions of its business activities to zero. 2. If it envisages a substantial role for offsetting of residual greenhouse gas emissions, the company provides details of that offset mechanism, including its reliability, its availability at sufficient scale for the global transition, and identification of who is going to pay for it. 3. If carbon dioxide removal plays a substantial role in the company's plans, the company provides details on how such removal will be achieved, paid for, monitored, and maintained—in effect, permanently.
Good (+1)	Company has set a strong, viable, long-term target for reducing greenhouse gas emissions resulting from company-wide operations and the use of its products. The company has developed a concrete action plan to achieve those reductions in service of the Paris climate agreement's global temperature goal and net-zero emissions. The plan is grounded in available technologies or, if it depends on future technology, specifies how the company intends to contribute to the development of new technology.
Fair (0)	Company has made a company-wide commitment to reduce absolute greenhouse gas emissions in the service of the Paris climate agreement's global temperature goal, but it has not set a science-based target or developed a concrete action plan to achieve the target.
Poor (-1)	Company has a plan for reducing greenhouse gas emissions, but the plan is not company-wide and is not in the service of a specific temperature goal or target. Or company has a greenhouse gas emissions reduction target that is not absolute or expires in the reporting year or earlier.
Egregious (-2)	Company has no commitment, targets, or plan for reducing greenhouse gas emissions.
Use of an internal price on carbon in investment decisions	
Advanced (+2)	Company meets all of the criteria for "good" and extends the use of the price on carbon to components of the supply chain that the company does not directly control.
Good (+1)	Company has set a price on carbon that it uses in investment decisions. The price reflects carbon emitted during all components of the supply chain over which the company has control (including refining and processing of fuels).

Fair (0)	Company has set a price on carbon that it uses in investment decisions, but the price is based solely on one segment of the supply chain, such as aggregate downstream greenhouse gas emissions (e.g., greenhouse gas emissions from end-user burning of the fuel).
Poor (-1)	Company has set a price on carbon that is used in investment decisions but does not disclose what that price is. Or the company has disclosed a specific price on carbon but does not explain how that price is used in investment decisions.
Egregious (-2)	Company does not use a price on carbon in investment decisions.
Commitment and mechanism to measure and reduce carbon intensity of supply chain (See Table 2 for industry initiatives)	
Advanced (+2)	Company has a mechanism to measure and reduce greenhouse emissions on a full lifecycle basis (e.g., has made a public commitment not to invest in higher-carbon fuel sources, such as tar sands, because of their high carbon intensity).
Good (+1)	Company has made a public commitment to reduce carbon emissions with a quantitative, time-bound target of at least 1 percent per year (e.g., has joined the ONE Future Commitment).
Fair (0)	Company has a public commitment to measure and reduce carbon emissions in its own operations within a set period (e.g., has signed onto World Bank's "Zero Routine Flaring by 2030" initiative), but without a quantitative emissions target.
Poor (-1)	Company has publicly joined a group designed to share best practices and information for reducing global warming emissions (e.g., has signed onto World Bank's "Global Gas Flaring Reduction Partnership (GGFRP)"), but it has not made a stronger commitment.
Egregious (-2)	Company has no public commitment to measure and reduce carbon emissions in its own operations.
Tracking and Disclosure	
Disclosure of investments in low-carbon technology research and development	
Good (+1)	Company meets all of the criteria for "fair" and also reports on low-carbon investments as a proportion of the total research and development budget and in the context of future budget allocations.
Fair (0)	Company reports annually on low-carbon research and development broken down by specific investments, including in renewable energy technologies and carbon capture and storage.
Poor (-1)	Company does not report annually on low-carbon research and development, and/or it does not provide a breakdown of specific low-carbon investments.
Disclosure of greenhouse gas emissions reduction plans	
Good (+1)	Company discloses to shareholders details of its company-wide, long-term, net-zero greenhouse gas emissions reduction plan, as well as its progress toward interim goals and benchmarks. Plan must have received a score of "good" or better in the metric, *Company-wide commitments and targets to reduce greenhouse gas emissions*.

Fair (0)	Company discloses details of its company-wide greenhouse gas emissions reduction plans to shareholders. Plan must have recived a Score of "fair" or better on the metric, *Company-wide commuments and targets to reduce grenhouse gas emissions*.
Poor (-1)	Company does not disclose details of its greenhouse gas emissions reduction plans to shareholders.
Disclosure of how company manages greenhouse gas emissions and associated risks	
Advanced (+2)	Company meets all four of the requirements under "good" disclosure.
Good (+1)	Company meets the requirements for "fair" disclosure and at least two of the following: 1. Discloses greenhouse gas emissions reduction timelines. 2. Discloses estimated and actual greenhouse gas emissions reductions resulting from emissions reduction activities undertaken by the company. 3. Specifies whether the company has identified any opportunities to benefit financially from its actions to reduce greenhouse gas emissions. 4. When individual greenhouse gas emissions reduction projects are discussed, provides context about larger impacts on the company, such as whether the results are replicable on a larger scale.
Fair (0)	Company provides a detailed description of actions it is taking to reduce, offset, or limit its own greenhouse gas emissions.
Poor (-1)	Company mentions or makes generic claims about greenhouse gas emissions management, but it does not provide details or descriptions of actions it is taking to reduce, offset, or limit its own greenhouse gas emissions and associated risks.
Egregious (-2)	Company does not disclose actions it is taking to reduce, offset, or limit its own greenhouse gas emissions and associated risks.
Disclosure of greenhouse gas emissions	
Advanced (+2)	Company discloses adequate data from the entire fuel production supply chain to estimate lifecycle greenhouse gas emissions. It describes the methodology used to calculate greenhouse gas emissions.
Good (+1)	Company meets the requirements for "fair" disclosure and also discloses indirect greenhouse gas emissions from downstream activities (e.g., final use of products, transportation, and distribution, also known as Scope 3 emissions[1]).
Fair (0)	Company provides information about direct greenhouse gas emissions from operations (also known as Scope 1 emissions[2]) and indirect greenhouse gas emissions from upstream activities (e.g., purchased goods and services, waste generated in operations, fuel- and energy-related activities, also known as

[1] Scope 3: Other indirect emissions, such as emissions from the use of sold products, the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g., transmission and distribution losses) not covered in Scope 2, outsourced activities, waste disposal, etc.

[2] Scope 1: All direct greenhouse gas emissions (emissions from sources that are owned or controlled by the reporting entity).

	Scope 2 emissions[3]) for the current year, as well as the methodology used to calculate emissions.
Poor (-1)	Company provides minimal data, insufficient to inform investors of the magnitude and trend of the company's greenhouse gas emissions (e.g., it discusses the company's greenhouse gas emissions trends but does not provide actual greenhouse gas emissions data, or it provides direct greenhouse gas emissions data but no information regarding upstream or downstream activities).
Egregious (-2)	Company does not disclose its greenhouse gas emissions.

DATA SOURCES: 2017 AND 2018 US SECURITIES AND EXCHANGE COMMISSION 10-K OR 20-F FILINGS, CDP DISCLOSURES, SUSTAINABILITY REPORTS, AND ANNUAL REPORTS; COMPANY WEBSITES AND COMPANY PRESS RELEASES FOR THE PERIOD JUNE 1, 2016, TO JUNE 30, 2018

TABLE 2. **Industry Initiatives on Supply Chain Emissions Management**

Initiative	**SCORE**
World Bank Zero Routine Flaring by 2030	0 The initiative includes an emissions reduction commitment within a set period, but no quantitative target
World Bank Global Gas Flaring Reduction Partnership (GGFRP)	-1 The initiative is designed to share best practices and information for reducing greenhouse gas emissions, without a stronger commitment
Environmental Protection Agency (EPA) Global Methane Initiative	-1 The initiative is designed to share best practices and information for reducing greenhouse gas emissions, without a stronger commitment
EPA Coalbed Methane Outreach Program	-1 The initiative is designed to share best practices and information for reducing greenhouse gas emissions, without a stronger commitment
EPA Natural Gas STAR Program	-1 The initiative is designed to share best practices and information for reducing greenhouse gas emissions, without a stronger commitment
EPA National Gas STAR International Program	0 The initiative includes an emissions reduction commitment within a set period, but no quantitative target
EPA Methane Challenge Program	0 The initiative includes an emissions reduction commitment within a set period, but no quantitative target
EPA ONE Future Emissions Intensity Commitment	1

[3] Scope 2: Indirect greenhouse gas emissions from consumption of purchased electricity, heat, or steam.

	The initiative includes a quantitative emissions reduction commitment within a set period
Climate and Clean Air Coalition Guiding Principles on Reducing Methane Emissions across the Natural Gas Value Chain	-1 The initiative is designed to share best practices and information for reducing greenhouse gas emissions, without a stronger commitment
Climate and Clean Air Coalition Oil and Gas Methane Partnership	-1 The initiative is designed to share best practices and information for reducing greenhouse gas emissions, without a stronger commitment
American Petroleum Institute (API) The Environmental Partnership Initiative	-1 The initiative is designed to share best practices and information for reducing greenhouse gas emissions, without a stronger commitment

TABLE 3. **Planning for a World Free from Carbon Pollution Scoring Bands**

AREA AGGREGATE SCORE	Definition	Point Range
Advanced	Company is demonstrating best practice in the area	+8 – +12
Good	Company is meeting emerging societal expectations in this area	+3 – +7
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	(-7) – (-3)
Egregious	Company is acting very irresponsibly in this area	(-12) – (-8)

TABLE 4. **Planning for a World Free from Carbon Pollution 2016 v 2018 Scores**

Company	2016 Area Score	2018 Area Score
Arch Coal	Egregious	Egregious
BP	Poor	Fair
Chevron	Poor	Poor
ConocoPhillips	Poor	Fair
CONSOL Energy	Egregious	Egregious
ExxonMobil	Poor	Poor
Peabody Energy	Egregious	Egregious
Royal Dutch Shell	Fair	Fair

Arch Coal

COMPANY-WIDE COMMITMENTS AND TARGETS TO REDUCE GREENHOUSE GAS EMISSIONS

SCORE:

Egregious (-2)

RATIONALE:

Arch Coal has no temperature targets or emissions reduction goals.

SOURCE DATA

No mention of any internal carbon price in public documents, CDP filings, or SEC filings.

USE OF AN INTERNAL PRICE ON CARBON IN INVESTMENT DECISIONS

SCORE:

Egregious (-2)

RATIONALE:

Arch Coal does not disclose whether it uses a price on carbon in investment decisions.

SOURCE DATA

No mention of any internal carbon price in public documents, CDP filings, or SEC filings.

COMMITMENT AND MECHANISM TO MEASURE AND REDUCE CARBON INTENSITY OF SUPPLY CHAIN

SCORE:

Poor (-1)

RATIONALE:

Arch Coal has no public commitment to measure and reduce carbon emissions in its own operations.

SOURCE DATA:

No mention of any efforts to measure or reduce carbon intensity price in public documents, CDP filings, or SEC filings.

