Suncor Energy Inc. - Climate Change 2018

C0. Introduction

C0.1

(C0.1) Give a general description and introduction to your organization.

Suncor is an integrated energy company headquartered in Calgary, Alberta, Canada. The company is strategically focused on developing one of the world's largest petroleum resource basins – Canada's Athabasca oil sands. In addition, Suncor and its affiliates explore for, acquire, develop, produce and market crude oil and natural gas in Canada and internationally; the company transports and refines crude oil, and markets petroleum and petrochemical products primarily in Canada. The company also conducts energy trading activities focused principally on the marketing and trading of crude oil, natural gas, power and byproducts. Suncor also operates a renewable energy business as part of its overall portfolio of assets.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Row 1	January 1 2017	December 31 2017	No	<Not Applicable>
Row 2	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Row 3	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Row 4	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>

C0.3

(C0.3) Select the countries/regions for which you will be supplying data.

Canada
United States of America

C0.4

(C0.4) Select the currency used for all financial information disclosed throughout your response.

CAD

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your consolidation approach to your Scope 1 and Scope 2 greenhouse gas inventory.

Operational control

C-OG0.7

(C-OG0.7) Which part of the oil and gas value chain and other areas does your organization operate in?

Row 1

Oil and gas value chain

Upstream
Downstream

Other divisions

Biofuels
Grid electricity supply from gas
Grid electricity supply from renewables

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?

Yes

C1.1a

(C1.1a) Identify the position(s) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Board/Executive board	The Board oversees Suncor's Enterprise Risk Management Program (the ''ERM Program''). In accordance with this program, the CEO and senior management undertake a process to identify, assess and mitigate significant risks. The Board undertakes an annual review of those risks identified by the ERM program as principal risks (exposure that has the potential to impact or impair the ability of the company to meet its strategic objectives) which includes carbon risk. The Board monitors risk management actions for these risks throughout the year. In addition to Board oversight of risk management efforts, each principal risk is mapped to a Board Committee. Carbon risk is mapped to the Environment, Health, Safety and Sustainable Development Committee of the Board.

C1.1b

(C1.1b) Provide further details on the board's oversight of climate-related issues.

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Please explain
Scheduled – some meetings	Reviewing and guiding strategy Reviewing and guiding major plans of action Reviewing and guiding risk management policies Reviewing and guiding annual budgets Reviewing and guiding business plans Setting performance objectives Monitoring implementation and performance of objectives Monitoring and overseeing progress against goals and targets for addressing climate-related issues	One of the Board's major duties is to review with management Suncor's mission, objectives and goals and the strategies and plans for achieving them. The Board also monitors Suncor's progress toward its strategic goals and plans, and revises Suncor's direction where warranted. The Board oversees Suncor's Enterprise Risk Management Program (the ''ERM Program''). In accordance with this program, the CEO and senior management undertake an entity-wide process to identify, assess and mitigate significant risks. The Board undertakes an annual review of those risks identified by the ERM program as principal risks (exposure that has the potential to impact or impair the ability of the company to meet its strategic objectives) which includes carbon risk. The Board monitors risk management actions for these risks throughout the year. In addition to Board oversight of risk management efforts, each principal risk is mapped to a Board Committee. Carbon risk is mapped to the Environment, Health, Safety and Sustainable Development Committee of the Board, and this committee receives quarterly reports from management. The board is also responsible for ensuring Suncor has an effective strategic planning process, and on an annual basis reviews Suncor's annual business plan (including Suncor's annual capital budget) and in doing so endorses the strategies reflected in Suncor's long range plan. The Governance Committee provides assistance to the Board by annually assessing Suncor's planning and budgeting process.

C1.2

(C1.2) Below board-level, provide the highest-level management position(s) or committee(s) with responsibility for climate-related issues.

Name of the position(s) and/or committee(s)	Responsibility	Frequency of reporting to the board on climate-related issues
Chief Sustainability Officer (CSO)	Both assessing and managing climate-related risks and opportunities	Quarterly

C1.2a

(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored.