DISCLOSURE OF INVESTMENTS IN LOW-CARBON TECHNOLOGY RESEARCH AND DEVELOPMENT

SCORE:

Poor (-1)

RATIONALE:

Arch Coal does not report on investments in low-carbon technology research and development.

SOURCE DATA

- Global warming, including the role and impact of man-made greenhouse gas emissions, is an issue of significant focus among domestic and international policymakers. On the policy side, Arch advocates an aggressive timeline for technology research and development that will reduce greenhouse gases from man-made sources, including the use of coal. (Arch Coal 2018a)

DISCLOSURE OF GREENHOUSE GAS EMISSIONS REDUCTION PLANS

SCORE:

Poor (-1)

RATIONALE:

Arch Coal does not disclose details of its greenhouse gas emission reduction plans to shareholders.

SOURCE DATA

- On the operations side, Arch is continually evaluating how to reduce our own greenhouse gas emissions and increase the efficiency of our fuel use, while also assessing the most effective approaches for managing our business in a carbon-constrained economy (Arch Coal 2018a).

DISCLOSURE OF HOW COMPANY MANAGES GREENHOUSE GAS EMISSIONS AND ASSOCIATED RISKS

SCORE:

Poor (-1)

RATIONALE:

Arch Coal makes generic claims about emissions management publicly but does not provide details or descriptions of activities the company is taking to reduce, offset, or limit its own greenhouse gas emissions.

SOURCE DATA

- On the operations side, Arch is continually evaluating how to reduce our own greenhouse gas emissions and increase the efficiency of our fuel use, while also assessing the most effective approaches for managing our business in a carbon-constrained economy (Arch Coal 2018a).
- On the policy side, Arch advocates an aggressive timeline for technology research and development that will reduce greenhouse gases from man-made sources, including the use of coal. (Arch Coal 2018a)

DISCLOSURE OF GREENHOUSE GAS EMISSIONS

SCORE:

Egregious (-2)

RATIONALE:

Arch Coal does not disclose its greenhouse gas emissions in public documents, SEC filings, or CDP filings.

SOURCE DATA

Arch Coal does not disclose its GHG emissions in publicly available documents.

PLANNING FOR A WORLD FREE FROM CARBON POLLUTION TOTAL SCORE: EGREGIOUS (-10)

BP

COMPANY-WIDE COMMITMENTS AND TARGETS TO REDUCE GREENHOUSE GAS EMISSIONS

SCORE:

Poor (-1)

RATIONALE:

BP made a short-term commitment to reduce carbon emissions in its energy transition report, but it has not set a net-zero emissions target in line with the Paris climate agreement's global temperature goal.

SOURCE DATA:

- We have set a sustainable emissions reductions target of 3.5 million tonnes out to 2025. Our operating businesses will deliver this through improved energy efficiency, fewer methane emissions and reduced flaring – all leading to permanent, quantifiable GHG reductions. And, to ensure that as our business grows, our carbon footprint does not, we'll offset any increase in emissions above 2015 levels that's not covered by our sustainable reductions activity (BP PLC 2018a).
- As a key part of this, BP is determined to tackle emissions of methane – the primary component of natural gas but also a powerful greenhouse gas – from its operations. BP is targeting limiting the methane intensity – methane emissions from its operations where gas goes to market as a percentage of that gas – to 0.2% across its oil and gas operations. (BP PLC 2018a)

USE OF AN INTERNAL PRICE ON CARBON IN INVESTMENT DECISIONS

SCORE:

Fair (0)

RATIONALE:

BP has set a price on carbon of $40 per tonne that it uses in investment decisions, but it does not specify whether the price reflects the carbon emitted during all components of the supply chain over which the company has control.

SOURCE DATA

- To help anticipate greater regulatory requirements for GHG emissions, we factor a carbon cost into our own investment decisions and engineering designs for large new projects and those for which emissions costs would be a material part of the project. In industrialized countries, this is currently $40 per tonne of CO2 equivalent, and we also stress test at a carbon price of $80 per tonne (BP PLC 2017b).

COMMITMENT AND MECHANISM TO MEASURE AND REDUCE CARBON INTENSITY OF SUPPLY CHAIN

SCORE:

Fair (0)

RATIONALE:

BP has made a public commitment to measure and reduce carbon emissions from its own operations within a set period, but it is not part of an initiative with a quantitative, time-bound target.

SOURCE DATA:

- Our low carbon ambitions - Reducing emissions in our operations:
    - Zero net growth in operational emissions out to 2025
    - 3.5 Mte of sustainable GHG emissions reductions by 2025
    - Targeting methane intensity of 0.2% and holding it below 0.3% (BP PLC 2017a)
- Methane emissions can occur along the gas supply chain - that includes flaring and venting, to leaks from equipment in gas production through to the delivery of gas to customers. We are working with Imperial College London through the Oil

and Gas Climate Initiative to compare GHG and air emissions across different gas and coal supply chains to identify the most effective ways to reduce GHG emissions (BP PLC 2017a).

- We are also a member of the World Bank Zero Routine Flaring by 2030 initiative, which aims to eliminate routine flaring from oil assets by 2030 (BP PLC 2017a).

DISCLOSURE OF INVESTMENTS IN LOW-CARBON TECHNOLOGY RESEARCH AND DEVELOPMENT

SCORE:

Fair (0)

RATIONALE:

BP reports annually on low-carbon research and development, with details on some specific investments, but it has not reported on low-carbon investments as a proportion of the total research and development budget or in the context of future budget allocations.

SOURCE DATA

- BP's Alternative Energy business was established over a decade ago to pursue opportunities created by fast growing markets in low-carbon sources of energy. Alternative Energy now has the largest operated renewables business among our oil and gas peers, with a focus on biofuels and wind. Alternative Energy is seeking to deliver value generating growth options through investment in existing installations and investing in new production. During 2016 we continued to explore opportunities to commercialise technology at scale in renewable fuels and recently announced that Butamax our joint venture with DuPont has acquired Nesika Energy. Its state-of-the-art ethanol facility in Kansas in the US will be converted to the commercial production of bio-butanol using Butamax's proprietary technology (CDP 2017a).
- Changes in climate change policy and regulation are creating fast growing markets for low carbon products and services that BP is pursuing as part of its strategy. Consequently, in 2016, BP made a number of business decisions to expand our activities in low carbon businesses. Two substantial examples are:
    - Butamax our joint venture with DuPont has acquired Nesika Energy. Its state-of-the-art ethanol facility in Kansas in the US will be converted to the commercial production of bio-butanol using Butamax's proprietary technology.
    - BP is partnering with Fulcrum BioEnergy – a company that produces sustainable jet fuel from household waste. We are investing $30 million in Fulcrum and are planning to supply the fuel to some of our aviation customers in North America (CDP 2017a).
- Solar $200m investment over three years in Europe's largest solar development company (BP PLC 2017a).
- We plan to invest around $200 million every year to help incubate and grow lower carbon solutions. This is all part of our near-term plan to allocate at least $500 million a year for low carbon activities, which also includes our renewables businesses and acquisitions (BP 2017).
- Collaborate and invest in the Oil and Gas Climate Initiative's $1 billion fund for research and technology (BP PLC 2017a).

DISCLOSURE OF GREENHOUSE GAS EMISSIONS REDUCTION PLANS

SCORE:

Poor (-1)

RATIONALE:

BP has not disclosed a sufficiently detailed plan to reduce greenhouse gas emissions that is in line with the Paris climate agreement's global temperature goal.

SOURCE DATA

- *Our low carbon ambitions* Here's how we are doing it: by reducing, improving, creating. We're reducing emissions in our own operations; we're improving our products to help customers lower their emissions; and we're creating low carbon businesses. We are able to do this because of the innovative mindset of our people, our unique global research network,

and the potential being unleashed by digital, big data and advanced technologies. This is allowing us to rapidly develop new ways to tackle emissions and improve efficiency, and to deploy these throughout BP (BP PLC 2018a).

- Shifting our upstream production towards a greater share of gas impacts our operational emissions. For example, liquefied natural gas can be more carbon-intensive than some oil production – but emissions from power generation using gas can be substantially lower than other fossil fuels, particularly coal. We have set a sustainable emissions reductions target of 3.5 million tonnes out to 2025. Our operating businesses will deliver this through improved energy efficiency, fewer methane emissions and reduced flaring – all leading to permanent, quantifiable GHG reductions. (BP PLC 2018b)
- We will deliver this commitment by reducing emissions in our operations, improving our products and services, and creating low carbon businesses. This is just the latest step in our 20-plus year journey – but a significant one and one we plan to build on in the years to come. By setting tough targets and aims – and sharing them – others can monitor our progress. We'll review these regularly so we can keep them up-to-date with changes in our portfolio, protocols and other factors. (BP PLC 2017a)

DISCLOSURE OF HOW COMPANY MANAGES GREENHOUSE GAS EMISSIONS AND ASSOCIATED RISKS

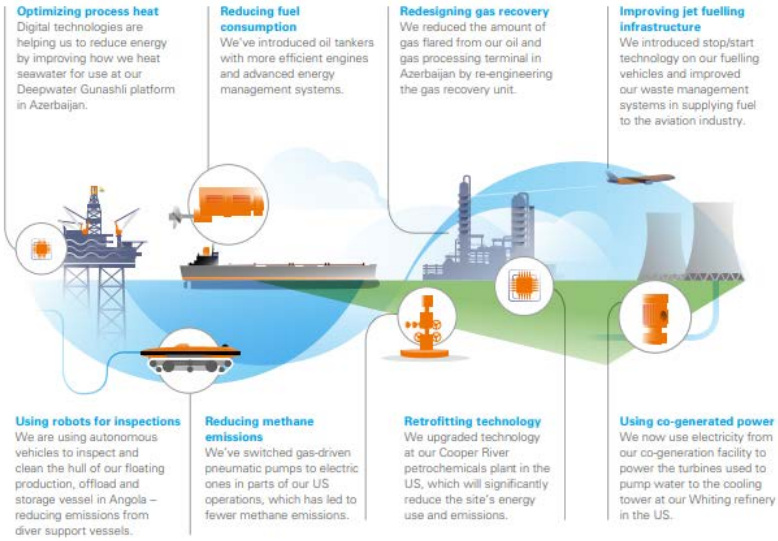
SCORE:

Fair (0)

RATIONALE:

BP has provided a detailed description of actions it is taking to reduce, offset, or limit its own greenhouse gas emissions. However, it has not disclosed actual emissions reductions resulting from activities undertaken by the company, identified any opportunities to benefit financially from its actions to reduce greenhouse gas emissions, or discussed the larger impacts of greenhouse gas emissions reductions on the company.

SOURCE DATA (BP PLC 2018a)



- *Reduce* We have set clear targets for emissions in our operations. So even as our business grows to meet growing demand, our net carbon emissions will not. We'll deliver this through sustainable reductions in our greenhouse gas emissions, by keeping a cap on our methane intensity and, as necessary, with offsets to keep net emissions at 2015 levels. We appreciate that there's more to do – but we see this as a critical next step in our journey to reduce emissions (BP PLC 2018a).
- *Improve* We're producing more natural gas – a lower carbon alternative to coal and a complement to renewables. And we're working with auto manufacturers to create fuels and lubricants that allow drivers to go further with fewer emissions (BP PLC 2018a).

- *Create* We are also creating low carbon businesses, such as LightSource BP, adding solar to our long-established renewables businesses in wind and biofuels (BP PLC 2018a).
- All our projections see renewables growing at a fast pace – but with oil and gas continuing to play a prominent role over the next two decades. That's why our portfolio is a balance of advantaged oil and gas, a competitive downstream, the trading of all forms of energy and a wide range of low carbon businesses. Each year, we reinvest about one tenth of the capital employed in new opportunities. At current rates, we produce our proved reserves over 11 years on average. Our rolling programme of activity gives us significant flexibility to redefine our business as the world's energy needs evolve. (BP PLC 2017a)

DISCLOSURE OF GREENHOUSE GAS EMISSIONS

SCORE:

Good (1)

RATIONALE:

BP provides information about direct greenhouse gas emissions from its operations and indirect greenhouse gas emissions from downstream activity. However, it has not disclosed adequate data from the entire fuel production supply chain to estimate life cycle greenhouse gas emissions.

SOURCE DATA

Greenhouse gas emissions

	2013	2014	2015	2016	2017
Operational control[a]					
Direct greenhouse gas (GHG) (Mte CO_2 equivalent (CO_2e))	–	54.1	51.2	51.4	**50.5**
Direct carbon dioxide (CO_2) (million tonnes (Mte))	–	51.6	48.5	48.4	**47.8**
Direct methane (Mte)	–	0.12	0.11	0.12	**0.11**
Methane intensity[h] (%)	–	–	–	0.2	**0.2**
Sustainable GHG emissions reductions[i] (Mte CO_2e)	–	0.1	0.2	0.7	**0.5**
Indirect emissions[j] (MteCO_2e)	–	7.5	7.0	6.2	**6.1**
Flaring[k] (upstream) (thousand tonnes of hydrocarbons)	2,028	2,188	1,863	1,896	**1,987**
Equity[l]					
Direct greenhouse gas (GHG) (Mte CO_2 equivalent (CO_2e))	50.3	48.7	49.0	50.1	**49.4**
Direct carbon dioxide (CO_2) (million tonnes (Mte))	47.0	45.5	45.1	46.1	**45.8**
Direct methane (Mte)	0.16	0.15	0.16	0.16	**0.15**
Sustainable GHG emissions reductions[i] (Mte CO_2e)	0.2	0.1	0.1	0.3	**0.4**
Greenhouse gas intensity ($TeCO_2$ equivalent/unit)					
Upstream (per thousand barrels of oil equivalent)	30.1	32	32.7	34.7	**30.4**
Refining (per utilized equivalent distillation capacity)	995	978	944	951	**923**
Petrochemicals (per thousand tonnes)	283	291	290	287	**304**
Indirect emissions[j] (MteCO_2e)	6.7	6.8	6.9	6.2	**6.8**
Customer emissions[m] (MteCO_2)	422	406	402	395	**412**
Carbon dioxide avoided through our renewables business[n] (MteCO_2e)	2.9	3.2	3.3	3.1	**2.9**

(BP PLC 2017a)

Please select the published methodologies that you use
IPIECA's Petroleum Industry Guidelines for reporting GHG emissions, 2nd edition, 2011
Other

(CDP 2017a)

- We use the BP Environmental Performance Reporting Requirements, which comprise reporting instructions and calculation methodologies covering a range of environmental parameters including GHG emissions. The reporting boundaries and emissions calculation approach are broadly aligned with both The Greenhouse Gas Protocol and the

IPIECA/API/OGP Petroleum Industry Guidelines for Reporting GHG Emissions. The BP Requirements set out a tiered approach to calculating emissions requiring the use of approaches (tiers) based on determination of fuel consumption and fuel properties for major sources rather than the use of generic emission factors. For minor sources and where we consider that it is not feasible to determine actual fuel properties BP defaults to IPCC emission factors (see 7.4). For industry specific "process" emissions the BP Requirements recommend emission factors from the API Compendium of Greenhouse Gas Emission Methodologies for the Oil and Gas Industry (CDP 2017a).

PLANNING FOR A WORLD FREE FROM CARBON POLLUTION TOTAL SCORE: FAIR (-1)

Chevron

COMPANY-WIDE COMMITMENTS AND TARGETS TO REDUCE GREENHOUSE GAS EMISSIONS

SCORE:

Egregious (-2)

RATIONALE:

Chevron has no plan or targets for reducing greenhouse gas emissions from its operations or from the use of its products.

SOURCE DATA

- Chevron operates in a highly competitive and constantly changing marketplace. We regularly reassess our views of existing and future energy markets as well as policy scenarios under which we expect to operate. To manage the wide array of potential risks inherent to its business, Chevron has in place mature processes for risk management, including risks that may be associated with climate change. Executive management and ultimately the Board of Directors are involved in these processes. Examples of our risk management processes include Enterprise Risk Management, investment decision making, and strategic and business planning. As to climate change risks, our assessments have included an examination of potential carbon-constrained scenarios, including pricing scenarios and the relative competitiveness of asset types. Our processes have enabled the Company to adapt to the dynamic and constantly changing nature of energy markets. As markets have evolved and changed, so have our Company's operations. The history of our operations has shown that we are consistently well prepared and able to adapt to changing conditions in the marketplace (CDP 2017b).

USE OF AN INTERNAL PRICE ON CARBON IN INVESTMENT DECISIONS

SCORE:

Poor (-1)

RATIONALE:

Chevron uses an internal price on carbon, but it pertains only to direct emissions and is not publicly disclosed. The company does not disclose either a specific price or range of prices, stating only that it varies by geographical location depending on existing levels of regulation.

SOURCE DATA

- Greenhouse gas emissions issues, climate change risks and carbon pricing risks are considered in Chevron's strategies, business planning, and risk management tools and processes. Chevron continually considers the possible policy and/or regulatory actions associated with carbon pricing as applied to our current production portfolio. Further, since 2008, our internal carbon price has been considered in the economic evaluations supporting major capital project appropriations. Chevron is exposed to a number of direct financial costs relating to GHG/climate regulation. The most prominent are payments for allowances for internal emissions under cap and trade systems and payments of carbon taxes on internal emissions. Some of these costs may be ultimately borne by customers in the competitive marketplace, mitigating their impact. The Company incurs additional expenses for monitoring, reporting and verifying emissions as well as collecting, accounting for and disbursing carbon taxes and allowance costs that it collects on products it sells. Since 2007, as part of its ongoing planning process, Chevron has generated an internal outlook of future carbon prices. Actual price(s) used and variance: Given the uneven state of GHG regulation around the world, this outlook is framed on a regional basis. The outlook is based on an assessment of economic conditions, energy demand, policy evolution, technology developments and costs of abatement, among other factors. This assessment brings together corporate experts and regional operating personnel. (CDP 2017b)

COMMITMENT AND MECHANISM TO MEASURE AND REDUCE CARBON INTENSITY OF SUPPLY CHAIN

SCORE:

Poor (-1)

RATIONALE:

Chevron has publicly joined a group designed to share best practices and information on reducing emissions of heat-trapping gases, but it has not made any time-bound or quantitative commitments.

SOURCE DATA:

- We have developed internal country-specific plans to minimize gas flaring, and we are a member of the World Bank–led Global Gas Flaring Reduction Partnership. (Chevron Corporation 2017a)

DISCLOSURE OF INVESTMENTS IN LOW-CARBON TECHNOLOGY RESEARCH AND DEVELOPMENT

SCORE:

Poor (-1)

RATIONALE:

Chevron provides some information on low-carbon research and development, but it does not provide an annual breakdown of specific low-carbon investments.

SOURCE DATA

- Chevron is a leadership sponsor of the Energy Efficiency Center (EEC) at the University of California at Davis. This partnership provides us with insights from the EEC's research efforts and from participants in different sectors of the energy efficiency industry. (Chevron Corporation 2018a)
- Chevron continues to manage its emissions profile and will deploy abatement technologies when they make sense for the business and for the applicable geological settings. For example, the Gorgon carbon dioxide injection project is anticipated to be the largest GHG emissions reduction project undertaken by industry globally. We are also participating in the Quest project through a joint venture in Alberta, Canada. We have invested about $1.1 billion in these two projects, and they are expected to reduce GHGs by about 5 million metric tons per year once operational, or an amount similar to the GHG emissions from the electricity used by approximately 620,000 U.S. homes in a year (Chevron Corporation 2018a)
- Chevron has invested more than $75 million in CCS research and development over the past decade. (Chevron 2018a)
- Chevron continues to be committed to understanding and evaluating the economic viability of investments in renewable energy. We pursue renewable energy technologies that leverage our company's strengths and that can be deployed with competitive economic returns. These technologies include geothermal energy, advanced biofuels, wind power and solar energy, in addition to energy efficiency technologies. (Chevron Corporation 2018a)

DISCLOSURE OF GREENHOUSE GAS EMISSIONS REDUCTION PLANS

SCORE:

Poor (-1)

RATIONALE:

Chevron does not disclose details of its greenhouse gas emissions reduction plans to shareholders.

SOURCE DATA

- Carbon-management plans: Business units in jurisdictions with regulations that impose a carbon price go through an annual compliance-planning process with the goal of achieving the most efficient manner of compliance. Where we have multiple assets in a single jurisdiction, integrated plans are developed to optimize total compliance costs across the

business. We develop marginal abatement cost curves for our facilities and compare the cost of internal reduction options with paying the tax or fees and purchasing offsets or allowances. The anticipated compliance costs, including investments to generate internal reductions, are included in business plans. (Chevron Corporation 2017b)

DISCLOSURE OF HOW COMPANY MANAGES GREENHOUSE GAS EMISSIONS AND ASSOCIATED RISKS

SCORE:

Poor (-1)

RATIONALE:

Chevron makes generic claims about greenhouse gas management but does not provide details of actions it is taking to reduce, offset, or limit its own greenhouse gas emissions and associated risks.

SOURCE DATA

- Chevron is a leader in improving how reliable and affordable energy is developed and delivered to meet global demand. We are making our operations more energy efficient, reducing flaring, managing methane emissions and investing in low-carbon technologies. In addition, we are investing in the innovations and innovators of tomorrow through our research and development and our investments in science-, technology-, engineering- and math-focused education. (Chevron Corporation 2017b)
- Although we cannot forecast exactly what will happen in the future, we believe Chevron's governance, risk management and strategy processes are sufficient to mitigate the risks and capture opportunities associated with climate change. These processes are appropriate in order to enable the company to continue to monitor and adjust accordingly as climate policy develops. In addition, as demonstrated by our actions, we believe that managing climate change risks is an important element of our strategic focus to return superior value to stockholders. (Chevron Corporation 2017b)

DISCLOSURE OF GREENHOUSE GAS EMISSIONS

SCORE:

Good (1)

RATIONALE:

Chevron provides information about direct greenhouse gas emissions from its operations and indirect greenhouse gas emissions from downstream activity. However, the company has not disclosed adequate data from the entire fuel production supply chain to estimate life cycle greenhouse gas emissions.