The Chief Sustainability Officer (CSO) is one of three C-suite members that reports directly to the CEO and President of Suncor. The CSO also has a direct link to the Environmental, Health, Safety & Sustainable Development (EHS&SD) Committee of the Board of Directors. The CSO is the highest-level management position below the board level where the most significant climate-related issues ultimately are managed. The fact that Suncor has created a CSO position demonstrates Suncor's commitment to have significant and dedicated resources responsible for the material sustainability issues facing Suncor, including climate-related issues. The CSO serves as the bridge between Management and the Board on Carbon Risk. As Such, the CSO has the responsibility of translating Carbon Risk and Suncor's mitigation measures to the Board and, conversely, translating the strategic direction from the Board into corporate action. The CSO has a direct link to the Environmental, Health, Safety & Sustainable Development (EHS&SD) Committee, which is a committee of to the Board of Directors, the EHS&SD Committee. The effectiveness and integrity of Suncor's internal controls as they related to operational risks of the corporations physical assets, including carbon risk, responsibilities including monitoring and other matters relating to the environment, health, safety and sustainable development. The Committee is also responsible for the review of the policies and practices of the Corporation respecting operational risks, as they relate to climate change. An example of one of the CSO's monitoring processes occurs within the EHS&SD committee at Suncor. This committee is responsible for the review of the policies and practices of Suncor in terms of operational risks, as they relate to climate change. This includes assessing the risks and impacts of climate change issues on the Corporation's current business and growth plans, reviewing the impacts of emerging climate legislation and regulations and reviewing the Company's disclosures on lobbying and carbon risk.

C1.3

(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

Yes

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues.

Who is entitled to benefit from these incentives?
Chief Executive Officer (CEO)

Types of incentives
Monetary reward

Activity incentivized
Energy reduction target

Comment
A significant portion of the total direct compensation of senior executives is provided in variable performance contingent pay designed to reward business performance and increasing shareholder return. Annual incentives are linked to overall corporate performance targets including operating energy efficiency metrics. These provide a clear line of sight to Suncor's input costs and overall GHG performance.

Who is entitled to benefit from these incentives?
Corporate executive team

Types of incentives
Monetary reward

Activity incentivized
Emissions reduction target

Comment
A significant portion of the total direct compensation of senior executives is provided in variable performance contingent pay designed to reward business performance and increasing shareholder return. Annual incentives are linked to overall corporate performance targets including operating energy efficiency metrics. These provide a clear line of sight to Suncor's input costs and overall GHG performance.

Who is entitled to benefit from these incentives?
Business unit manager

Types of incentives
Monetary reward

Activity incentivized
Energy reduction project

Comment
A portion of the total direct compensation of management is provided in variable performance contingent pay designed to reward business performance and increasing shareholder return. Annual incentives are linked to overall corporate and Business Unit performance. Operating energy efficiency metrics provides a line of sight to Suncor's input costs and overall GHG performance.

Who is entitled to benefit from these incentives?
Facilities manager

Types of incentives
Monetary reward

Activity incentivized
Emissions reduction project

Comment
A portion of the total direct compensation of management is provided in variable performance contingent pay designed to reward business performance and increasing shareholder return. Annual incentives are linked to overall corporate and facility performance. Operating energy efficiency metrics and implementation of reduction projects provides a line of sight to Suncor's input costs and overall GHG performance.

C2. Risks and opportunities

C2.1

(C2.1) Describe what your organization considers to be short-, medium- and long-term horizons.

	From (years)	To (years)	Comment
Short-term	0	3	
Medium-term	3	10	
Long-term	10	25	

C2.2

(C2.2) Select the option that best describes how your organization's processes for identifying, assessing, and managing climate-related issues are integrated into your overall risk management.
Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes

C2.2a

(C2.2a) Select the options that best describe your organization's frequency and time horizon for identifying and assessing climate-related risks.

	Frequency of monitoring	How far into the future are risks considered?	Comment
Row 1	Six-monthly or more frequently	>6 years	Carbon risk is included as one of the company's principal risks, an exposure with potential to materially impact Suncor's ability to meet or support its strategic objectives. Besides undergoing an annual Board review, carbon risk is also mapped to the EHS and SD Board Committee for oversight which meets quarterly to review effectiveness of our EHS policies and oversees management systems that support policy compliance. The CEO holds top executive responsibility for sustainability.