SOURCE DATA

Environmental performance[28]	2016	2015	2014	2013	2012
Greenhouse gas					
EQUITY BASIS					
Net greenhouse gas (GHG) emissions, equity basis (million metric tons of CO_2-equivalent)[29, 30, 31, 32, 34]	60	59	56	57	57
Direct GHG emissions (Scope 1), equity basis (million metric tons of CO_2-equivalent)[29, 31, 32, 34]	60	59	56	57	58
GHG emissions from imported electricity and steam (Scope 2), equity basis (million metric tons of CO_2-equivalent)[29, 32]	4	4	5	5	4
GHG emissions from exported electricity and steam, equity basis (million metric tons of CO_2-equivalent)[29, 32]	4	5	5	5	6
GHG emissions from third-party use of our products, equity basis (million metric tons of CO_2)[33]	363	366	358	363	364
OPERATED BASIS					
Direct GHG emissions (Scope 1), operated basis (million metric tons of CO_2-equivalent)[29, 31, 32]	66	68	66	69	70
GHG emissions from imported electricity and steam (Scope 2), operated basis (million metric tons of CO_2-equivalent)[29, 32]	6	6	6	6	6
Methane emissions, direct, operated basis (million metric tons of CO_2-equivalent)[32]	6	6	6	7	6
Upstream GHG emissions intensity, direct, operated basis (metric tons of CO_2-equivalent per 1,000 barrels of oil-equivalent production)[32]	35	36	34	36	36
Refining GHG emissions intensity, direct, operated basis (metric tons of CO_2-equivalent per 1,000 barrels of crude oil and other refinery feed)[32]	33	35	37	38	38
Average flare gas volume rate, direct, operated basis (million standard cubic feet per day)[34]	644	615	563	692	821

(Chevron Corporation 2017a)

- The World Resources Institute/World Business Council for Sustainable Development Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard defines three “scopes” that Chevron uses to report GHG emissions. Scope 1 includes direct emissions from sources within a facility. Scope 2 includes indirect emissions from electricity and steam that Chevron imports. Scope 3 includes all other indirect emissions. Chevron reports information related to two types of Scope 3 emissions: emissions associated with electricity and steam that Chevron exports to third parties and emissions from third-party use of our products. (CDP 2017b).
- The GHG performance data that reference this footnote were calculated by adding direct (Scope 1) emissions to indirect (Scope 2) emissions and subtracting indirect (Scope 3) emissions associated with electricity and steam that Chevron exports. Due to rounding, individual numbers may not sum to the total number. (CDP 2017b).
- Chevron calculated emissions from third-party use of our products by multiplying total 2016 Upstream liquids and gas production by emissions factors from API’s Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry (2004, 2009) (CDP 2017b).
- The 2016 enterprise wide flare gas volume rate increased due to the startup of major capital projects (MCPs). It is anticipated that the enterprise wide flare gas volume rate will decrease after steady-state operation of the MCPs is achieved. The 2015 enterprise wide flare gas volume rate has been refined to include emissions from MCPs that started up in 2015. In 2016, facilities under Chevron’s operational control generated an enterprise wide average vent gas volume rate of 42 million standard cubic feet per day (CDP 2017b).

PLANNING FOR A WORLD FREE FROM CARBON POLLUTION TOTAL SCORE: POOR (-6)

ConocoPhillips

COMPANY-WIDE COMMITMENTS AND TARGETS TO REDUCE GREENHOUSE GAS EMISSIONS

SCORE:

Poor (-1)

RATIONALE:

ConocoPhillips has made a company-wide commitment to reduce greenhouse gas emissions intensity (by 5 to 15 percent by 2030), but it has not set a net-zero emissions reduction target in line with the Paris climate agreement's global temperature goal.

SOURCE DATA

- We set a long-term target of reducing GHG emissions intensity between 5 and 15 percent by 2030, from a 2017 baseline (ConocoPhillips 2018a).

USE OF AN INTERNAL PRICE ON CARBON IN INVESTMENT DECISIONS

SCORE:

Fair (0)

RATIONALE:

ConocoPhillips has a set carbon price of $40 per tonne that it uses in investment decisions, but it does not specify whether the price reflects the carbon emitted during all components of the supply chain over which the company has control.

SOURCE DATA

- The company uses an estimated market cost of GHG emissions of $40 per metric tonne to evaluate future projects and opportunities (ConocoPhillips 2017a).

COMMITMENT AND MECHANISM TO MEASURE AND REDUCE CARBON INTENSITY OF SUPPLY CHAIN

SCORE:

Fair (0)

RATIONALE:

ConocoPhillips has publicly stated its commitments to lower the company's emissions intensity by 5 to 15 percent by 2030. While this is a quantitative target, the company's minimum commitment results in less than 1 percent emissions intensity reduction per year. The company has also publicly joined a group designed to share best practices and information on reducing global warming emissions.

SOURCE DATA:

- Member of the Natural Gas STAR Program run by the EPA (ConocoPhillips n.d.)
- GHG target — We set a long-term target of reducing GHG emissions intensity between 5 and 15 percent by 2030, from a 2017 baseline. (ConocoPhillips 2018a)

DISCLOSURE OF INVESTMENTS IN LOW-CARBON TECHNOLOGY RESEARCH AND DEVELOPMENT

SCORE:

Poor (-1)

RATIONALE:

ConocoPhillips does not report annually on low-carbon research and development or provide a breakdown of specific low-carbon investments.

SOURCE DATA

- Product efficiency regulations and standards
  - Research and development opportunities may lead to lower carbon intensity products.
  - R & D opportunities would depend on the specific size, scale and commercial viability of the opportunity.
  - Our technology organization is responsible for monitoring new technologies.
  - Cost is variable depending on the scale and availability of opportunities. (CDP 2017c)
- GHG technology strategy — We produced an internal GHG technology mapping document to identify GHG emission reduction challenges identified by each business unit with potential technology solutions to inform our overall technology strategy. (ConocoPhillips 2018a)

DISCLOSURE OF GREENHOUSE GAS EMISSIONS REDUCTION PLANS

SCORE:

Poor (-1)

RATIONALE:

ConocoPhillips set a long-term target to reduce its greenhouse gas emissions intensity, but it has not disclosed to shareholders details of its plans to reduce absolute greenhouse gas emissions from its operations and from the use of its products.

SOURCE DATA

- Reducing GHG emissions—In 2016, the company reduced or avoided GHG emissions by approximately 114,000 metric tonnes by carrying out a range of programs across our business units. In 2017, we set a long-term target to reduce our greenhouse gas emissions intensity between 5 percent and 15 percent by 2030 from a 2017 baseline. Setting such a target demonstrates our continuing systematic approach to managing climate-related risks throughout the business. (ConocoPhillips 2018b)

DISCLOSURE OF HOW COMPANY MANAGES GREENHOUSE GAS EMISSIONS AND ASSOCIATED RISKS

SCORE:

Fair (0)

RATIONALE:

ConocoPhillips has provided a detailed description of actions it is taking to reduce, offset, or limit its own greenhouse gas emissions. However, it has not disclosed actual emissions reductions resulting from actions undertaken by the company, identified any opportunities to benefit financially from its actions to reduce emissions, or discussed the company-wide impacts of particular emissions reduction projects.

SOURCE DATA

- Our current Climate Change Action Plan includes:
  - Developing an integrated greenhouse gas (GHG) technology strategy that focuses our efforts on technology that addresses the major challenges for key operations, including oil sands and natural gas operations.
  - Implementing a long-term GHG emissions intensity target to more effectively motivate an emissions reduction mindset in our operations.
  - Prioritizing our emission reduction projects on the most economically and environmentally effective projects.
  - Revisiting a global GHG offset strategy and monitoring the global development of greenhouse gas offsets to optimize emission reduction opportunities between regions and business units.

- Taking Steps to Reduce GHG Emissions
    - We have incorporated emissions reduction goals into our long-range plans since 2003 and each of our business units has a climate change action plan.
    - We've kept our own absolute emissions essentially flat for eight years, despite changes in our hydrocarbon production. By reducing methane leakage, optimizing equipment, reducing flaring and other steps, annual emissions in 2016 were 6.9 million tonnes lower than business as usual.
- Flare Reduction
    - Flaring is the safety practice of burning off excess gases that might otherwise pose a hazard and that cannot be:
        - Recovered for sale to consumers.
        - Used as fuel within the field.
        - Cost-effectively re-injected into the producing formation.
    - Goals addressing flaring and venting have been adopted by our business units in their climate change management plans.
- Technology to Manage Our Emissions
    - We undertake research and development on technologies that reduce the environmental footprint of oil and gas activities through a mix of:
        - Internal technology development.
        - Partnerships with academic institutions and key suppliers.
        - Industry collaborations such as COSIA in Canada.
    - Carbon capture and underground storage may represent a key set of technologies and practices that could play an important role in meeting long-term greenhouse gas reduction goals.
- Energy Efficiency
    - We continually strive to make our operations more energy efficient. This provides an environmental benefit through reduced emissions, as well as often an economic benefit through lower production costs. We have conducted several projects to improve overall energy efficiency in our producing fields.
- Carbon Trading
    - Our commercial organization trades GHG emission allowances to optimize emissions management in countries implementing emission-trading programs.
    - Where our operations are subject to GHG regulation, our goal is to meet our compliance obligation in the most cost-effective manner possible. We begin by understanding the cost and impact of our internal GHG reduction opportunities, including energy efficiency projects.
    - When reducing our own emissions will be costly and where the regulatory system allows trading, we consider purchasing allowances and high-quality offset credits to meet our compliance obligations. (ConocoPhillips 2018b)

DISCLOSURE OF GREENHOUSE GAS EMISSIONS

SCORE:

Good (1)

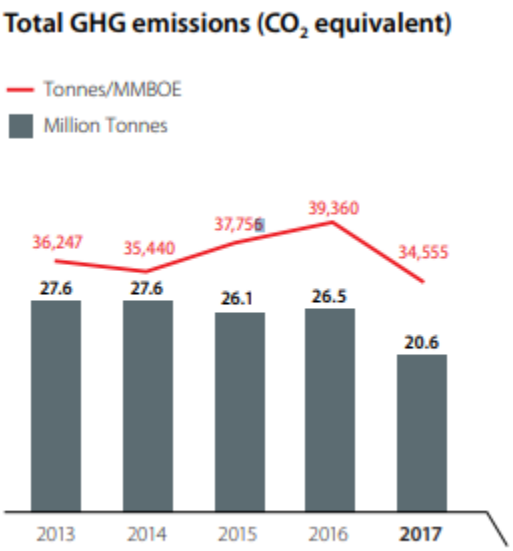
RATIONALE:

ConocoPhillips provides information about direct greenhouse gas emissions from its operations and indirect greenhouse gas emissions from downstream activity, but it has not disclosed adequate data from the entire fuel production supply chain to estimate life cycle greenhouse gas emissions.

SOURCE DATA

- In 2016, total CO2 e gross operated GHG emissions were approximately 26.8 million tonnes, an increase of about 2.7 percent, or 0.7 million tonnes, from 2015. We reduced our emissions by 114,000 tonnes CO2 e from business-as-usual, bringing our total reduced or avoided to 6.9 million tonnes since 2009. These actions have kept our emissions nearly flat at

26-27.5 million tonnes since 2009. While overall emissions increased slightly, methane emissions were reduced 14 percent from 2015. Primary drivers for reduced methane emissions were asset dispositions in Lower 48 and Canada, partly offset by regulatory reporting changes in Lower 48. Emissions intensity increased 4.3 percent due to our increased emissions, as well as a 1.7 percent decrease in gross operated production (ConocoPhillips 2017b).



(ConocoPhillips 2017b).

Downstream transportation and distribution	Relevant, calculated	6104536	This emission estimate is based on equity production rates publicly reported in company financial statements and literature-based assumptions on product (i.e. oil, bitumen, NGLs and natural gas) transportation emissions.	40.00%	Based on GHG Protocol, this category includes emissions associate with product (crude oil, bitumen, NGLs and natural gas) transportation which are purchased by third parties.
Processing of sold products	Relevant, calculated	22139526	This emission estimate is based on equity production rates publicly reported in company financial statements and literature-based assumptions on product (i.e. oil, bitumen, NGLs and natural gas) processing emissions.	40.00%	Based on GHG Protocol, this category includes (1) refining of all oil sands and conventional crude to petroleum products, (2) processing of some NGL's into consumer products, (3) processing of naphtha-range liquids (from refined crude oil) into consumer products, (4) processing of some natural gas production into petrochemicals and (5) regasification of LNG to natural gas.
Use of sold products	Relevant, calculated	193974280	This emission estimate is based on equity production rates publicly reported in company financial statements and literature-based assumptions of product (i.e. oil, bitumen, NGLs and natural gas) yields and combustion emission factors.	80.00%	Based on GHG Protocol, this category includes (1) combustion of all fuel products, including still gas, gasoline, kerosene, diesel, resin and coke, (2) combustion of some natural gas liquids for heating and mechanical work and (3) combustion of most natural gas for electricity production, industrial and residential heating.

(CDP 2017c)

PLANNING FOR A WORLD FREE FROM CARBON POLLUTION TOTAL SCORE: FAIR (-2)

CONSOL Energy

COMPANY-WIDE COMMITMENTS AND TARGETS TO REDUCE GREENHOUSE GAS EMISSIONS

SCORE:

Egregious (-2)

RATIONALE:

CONSOL Energy has no long-term temperature targets or emissions reduction goals.

SOURCE DATA

- CONSOL Energy's air quality management approach is based on maintaining full compliance with our air permits, accurately characterizing our emissions, and identifying opportunities to improve performance. Comprehensive analysis and disclosure of our emissions facilitate regulatory impact analysis, stakeholder dialogue and investigation of reduction strategies. (CONSOL Energy n.d.)
- Our recent initiatives focus on conserving energy during operations and evaluating mine methane ventilation abatement technologies. We believe both programs will improve energy efficiency, control energy use, inform our investments and reduce emissions in support of continued, sustainable mining. (CONSOL Energy n.d.)
- CDP CC3.1 - Did you have an emissions reduction or renewable energy consumption or production target that was active (ongoing or reached completion) in the reporting year? "No" (CDP 2017d)

USE OF AN INTERNAL PRICE ON CARBON IN INVESTMENT DECISIONS

SCORE:

Egregious (-2)

RATIONALE:

CONSOL Energy has not set an internal price on carbon that is used in investment decisions.

SOURCE DATA

- No, and we currently don't anticipate doing so in the next 2 years (CDP 2017d)

COMMITMENT AND MECHANISM TO MEASURE AND REDUCE CARBON INTENSITY OF SUPPLY CHAIN

SCORE:

Poor (-1)

RATIONALE:

CONSOL Energy has publicly joined a group designed to share best practices and information on reducing greenhouse gas emissions, but it does not participate in any time-bound or quantitative commitments.

SOURCE DATA:

- CONSOL Energy is a member of the EPA's Coalbed Methane Outreach Program. (EPA 2016)

DISCLOSURE OF INVESTMENTS IN LOW-CARBON TECHNOLOGY RESEARCH AND DEVELOPMENT

SCORE:

POOR (-1)

RATIONALE:

CONSOL Energy does not report on low-carbon technology research and development.

SOURCE DATA

- Improved operational efficiency lends itself to and supports the reduction of Greenhouse Gas Emissions through the introduction of new methods and technology (CDP 2017d).
- Partnering with governments on technology development: CNXC dedicates a portion of the Environmental budget to air compliance and emissions reductions (CDP 2017d).

DISCLOSURE OF GREENHOUSE GAS EMISSIONS REDUCTION PLANS

SCORE:

POOR (-1)

RATIONALE:

CONSOL Energy does not disclose details of its greenhouse gas emissions reduction plans to shareholders.

SOURCE DATA

- There is no source data for this metric.

DISCLOSURE OF HOW COMPANY MANAGES GREENHOUSE GAS EMISSIONS AND ASSOCIATED RISKS

SCORE:

Poor (-1)

RATIONALE:

CONSOL Energy mentions or makes generic claims about emissions management but does not provide details or descriptions of activities it is taking to reduce, offset, or limit its own greenhouse gas emissions.

SOURCE DATA

- At the company level, CNXC discloses material risks in the Company's regulatory filings. These material risks encompass financial, regulatory, and environmental factors that are reviewed by the senior management team and the Board of Directors. These factors are determined based on a multidisciplinary enterprise risk management process, which includes prioritization of risks through the development of heat maps that assess the likelihood and impact of risk occurrence. (CDP 2017d)
- Operational risks are routinely evaluated and managed through protocols defined in the Company's Environmental Management System (EMS). Regular operations meetings with upper management involve the identification of critical facilities, which would have a large negative impact on the company should they be forced to shut down, and the risks which accompany their operation. Specific risk mitigation measures are identified for a multitude of situations, ranging from adverse weather factors to legislative action related to emission limits. Prior to making any operational changes, we employ a Management of Change process, which includes an evaluation of the safety and environmental impacts associated with the proposed change. Associated risk mitigation plans are subsequently generated as needed. (CDP 2017d)

DISCLOSURE OF GREENHOUSE GAS EMISSIONS

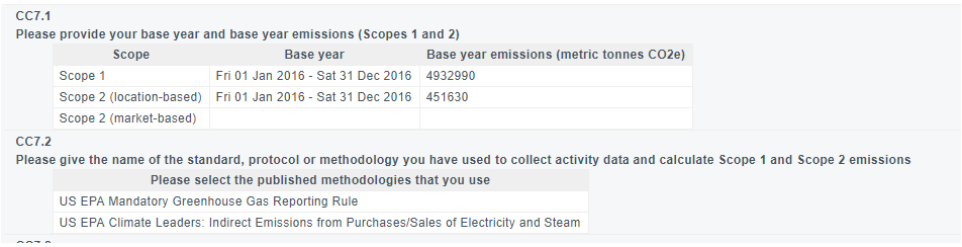
SCORE:

Fair (0)

RATIONALE:

CONSOL Energy provides information about direct greenhouse gas emissions from operations and indirect emissions from upstream activities but does not disclose indirect emissions from downstream activities.

SOURCE DATA



CC7.1

Please provide your base year and base year emissions (Scopes 1 and 2)

Scope	Base year	Base year emissions (metric tonnes CO2e)
Scope 1	Fri 01 Jan 2016 - Sat 31 Dec 2016	4932990
Scope 2 (location-based)	Fri 01 Jan 2016 - Sat 31 Dec 2016	451630
Scope 2 (market-based)		

CC7.2

Please give the name of the standard, protocol or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions

Please select the published methodologies that you use
US EPA Mandatory Greenhouse Gas Reporting Rule
US EPA Climate Leaders: Indirect Emissions from Purchases/Sales of Electricity and Steam

(CDP 2017b)

PLANNING FOR A WORLD FREE FROM CARBON POLLUTION TOTAL SCORE: EGREGIOUS (-8)

ExxonMobil

COMPANY-WIDE COMMITMENTS AND TARGETS TO REDUCE GREENHOUSE GAS EMISSIONS

SCORE:

Poor (-1)

RATIONALE:

ExxonMobil has made a short-term commitment to reduce methane emissions but does not have a company-wide plan to bring its emissions to net zero by mid-century, an action that would be consistent with the Paris climate agreement's global temperature goal.

SOURCE DATA

- ExxonMobil today announced greenhouse gas reduction measures that are expected to lead to significant improvements in emissions performance by 2020, including a 15 percent decrease in methane emissions and a 25 percent reduction in flaring. The company also announced its intention to improve its industry-leading energy efficiency in refining and chemical manufacturing facilities. Efforts associated with oil and gas production and processing are expected to lower natural gas flaring across ExxonMobil operations by about 25 percent by 2020 compared with 2016. The most significant reductions are expected to occur in operations in West Africa and include use of third-party infrastructure. (ExxonMobil 2018a)
- Did you have an emissions reduction or renewable energy consumption or production target that was active (ongoing or reached completion) in the reporting year? - No (CDP 2017e)
- As we seek to increase production of oil and natural gas to meet growing global energy demand, we are committed to mitigating greenhouse gas emissions within our operations. ExxonMobil has a robust set of processes to improve efficiency, mitigate emissions and contribute to effective long-term solutions to manage climate change risks. These processes include, where appropriate, setting tailored objectives at the business, site and equipment levels, and then stewarding progress toward meeting those objectives. Based on decades of experience, ExxonMobil believes this rigorous bottom-up approach is a more effective and meaningful way to drive efficiency improvement and greenhouse gas emissions reduction than simply setting high-level corporate targets. We also believe that continuing to use this approach will yield further improvements in all sectors of our business. (CDP 2017e)
- In the near term, we are working to increase energy efficiency while reducing flaring, venting and fugitive emissions in our operations. In the medium term, we are deploying proven technologies such as cogeneration and carbon capture and storage where technically and economically feasible. Longer term, we are conducting and supporting research to develop breakthrough technologies. Since 2000, ExxonMobil has spent approximately $8 billion to develop lower-emission energy solutions. (CDP 2017e)
- ExxonMobil is taking action by reducing greenhouse gas emissions in its operations, helping consumers reduce their emissions, supporting research that leads to technology breakthroughs and participating in constructive dialogue on policy options (ExxonMobil Corporation 2018b)

USE OF AN INTERNAL PRICE ON CARBON IN INVESTMENT DECISIONS

SCORE:

Poor (-1)

RATIONALE:

The company has set a price on carbon that is used in investment decisions, requiring an estimate of greenhouse gas–related emissions costs for capital investments. However, it does not disclose that price, stating only that it varies based on geography and may be as much as $80/ton by 2040. Due to this geographic variation, it is unclear based on current disclosures what aspects of the supply chain must be included in these estimates.