C2.2b

(C2.2b) Provide further details on your organization's process(es) for identifying and assessing climate-related risks.

Carbon risk is considered one of Suncor's principal risks. A principal risk is generally considered to be an exposure that has the potential to materially impact Suncor's ability to meet or support its strategic objectives.

As a principal risk, carbon risk receives oversight from the full Board and executive management and systems are in place to mitigate potential impacts. As such, it undergoes an annual Board of Directors review as a principal risk. Carbon risk is also brought forward to the Environment, Health, Safety and Sustainable Development (EHS &SD) Committee of the Board for oversight.

Each year, as part of our normal business planning process, a base case carbon price outlook is developed, taking into account existing regulations and the expected trajectory of those regulations as they apply to our assets.

The company business plan, investments and all capital decisions are tested against a range of variables, including our base and alternative carbon price outlook, to ensure an expectation of a competitive rate of return over the asset life. In 2018, we also developed an alternative case that takes a much higher view of future carbon prices. This alternative case serves as a "stress test" and adds confidence to capital decisions.

Suncor uses a risk matrix based on likelihood and consequence to identify different types of risk to the organization including environmental and financial impacts. Suncor assumes substantive financial impacts are possible in high risk situations. High risk situations begin when the financial consequences could be $10 million of impact or greater.

C2.2c

(C2.2c) Which of the following risk types are considered in your organization's climate-related risk assessments?

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	Existing and future laws and regulations can impose significant liabilities on a failure to comply with their requirements. Concerns over climate change and fossil fuel extraction could lead governments to enact additional or more stringent laws and regulations applicable to Suncor and other companies in the energy industry in general. Each year, a carbon price outlook is developed, taking into account existing regulations and the expected trajectory of those regulations as they apply to our assets. Investments and capital decisions are tested against a range of variables, including our carbon price outlook, to ensure an expectation of a competitive rate of return over the asset life. Examples of current legislation imposing a cost on carbon include the Alberta Climate Leadership Act and the Carbon Competitiveness Incentive Regulation (CCIR). The cost of this legislation is built into Suncor's economic evaluations.
Emerging regulation	Relevant, always included	Future laws and regulations may impose significant liabilities on a failure to comply with their requirements. Concerns over climate change and fossil fuel extraction could lead governments to enact additional or more stringent laws and regulations applicable to Suncor and other companies in the energy industry in general. Each year, a carbon price outlook is developed, taking into account existing regulations and the expected trajectory of those regulations as they apply to our assets. Investments and capital decisions are tested against a range of variables, including our carbon price outlook, to ensure an expectation of a competitive rate of return over the asset life.
Technology	Relevant, always included	Technology is included in the annual risk assessment process of Suncor. Suncor incorporates technology into scenario planning, and uses three scenarios encompassing different degrees of technological change. A review of the existing portfolio of GHG reduction technologies is also included in the annual risk assessment process. In 2017, Suncor invested approximately $350 million in technology development and deployment as part of a robust strategy to optimize current assets and develop next-generation facilities.
Legal	Relevant, always included	Suncor undertakes a corporate-wide process to identify, assess and report on significant risks, which in 2016 included carbon as a principal risk. Our assessment is supported by a carbon price outlook, which highlights regulations and their expected trajectory, as they apply to our assets. The risk assessment includes a review of financial, reputational, regulatory impacts on Suncor's business, including the potential implications of climate litigation.
Market	Relevant, always included	As part of its ongoing business planning, Suncor assesses future costs associated with CO2 emissions in its operations and the evaluation of future projects, based on the company's outlook for the carbon price under current and pending GHG regulations. Suncor evaluates the potential impact of future carbon-constrained scenarios on its business strategy. The annual assessment of Carbon Risk as a principal risk takes in to account demand destruction of fossil fuels due to changing society attitudes and alternative energy incentives and mandates.
Reputation	Relevant, always included	Suncor undertakes a corporate-wide process to identify, assess and report on significant risks, which in 2017 included carbon as a principal risk. The risk assessment includes a review of financial, reputational, regulatory impacts on Suncor's business, including the increasing activism and public opposition to fossil fuels, and oil sands in particular.
Acute physical	Relevant, always included	In general, Suncor's operations are subject to operational hazards and risks such as, among other things, icebergs, hurricanes, fires (including forest fires), severe winter climate conditions, prolonged periods of extreme cold or extreme heat, flooding, droughts, and other extreme weather conditions. Operational plans, business continuity plans, and insurance are all tools used to mitigate these risks. As an example, Suncor currently mitigates pack ice and iceberg risk through the design of its facilities and with its emergency response system. A continuous monitoring system tracks iceberg locations and makes projections of the expected course of the icebergs. Where an iceberg cannot be diverted, an emergency response system allows for the floating platform to be disengaged and moved to safer water, protecting the asset but resulting in production disruption. These methods lessen the likelihood and magnitude of the risk. For tropical cyclones, a continuous weather tracking service monitors storm systems in the North Atlantic.
Chronic physical	Not relevant, explanation provided	Chronic risks such as rising sea level and region changes in rainfall and temperature do not pose a risk to Suncor's operations.
Upstream	Relevant, always included	Suncor undertakes a corporate-wide process to identify, assess and report on significant risks, which in 2017 included carbon pricing as a principal risk. Suncor tracks its GHG performance enterprise-wide and applies its carbon price outlook to both upstream and downstream assets.
Downstream	Relevant, always included	Suncor undertakes a corporate-wide process to identify, assess and report on significant risks, which in 2017 included carbon pricing as a principal risk. Suncor tracks its GHG performance enterprise-wide and applies its carbon price outlook to both upstream and downstream assets.

C2.2d

(C2.2d) Describe your process(es) for managing climate-related risks and opportunities.

Suncor undertakes a corporate-wide process to identify, assess and report on significant risks, which in 2017 included carbon risk as a principal risk. As a principal risk, carbon risk receives oversight from the full Board and executive management and systems are in place to mitigate potential impacts. Our assessment is supported by a carbon price outlook, which highlights regulations and their expected trajectory, as they apply to our assets.

Suncor's Enterprise Risk Management (ERM) process employs a corporate risk matrix to assess and prioritize all risks/opportunities using a common measure of impact and consequence; these include reputational, financial and environmental. To prioritize the risks and opportunities, our investments and capital decisions are tested against a range of variables, including alternative future energy scenarios and our carbon price outlook to ensure an expectation of a competitive rate of return over the asset life.

Suncor assesses specific risks to its physical assets in light of various potential operational hazards to which those assets may be subject, including the risk of extreme weather events, which are possible in the course of operations in the areas where we operate. Suncor manages these risks through facility design and operational procedures. We also maintain insurance for damage to, or loss of, assets as well as production interruption.

One activity to support the assessment of transitional risks and opportunities is Suncor's use of three long-term energy futures scenarios. Each scenario is plausible and could affect our operating environment and business strategy in markedly different ways. Signposts and milestones are monitored to identify critical shifts in the external context. Signposts include changes in global energy demand and supply mix, political and economic indicators, climate data and policy trends, and also include technology advances and consumer trends.

C2.3

(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.3a

(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.

Identifier
Risk 1

Where in the value chain does the risk driver occur?
Direct operations

Risk type
Transition risk

Primary climate-related risk driver
Policy and legal: Increased pricing of GHG emissions

Type of financial impact driver
Policy and legal: Increased operating costs (e.g., higher compliance costs, increased insurance premiums)