SOURCE DATA

- Does your company use an internal price on carbon? Yes
  - Please provide details and examples of how your company uses an internal price on carbon
    - ExxonMobil considers the potential impact of GHG-related policies on its individual projects in two ways. First, the demand for energy projected in our Outlook for Energy—which forms a critical part of ExxonMobil's project planning process—utilizes a proxy cost of carbon as well as targeted policy assessments to comprehensively reflect potential policies governments may employ related to managing the risks of climate change, which can, in turn, impact future oil and gas demand. This rigorous assessment of the potential impact of future emissions policies is central to the development of ExxonMobil's Outlook for Energy and is therefore baked into ExxonMobil's macro demand and price outlooks, which are considered when evaluating the economics of ExxonMobil's potential projects. To enhance the robustness of our Outlook, we assess a wide range of assumptions for key supply and demand drivers to test the range of potential energy mix outcomes.
    - Second, ExxonMobil also evaluates the direct financial impact of existing and potential future GHG regulation on potential investments on a project-by-project basis, as appropriate. This GHG cost examines those existing and reasonably anticipated regulations that may have an impact on the economics of the project in question, as opposed to those policies that might have an effect on global demand. Additionally, ExxonMobil considers many variables to stress-test potential investments, including, among other things, potential wide swings in oil and gas prices, geopolitical risks, and potential changes in sales markets. The application of a GHG cost, over and above the projected macro impact of climate change policy factored into ExxonMobil's energy outlook, is thus in keeping with ExxonMobil's disciplined approach to evaluating potential investments and projects across a wide range of economic conditions and commodity prices. (CDP 2017e)
- Our Outlook seeks to identify potential impacts of climate-related policies, which often target specific sectors, by using various assumptions and tools including application of a proxy cost of carbon to estimate potential impacts on consumer demands. or purposes of the Outlook, a proxy cost on energy-related CO2 emissions is assumed to reach about $80 per tonne on average in 2040 in OECD nations. 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. (ExxonMobil 2018c)

COMMITMENT AND MECHANISM TO MEASURE AND REDUCE CARBON INTENSITY OF SUPPLY CHAIN

SCORE:

Fair (0)

RATIONALE:

ExxonMobil has announced measures that are expected to lower its methane emissions in the near term and publicly joined a group designed to share best practices and information on reducing emissions. However, it has not set a time-bound quantitative reduction target.

SOURCE DATA:

- ExxonMobil today announced greenhouse gas reduction measures that are expected to lead to significant improvements in emissions performance by 2020, including a 15 percent decrease in methane emissions and a 25 percent reduction in flaring. The company also announced its intention to improve its industry-leading energy efficiency in refining and chemical manufacturing facilities. Efforts associated with oil and gas production and processing are expected to lower natural gas flaring across ExxonMobil operations by about 25 percent by 2020 compared with 2016. The most significant reductions are expected to occur in operations in West Africa and include use of third-party infrastructure. (ExxonMobil 2018a)

- ExxonMobil is a charter member of the Global Gas Flaring Reduction Partnership, an initiative of the World Bank that seeks to reduce flaring by increasing the use of natural gas associated with oil production, by helping remove technical and regulatory barriers to flaring reduction, conducting research, disseminating best practices and developing regulatory country-specific gas flaring reduction programs. In addition, we put in place our own Upstream Flaring and Venting Reduction Environmental Standard for Projects in 2005. Our goal is to avoid routine flaring in new Upstream projects and to reduce "legacy" flaring in our existing operations. (CDP 2017e)

DISCLOSURE OF INVESTMENTS IN LOW-CARBON TECHNOLOGY RESEARCH AND DEVELOPMENT

SCORE:

Poor (-1)

RATIONALE:

ExxonMobil mentions areas of investment in low-carbon technology research but does not provide a breakdown of specific low-carbon investments.

SOURCE DATA

- We believe society will continue moving towards a lower-carbon energy system, and we are committed to longer-term solutions through our ongoing research and development program. We have collaborations with more than 80 academic institutions around the globe to progress an array of technologies that have the potential to be scalable, reliable, and commercially viable. We are focused on fundamental research to discover or enhance energy solutions for the future.
    - Power generation • One of the attributes of a lower carbon future is the increased electrification of society. We have several areas of research that support this trend, including greater utilization of CCS and developments in energy storage technology. ExxonMobil is a leader in existing CCS, participating in more than one-fifth of the world's CCS capacity.
    - Industrial/Petrochemicals • As economic development progresses, energy demand for industry and the need for petrochemicals will continue to grow. Here again, we expect CCS will be an important technology to reduce emissions. Biofuels, as an alternative source of energy or as feedstock, is another significant opportunity being investigated. We are also researching ways to reduce energy requirements of manufacturing facilities by fundamentally changing processes that require significant heat and pressure.
    - Commercial transportation • Large-scale commercial transportation requirements by road, sea, and air will continue to require fuels with high energy density. Advanced biofuels offer potential to meet these energy requirements while reducing emissions and minimizing the impact on land, fresh water, and food supplies. Our research programs are focused on algae and conversion of agricultural waste to liquid fuels. These technologies could provide renewable, lower-emission fuels that utilize existing refining processes and infrastructure. (ExxonMobil Corporation 2018d)
- As society pursues policies to lower greenhouse gas emissions, technological advancements will be instrumental in providing the global economy with the energy it needs. Recognizing the challenges associated with most existing low-GHG emissions energy technologies, particularly in delivering the necessary economy, scale, and reliability, we are conducting fundamental research aimed at developing energy solutions that have the potential to be economically feasible and scalable. ExxonMobil is pioneering scientific research to discover innovative approaches to enhance existing – and develop next-generation – energy sources. (ExxonMobil Corporation 2018d)

DISCLOSURE OF GREENHOUSE GAS EMISSIONS REDUCTION PLANS

SCORE:

Poor (-1)

RATIONALE:

ExxonMobil has not disclosed to shareholders a plan to reduce greenhouse gas emissions that aligns with the Paris climate agreement's global temperature goal.

SOURCE DATA

- The company does not disclose details of its greenhouse gas emissions reduction plans to shareholders. (ExxonMobil 2018d)

DISCLOSURE OF HOW COMPANY MANAGES GREENHOUSE GAS EMISSIONS AND ASSOCIATED RISKS

SCORE:

Fair (0)

RATIONALE:

ExxonMobil provides a detailed description of actions it is currently taking to reduce greenhouse gas emissions, but it fails to provide information on actual emissions reductions resulting from its actions, the opportunities to benefit financially from emissions reductions, or company-wide impacts of particular projects.

SOURCE DATA

- As demonstrated by the Paris Agreement, governments have signaled an aspiration to move towards a lower carbon energy system. We have already observed the beginnings of a shift, and are taking action to position ourselves to help meet future global energy needs. For example, we are:
    - Expanding supply of cleaner-burning natural gas. This will enable greater substitution of coal with natural gas in power generation. Natural gas can be up to 60-percent less carbon intensive than coal for power generation and is a significant component of ExxonMobil's portfolio and investment activities.
    - Transitioning our manufacturing facilities. We are retooling our refining capacity to shift from fuel oils and light-duty vehicle gasoline to higher-value distillates (e.g., diesel, jet fuel), lubricants, and chemical feedstock. This reflects projected trends in consumer products and policy, such as growing EV penetration, increasing requirements for heavy-duty transportation fuels, higher performance lubricants, and increasing demand for chemical products that provide sustainability benefits.
    - Mitigating emissions from our own facilities/ operations. Our prime focus is on energy efficiency and reducing flaring, venting, and fugitive emissions. ExxonMobil also extensively employs cogeneration in its operations to increase energy efficiency and reduce net emissions while reducing the need to import power. Currently, our global gross capacity for cogeneration is 5.3 gigawatts, enough to meet the annual electricity needs of 2.5 million U.S. homes.
    - Developing consumer products that help others reduce their emissions. ExxonMobil has one of the largest chemical companies in the world. Leveraging proprietary technologies, we produce an array of materials that bring both energy efficiency and sustainability benefits to consumers.
    - Engaging on climate policy. We continue to encourage policy that addresses the risks of climate change at the lowest cost to society. We are actively engaged in evaluating potential renewable alternatives, including solar, bioenergy, and wind. Our focus is on contributing in areas where we can help make a difference in line with our technical capabilities. Our research and development program includes opportunities that could make renewable technologies more competitive. We also support the deployment of renewables as a supplier of synthetic lubricants to wind turbines around the world. The natural gas that we produce can also serve as an energy backstop to address intermittency issues associated with these energy sources. We continue to actively monitor developments in this area through our research activities and our annual Outlook process, advancing opportunities that appear to hold promise (ExxonMobil Corporation 2018d).

DISCLOSURE OF GREENHOUSE GAS EMISSIONS

SCORE:

Fair (0)

RATIONALE:

ExxonMobil provides data for the current year on direct greenhouse gas emissions from operations and indirect greenhouse gas emissions from upstream activities, as well as the methodology used to calculate emissions. However, it has not disclosed indirect greenhouse gas emissions from downstream activities or adequate data from the entire fuel production supply chain to estimate life cycle greenhouse gas emissions.

SOURCE DATA

Managing climate change risks											
[5]Greenhouse gas emissions, absolute (net equity, CO_2-equivalent emissions), millions of metric tons	135	126	123	126	128	126	127	123	122	**125**	20
[6]Direct (excluding emissions from exported power and heat)	125	117	114	117	119	118	119	115	114	**117**	N/A
[7]Emissions associated with imported power	10	9	9	9	9	8	8	8	8	**8**	N/A
Greenhouse gas emission consituents (excludes emissions from exported power and heat), millions of metric tons											
CO_2 (excluding emissions from exported power and heat)	131	122	119	122	124	120	119	116	115	**118**	N/A
Methane (CO_2-equivalent)	3	3	3	3	3	5	7	6	6	**7**	N/A
Other gases (CO_2-equivalent)	1	1	1	1	1	1	1	1	1	**<1**	N/A
Emissions from exported power and heat	14	13	14	13	15	15	16	7	4	**3**	N/A
By-region greenhouse gas emissions (net equity, CO_2-equivalent emissions), millions of metric tons											
Africa/Europe/Middle East	50	45	43	45	45	44	44	43	44	**44**	N/A
Americas	65	62	62	64	66	68	70	66	65	**65**	N/A
Asia Pacific	20	19	18	17	17	14	13	14	13	**16**	N/A