Company- specific description
Suncor's operations in British Columbia are subject to a carbon tax which is currently set at $35/t. Suncor's Alberta operations are subject to the Carbon Competitiveness Incentive Regulation (CCIR) which imposed a carbon price of $30/ton emissions beyond an ambitious government-set performance target (called the Output Based Allocation or OBA). The OBA will become more stringent at a tightening rate of 1% per year, with carbon pricing expected to increase through time. Facilities that perform better than the OBA can generate and sell credits within this system. Where physical GHG reductions cannot be made at the facility, compliance may be achieved through a combination of offsets, emission performance credits or payment into a provincial technology innovation fund. Alberta oil sands facilities are also subject to a combined Emissions Limit of 100 Mt, which is driving increased investment in and deployment of new technology to collectively remain under the cap. In 2017, Suncor's refineries in Quebec and Ontario are regulated under a cap and trade program linked to the Western Climate Initiative (WCI) cap and trade program. Regulated refining facilities receive an allowance allocation that aligns with a benchmark performance and takes into account competiveness in a trade-exposed context. Fuel suppliers are required to purchase allowances to cover the tail pipe emissions of all fuel sold, the cost of which is largely passed through to the consumer, thus acting as a carbon price on fuel consumption. In Newfoundland, the provincial government is developing carbon pricing regulations that will apply to Suncor's operated Terra Nova offshore operation. The Canadian federal government is developing "backstop" legislation that will take effect in any jurisdictions without provincial or territorial carbon pricing mechanisms; currently none of Suncor's operations are within backstop jurisdictions.

Time horizon
Current

Likelihood
Very likely

Magnitude of impact
Medium-low

Potential financial impact
150000000

Explanation of financial impact
Based on our current forecast the production weighted average after-tax cash cost per barrel of global upstream production over the period 2018 to 2027 is estimated at up to $0.60 per barrel.

Management method
Suncor's GHG intensity reduction goal of 30% by 2030 drives energy efficiency, fuel switching opportunities, and technology advancement. Suncor's technology strategy is driving step-change innovation to reduce GHG intensity in bitumen production and processing. COSIA's GHG technology strategy is to accelerate deployment of step-change technology. We continue to generate offset credits from our wind and cogen assets to reduce GHG compliance costs at other facilities. Where efficiency improvements and Emission Performance Credits from our other operations do not cover compliance requirements, Suncor purchases compliance instruments at competitive prices.

Cost of management
2000000

Comment
Risk Name: Escalating Climate-Related Regulatory Costs and Contraints

Identifier
Risk 2

Where in the value chain does the risk driver occur?
Direct operations

Risk type
Transition risk

Primary climate-related risk driver
Reputation: Increased stakeholder concern or negative stakeholder feedback

Type of financial impact driver
Reputation: Reduced revenue from decreased production capacity (e.g., delayed planning approvals, supply chain interruptions)

Company- specific description
Changes in public perception of integrated oil and gas companies and their operations may pose issues related to development and operating approvals or market access risk for products, which may have a material adverse effect on Suncor's business, financial condition, results of operations and cash flow. Based on data presented by Environment and Climate Change Canada, notwithstanding that Canada's oil sands proportionate share of global emissions is less than 0.2%, the development of the oil sands has figured prominently in politics, media and activist commentary on the subject of climate change. According to an IHS study, while emissions intensity has decreased over the past decade for oil sands production, oil sands refined products range between 1% - 19% higher carbon intensity on a well-to-wheels basis than products from conventional crudes. Planned growth projects to meet global energy demand may increase Suncor's absolute emissions in the next decade. Reputational damage related to GHG emissions may directly or indirectly affect the profitability of our current oil sands projects and the viability of future oil sands projects in a number of

ways, including: a) creating regulatory uncertainty that challenges economic modelling of future projects and potentially delays sanctioning; b) motivating more onerous emissions regulation of those projects that could result in changes to facility design and operating requirements, thereby potentially increasing the cost of construction and operation; and c) legislation or policy that limits the purchase of oil sands crude oil by governments and other institutional consumers that, in turn, limits the market for this crude oil and reduces its price.

Time horizon
Medium-term

Likelihood
Likely

Magnitude of impact
Medium

Potential financial impact
8

Explanation of financial impact
A potential cost to the oil sands industry associated with climate change reputation risk is the price differential between bitumen and lighter oils in 2017 caused by delays in approval of new pipelines intended to provide access of oil sands bitumen to tidewater and international markets. Please note that the "8" identifid in the potential financial impact is $8/barrel.