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Page #
Managing climate change risks (continued)											
By-division greenhouse gas emissions (net equity, CO_2-equivalent emissions), millions of metric tons											
Upstream	53	49	47	50	54	56	58	56	56	**59**	N/A
Downstream	59	57	56	55	54	51	49	47	45	**45**	N/A
Chemical	23	20	20	21	20	19	20	20	21	**21**	N/A
Carbon dioxide – captured for storage, millions of metric tons	N/A	N/A	N/A	N/A	5.0	4.8	5.9	6.9	6.9	**6.3**	18
[8]Greenhouse gas emissions, normalized (net equity, CO_2-equivalent emissions), metric tons per 100 metric tons of throughput or production											
Upstream	21.7	21.0	20.1	20.5	20.7	22.3	23.2	23.9	23.9	**24.6**	20
Downstream	21.5	21.0	21.0	20.8	20.0	19.6	19.7	19.2	18.9	**19.5**	20
Chemical	62.1	59.8	60.7	57.9	57.2	56.3	57.0	53.4	53.6	**52.2**	20
Energy use (billion gigajoules)	1.6	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.5	**1.5**	20
Energy intensity, normalized versus *Global Energy Management System* (GEMS) base year (2002) – refining	94.2	93.7	92.8	91.8	90.9	90.0	90.5	90.3	91.2	**90.7**	N/A
Energy intensity, normalized versus GEMS base year (2002) – chemical steam cracking	89.6	90.4	88.6	87.6	87.3	88.2	88.8	86.4	86.6	**84.2**	N/A
Hydrocarbon flaring (worldwide activities), millions of metric tons	8.0	5.7	4.4	3.6	4.1	3.6	3.7	4.5	5.3	**5.0**	21
[9]Cogeneration capacity in which we have interest, gigawatts	4.5	4.6	4.9	4.9	5.0	5.2	5.3	5.5	5.5	**5.3**	21

Data included in the performance table is guided by the reporting guidelines and indicators of IPIECA's Oil and Gas Industry Guidance on Voluntary Sustainability Reporting (2015). (ExxonMobil Corporation 2016)

PLANNING FOR A WORLD FREE FROM CARBON POLLUTION TOTAL SCORE: POOR (-5)

Peabody Energy

COMPANY-WIDE COMMITMENTS AND TARGETS TO REDUCE GREENHOUSE GAS EMISSIONS

SCORE:

Egregious (-2)

RATIONALE:

Peabody Energy has no plan or targets for reducing greenhouse gas emissions.

SOURCE DATA

- The company does not disclose any targets or goals for reducing GHG emissions**.** (Peabody Energy Corporation 2017)

USE OF AN INTERNAL PRICE ON CARBON IN INVESTMENT DECISIONS

SCORE:

Egregious (-2)

RATIONALE:

Peabody Energy does not disclose whether it uses an internal price on carbon in its investment decisions.

SOURCE DATA

- There is no information about an internal carbon price in the publicly available documents. (Peabody Energy Corporation 2017)

COMMITMENT AND MECHANISM TO MEASURE AND REDUCE CARBON INTENSITY OF SUPPLY CHAIN

SCORE:

Egregious (-2)

RATIONALE:

Peabody Energy has no public commitment to measure and reduce carbon emissions in its own operations.

SOURCE DATA:

- The company makes no mention of effort to measure or reduce carbon in their supply chain, or of membership in industry groups that share best practices on emissions reduction (Peabody Energy Corporation 2017).

DISCLOSURE OF INVESTMENTS IN LOW-CARBON TECHNOLOGY RESEARCH AND DEVELOPMENT

SCORE:

Poor (-1)

RATIONALE:

Peabody Energy does not disclose investments in low-carbon technology research and development.

SOURCE DATA

- Peabody has been an industry leader in promoting the advancement of CCUS technology. We are active members of both the Carbon Utilization Research Council and the National Enhanced Oil Recovery Initiative. These organizations are working together to lay the groundwork for a CCUS future in the U.S. and throughout the world. (Peabody Energy Corporation 2017)

DISCLOSURE OF GREENHOUSE GAS EMISSIONS REDUCTION PLANS

SCORE:

Poor (-1)

RATIONALE:

Peabody Energy does not disclose an emissions reduction plan to shareholders.

SOURCE DATA

- The company does not detail any plans to reduce GHG emissions (Peabody Energy Corporation 2017).

DISCLOSURE OF HOW COMPANY MANAGES GREENHOUSE GAS EMISSIONS AND ASSOCIATED RISKS

SCORE:

Fair (0)

RATIONALE:

Peabody Energy provides a detailed description of actions it is taking to reduce, offset, or limit its own greenhouse gas emissions, but it does not disclose a timeline, reduction projects, financial opportunities from emissions reductions, or a larger context around individual projects.

SOURCE DATA

- Peabody will continue to endeavor to reduce our carbon footprint and promote the development and deployment of low-carbon technologies by:
    - Conserving energy and reducing greenhouse gas intensity at our operations when possible through energy efficiency and other best practices;
    - Funding research and key initiatives in low-emissions projects and partnerships such as those already advancing in the U.S., Australia and China;
    - Playing a leadership role in the development of public policies related to energy and the environment;
    - Engaging with governments, academia, communities and other stakeholders to support constructive and informed dialogue; and
    - Building awareness and support to eliminate energy poverty, increase access to low-cost electricity and improve emissions through advanced clean coal technologies. (Peabody Energy Corporation 2017)
- From 2015 to 2016, the greenhouse gas emissions from ventilation and stationary sources for all Peabody underground mines, reported as CO2e, had a net decrease of 21 percent. The improvement comes on top of emission declines made in prior years, achieved in part by sealing previously mined areas and reducing or eliminating propane heat for office use. (Peabody Energy Corporation 2017)

DISCLOSURE OF GREENHOUSE GAS EMISSIONS

SCORE:

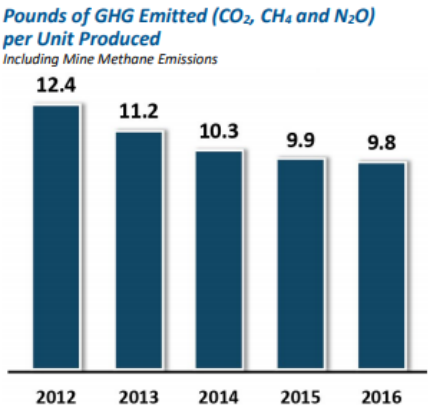
Poor (-1)

RATIONALE:

Peabody Energy provides insufficient data to inform investors of the magnitude and trend of the company's greenhouse gas emissions.

SOURCE DATA

- Peabody measures greenhouse gas emissions at our operations in pounds of carbon dioxide equivalent or CO2e (CO2, CH4 and N2O) per unit of production (raw tons of coal mined and cubic yards of overburden moved). Over the past five years, Peabody's greenhouse gas intensity across our global operations has declined slightly from 11.2 CO2e per unit in 2013 to 11.1 CO2e in 2017. (Peabody Energy Corporation 2017)



(Peabody Energy Corporation 2017)

PLANNING FOR A WORLD FREE FROM CARBON POLLUTION TOTAL SCORE: EGREGIOUS (-9)

Royal Dutch Shell

COMPANY-WIDE COMMITMENTS AND TARGETS TO REDUCE GREENHOUSE GAS EMISSIONS

SCORE:

Poor (-1)

RATIONALE:

Shell has stated its ambition to reduce emissions of heat-trapping gases from its operations and from the use of its products, but it has not set a company-wide, net-zero target or adopted a concrete action plan consistent with the Paris climate agreement's global temperature goal.

SOURCE DATA

- In 2017, we announced our ambition to cut the net carbon footprint of the energy products we provide by around half by 2050 in step with society's drive to align with the goals of the Paris Agreement. This is an industry-leading aspiration that may need periodic recalibration in line with the pace of change in broader society and the wider energy system. As an interim step, by 2035, we aim for a reduction of 20% based on our expectation of society's movement toward meeting the goal of the Paris Agreement. This includes emissions from Shell's operations; emissions of third parties who supply energy for that production; and our customers' emissions from their use of the products we sell. This means we aim to help our customers reduce their own emissions through the solutions we offer. (Royal Dutch Shell 2017)

USE OF AN INTERNAL PRICE ON CARBON IN INVESTMENT DECISIONS

SCORE:

Fair (0)

RATIONALE:

Shell has set a price on carbon of $40 per ton that it uses in investment decisions, but it is unclear if that price reflects carbon emitted during all components of the supply chain over which the company has control.

SOURCE DATA

- At Shell, we typically assess the GHG risks on all our planned ventures, including existing operations that undergo substantial modifications, applying a GHG project screening value (PSV) to the base case economics against scope 1 and 2 emissions for all new projects since 2000 (CDP 2017f).
- Since 2008, our GHG PSV has been $40 per tonne. The GHG PSV is estimated of the long-term potential costs that Shell assets could incur as a result of governments taking actions to reduce CO2 emissions. The PSV tests the robustness of the economics of a project against potential future CO2 constraints and the resulting carbon price signal. The PSV incentivises investments in CO2 abatement, highlights projects with the most exposure to rising carbon prices and helps screen early-stage opportunities. In addition to applying the base case GHG PSV, we also consider GHG price sensitivities, both in the case of upsides and downsides e.g. for projects with a high exposure to carbon pricing or legislation, we consider the impact of higher GHG prices. The screening value can affect our project design in a number of ways. Some projects may be stopped at an early stage if the GHG footprint is too high or a design may be altered to reduce GHG emissions at start-up. For example, we have stopped some projects at an early stage, due to high levels of CO2 in the hydrocarbon reservoir. Alternatively, a project may be designed to enable CO2 reduction at a later date if there is an increase in the local government-imposed carbon price – for example, by adding CCS. As well as guiding investment decisions, our GHG PSV is used as a reference to guide business planning assumption when current GHG costs are unknown or expected to change within the planning period. (CDP 2017f)

COMMITMENT AND MECHANISM TO MEASURE AND REDUCE CARBON INTENSITY OF SUPPLY CHAIN

SCORE:

Fair (0)

RATIONALE:

Shell has made a public commitment to measure and reduce carbon emissions in its own operations within a set period but is not part of an initiative with a quantitative, time-bound target.

SOURCE DATA:

- As an interim step, by 2035, we aim for a reduction of 20% based on our expectation of society's movement toward meeting the goal of the Paris Agreement. This includes emissions from Shell's operations; emissions of third parties who supply energy for that production; and our customers' emissions from their use of the products we sell.
- Our policy is to reduce any continuous flaring or venting to as low as level as reasonably practical. We are a signatory of the World Bank's "Zero routine flaring by 2030" initiative. (Royal Dutch Shell 2017)

DISCLOSURE OF INVESTMENTS IN LOW-CARBON TECHNOLOGY RESEARCH AND DEVELOPMENT

SCORE:

Fair (0)

RATIONALE:

Shell reports annually on low-carbon research and development, with a breakdown by specific investments, including in renewable energy technologies and carbon capture and storage. However, it has not reported on low-carbon investments as a proportion of the total research and development budget or in the context of future budget allocations.

SOURCE DATA

- HIGHLIGHTS IN 2017 ▪ We invested $922 million in research and development. ▪ In the USA, we agreed to support the Energy Biosciences Institute's research into using biochemical processes to store or deliver energy. ▪ We signed an agreement with Brazil's industry association SENAI to collaborate on technology innovations in the oil and gas sector. ▪ We extended our support for the largest clean-tech incubator in the USA, Greentown Labs, where startups build their prototypes.
    - R&D projects often involve collaborations with public or private entities, including universities, government laboratories, technology start-ups and incubators. We invested $922 million in R&D in 2017 compared with $1,014 million in 2016.
    - The Quest CCS project in Canada captured and safely stored more than 1 million tonnes of carbon dioxide in 2017.
    - Our R&D projects often involve collaborations with public or private entities, including universities, government laboratories, technology start-ups and incubators. This collaborative approach to innovation with partners inside and beyond the energy sector helps spark new ideas and accelerates their development and deployment.
    - Our collaborations range from developing advanced fuels to improving data processing within the IT industry. For example, in the USA, we are supporting the Energy Biosciences Institute's research into using biochemical processes to store and deliver energy. At the same time, we have extended our support for Greentown Labs, the largest clean-tech incubator in the USA.
    - We actively support open innovation through programmes such as Shell GameChanger, Shell Technology Ventures and Shell TechWorks, to help speed up developments in areas such as natural gas, biofuels, solar power, water treatment, CO_2 management and energy efficiency. (Royal Dutch Shell 208b)
    - RESEARCH AND DEVELOPMENT We continue to invest in research and development (R&D) to improve the efficiency of our products, processes and operations, and to commercialise technologies for the transition to a low-carbon energy future. In 2017, we spent $922 million on R&D. We operate a global network of technology centres, with major hubs in Houston, the USA; Amsterdam, the Netherlands; and Bangalore, India. Thousands of employees across the network work on R&D projects that seek, for example, to turn natural gas into more

efficient and cleaner fuels, unlock oil from rock layers thousands of metres below the sea surface, and reduce Shell's Net Carbon Footprint. R&D projects often involve collaborations with public or private entities, including universities, government laboratories, technology start-ups and incubators. For example, in 2017 we agreed to support research by the Energy Biosciences Institute in the USA into using biochemical processes to store or deliver energy, or to synthesise high-value chemicals. Most of our research focuses on the near term, to help our existing businesses reduce capital and operating costs, and to enhance customer products and services. This research also focuses on ways to lower energy consumption. For the long term, we aim to quickly acquire deeper insights into the science and engineering that underpins new energy technologies that can help create a lower-carbon future. Our open innovation programmes include: Shell GameChanger This programme works with start-ups and businesses on unproven early-stage ideas with the potential to impact the future of energy.
We provide companies with support, expertise and seed funding, while they maintain the independence to make their own decisions. Shell Technology Ventures This is our corporate venturing arm. It invests in companies that are developing promising technologies that complement Shell's businesses – mainly in oil and gas, new energies and information technology. Shell TechWorks Based in Massachusetts, the USA, Shell TechWorks accelerates the adoption of proven technologies from other industries and applies them to the oil and gas sector. Founded in 2013, the programme has collaborated with companies, universities, research institutes and start-ups to help develop and deploy technology quickly and cost-effectively (Royal Dutch Shell 2018a).

DISCLOSURE OF GREENHOUSE GAS EMISSIONS REDUCTION PLANS

SCORE:

Poor (-1)

RATIONALE:

Shell has disclosed details of its greenhouse gas emissions reduction plans to shareholders, but the plan is not oriented toward a target of bringing emissions from its operations and from the use of its products to net zero by mid-century.

SOURCE DATA

- To meet this ambition, we will step up many of our existing activities. That means bringing more biofuels, hydrogen and electric vehicle charging into the mix; more renewable power; and helping to advance technology to capture CO2 emissions and store them safely underground. We will also use natural solutions, including forests and wetlands, to help naturally absorb emissions from uses where alternatives do not yet exist or will take time to reach commercial scale. We will produce more natural gas, the cleanest-burning hydrocarbon, and make it a priority to reduce leakage of the potent greenhouse gas methane from our gas operations. (Royal Dutch Shell 2017)
- Our GHG and energy management plans for our facilities and projects help drive our emissions performance through a range of actions. These include improving the schedules for equipment maintenance, installing more energy-efficient equipment and considering the potential for CCS in the design of our new and largest projects. GHG and energy management plans must include the sources of GHG emissions, as well as a forecast of expected emissions at the site for at least 10 years. To assess the resilience of new projects, we consider potential costs associated with GHG emissions when evaluating all new investments. This means projects may be stopped at an early planning stage if the GHG emissions are expected to be too high, or a design may be altered to reduce GHG emissions. (Royal Dutch Shell 2018a)

DISCLOSURE OF HOW COMPANY MANAGES GREENHOUSE GAS EMISSIONS AND ASSOCIATED RISKS

SCORE:

Fair (0)

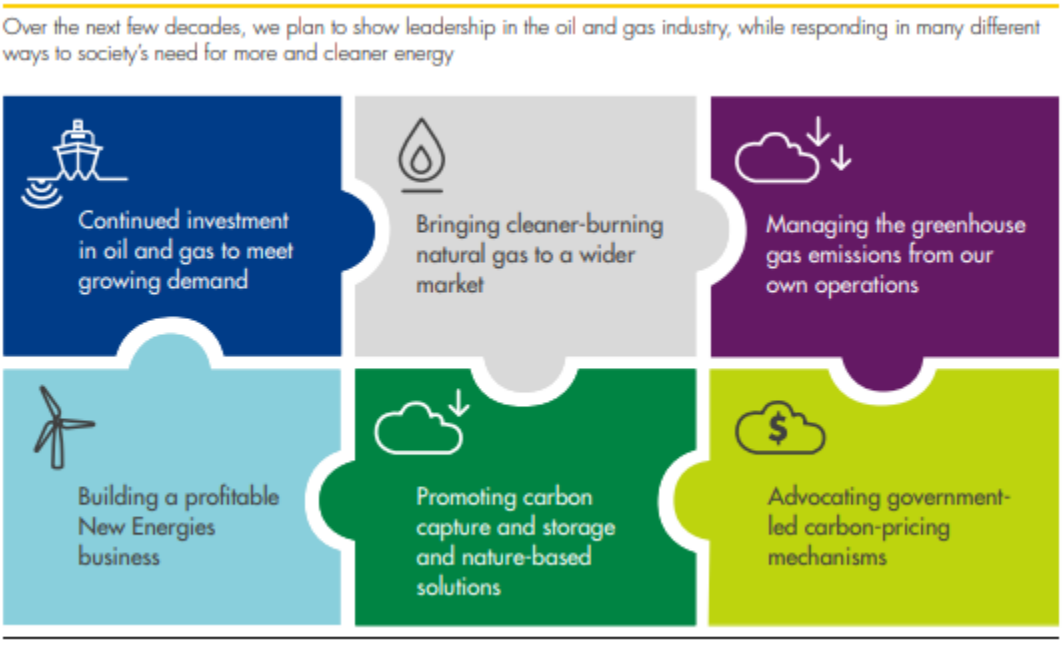
RATIONALE:

Shell has provided a description of actions it is taking to reduce, offset, or limit its own greenhouse gas emissions but has not disclosed actual reductions resulting from activities undertaken by the company, identified any opportunities to benefit

financially from its actions to reduce greenhouse gas emissions, or discussed the company-wide impacts of particular emissions reduction projects.

SOURCE DATA

- We will continue to assess and adjust investments to sustain our oil and gas resources, with significant flexibility to respond to expected demand, prices and other relevant factors. When making investments we consider the following factors to enhance resilience: Short-cycle investment and flexibility to allow production to increase or decrease in response to changes in demand or price (for example in Shales); Focusing on projects that generate positive cash flow in a short period of time (for example, by adding new wells to existing deep-water fields); Improving capital efficiency to lower break-even prices; Considering specific performance standards on CO2 intensity for various asset classes when investing in new assets; Deploying technologies to further drive resilience, including the use of CCS and renewables in Upstream assets; GHG and energy management to lower CO2 intensity and potential costs from carbon prices in our operating assets. (Royal Dutch Shell 2018a)
- Reducing our Net Carbon Footprint will require us to reduce emissions from our own operations. But most of the reductions will come from changing our portfolio to supply customers more products that produce lower emissions. We will do this in ways that make commercial sense for Shell, in response to changing consumer demand and in step with society's progress. To give some sense of the scale of the ambition, these are some of the changes that reducing our Net Carbon Footprint to match the energy system by 2050 could mean for our business. And it could mean doing not just one, but all of them. Selling the output from 200 large offshore wind farms the size of our planned Borssele wind farm in the North Sea. Changing the proportion of gas in the total amount of oil and gas we produce, so that natural gas increases from 50% to 75%. Selling the fuel produced by 25 biofuel companies the size of our joint venture Raízen in Brazil. Selling enough electricity on our forecourts around the world to meet three times the total demand for power in the Netherlands. Developing the capacity of 20 CCS plants the size of our Quest CCS plant in Canada. Planting forests the size of Spain to act a carbon sink for emissions that still exist. These examples reflect Shell's size and scale in the overall energy system: Shell produces around 1.5% of the world's total energy and we sell about 3% of the total energy consumed. They also provide a sense of the far greater ambition that society has set itself in the Paris Agreement. (Royal Dutch Shell 2018a)



(Royal Dutch Shell 2017)

DISCLOSURE OF GREENHOUSE GAS EMISSIONS

SCORE:

Good (1)

RATIONALE:

Shell has disclosed direct greenhouse gas emissions from its operations and indirect greenhouse gas emissions from downstream activities, but it has not disclosed adequate data from the entire fuel production supply chain to estimate life cycle greenhouse gas emissions.

SOURCE DATA

Downstream transportation and distribution	Relevant, calculated	2900000	The activity data was taken from the 2016 Annual Report. Emission factors were generally taken from DEFRA or the McKinnon and Piecyk's report "Measuring and managing CO2 emissions from the transportation of chemicals in Europe". Emissions were estimated from the mass of sold products multiplied by the appropriate emission factor for each freight mode (sea, pipeline, road or rail) and average distance travelled based on data published in the USA and the UK.	50.00%	We do not track the destination of all products through the processing, conversion, distribution, use and disposal by customers. Primary product data is taken directly from our own sources but the assumptions come from external sources like the one referenced in the methodology.

Use of sold products	Relevant, calculated	600000000	The activity data is taken from pages 37-44 of the 2016 Annual Report. The following emission factors (tonne CO2 / tonne of product) were assigned to each product, i.e. Gasoline = 3.07, Kerosene = 3.17, Gas Oil = 3.18, Fuel Oil = 3.08, LPG = 2.95, Natural Gas = 2.65. The boundary used to report refinery products and natural gas production are those used for financial reporting and do not align with the traditional GHG boundaries defined by the GHG Protocol. The Refinery Outturn data reflects Shell subsidiaries, the 50% Shell interest in Motiva in the USA and instances where Shell owns the crude or feedstock processed by a refinery. Some equity accounted investments are not included. The natural gas production includes Shell subsidiaries and the Shell share of equity accounted investments. See the assurance statement for more details.	100.00%	The exclusions are mentioned in the assurance statement under "5. Emissions from the use and disposal of chemical products, lubricants and other non-fuel products like bitumen are not included. Refinery type products produced by Chemical plants are also not included."

(CDP 2017e)

PLANNING FOR A WORLD FREE FROM CARBON POLLUTION TOTAL SCORE: FAIR (-1)

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