Management method
Market access risk is substantially mitigated by Suncor's integrated business model where we process much of our bitumen in our own upgraders and refineries thereby avoiding the bitumen discount. Reputational risk is best managed through improved environmental performance. Our oil sands operation's energy efficiency initiatives have demonstrated tangible reduction in energy intensity since 1990. We continue to make long term tech investments towards step changes in in-situ production emissions intensity. Activities include various efforts to collaborate in industry initiatives (e.g. COSIA); our support of various academic & engineering research organizations to understand the lifecycle emissions of oil sands products; and consistent engagement with media/public to deliver factual and balanced information in a relevant and understandable format. These actions allow us to create a space for balanced dialogue. Studies have demonstrated that oil sands refined products, on a well-to-wheels basis, are on average 1% - 19% higher carbon intensity than average conventional crude-based refined products. Hence, oils sands refined products are on par with the refined products made from many international heavy crude oils including Venezuela and California.

Cost of management
500000

Comment
Risk Name: Increased Stakeholder Expectations Cost of Management: Estimated costs associated with studies to ascertain the Life Cycle emissions of oil sands crudes total approximately $500,000

Identifier
Risk 3

Where in the value chain does the risk driver occur?
Customer

Risk type
Transition risk

Primary climate-related risk driver
Reputation: Shifts in consumer preferences

Type of financial impact driver
Reputation: Reduced revenue from decreased demand for goods/services

Company- specific description
Suncor produces refined products, marketed through our Petro-Canada retail network. Potential for consumer behaviour changes, as a result of increasing availability of non-fossil fuel alternatives such as electric vehicles, could reduce the demand for Suncor's fossil fuel based refined products. Additionally, continued efficiency improvements in transportation miles per gallon, consumer preference for improved vehicle efficiency, and increasing public participation of the impacts of climate change and its purported link to fossil fuel products could reduce demand for Suncor refined products. However, throughout 2016-2017, the low global price of oil created conditions that resulted in record auto sales in North America with a strong trend towards larger vehicles. These vehicles are expected to remain part of the global fleet for at least a decade. Downstream, we expect to see a modest decline in demand for gasoline in North America over the next 10 years, accelerating towards 2030. Long-term gasoline demand is expected to be moderated by efficiency improvements in internal combustion engines and increased uptake of biofuels as well as hybrid and electric vehicles. However, we believe cost, consumer familiarity and carbon competitiveness mean liquid fuels will remain the primary fuel source of vehicle mobility for many years to come. Mitigating this trend, we expect that older, inefficient refining capacity will be taken out of commission in the future, somewhat balancing North American supply and demand. Retention of market share in refined product sales will become critical, likely resulting in tight retail margins in North America. However, both refined products and crude oils are easily transported into global markets. We expect the global oil demand will continue to grow to 2040 due to population growth, urbanization and increased living standards, but decline as a percentage of the global energy consumption mix.

Time horizon
Medium-term

Likelihood
More likely than not

Magnitude of impact
Medium

Potential financial impact
1000000000

Explanation of financial impact
In 2017, our refining and marketing business contributed net earnings of $2.658 bln, making it a significant contributor to the company's profitability. Some of this margin would be at risk if demand for refined product decreases.

Management method
Suncor has a diversified portfolio which includes a renewable energy business. Suncor supports initiatives to gain access to new international markets in the next 5-10 yrs for our crude oil and refined products. Activities: We operate Canada's largest ethanol plant by volume and as of the end of 2017 are involved in 4 wind projects (111MW capacity) . Our renewables business provides first-mover advantage as consumer behaviour changes increases demand for renewable energy. We monitor alternative

transportation technology and are well-positioned to invest in the provision of low carbon transportation fuels once reliability, value and environmental attributes support consumer preference shift. Suncor has supported the development of pipeline infrastructure (e.g. new/expanded pipelines to the U.S. Gulf Coast, the West Coast of Canada and Eastern Canada) that would improve market access & operations flexibility for our oil sands bitumen. Suncor and other oil sands companies have implemented rail as a bridging solution. The large-scale movement of oil by rail is more costly and more carbon intensive and less safe than pipeline. Expanded pipeline links are the most efficient way to transport oil sands crude to market, given the sizable capacity advantage of pipelines, and their overall safety and reliability record.

Cost of management
0

Comment
Risk Name: Changing Consumer Behaviour Cost of Management ($0): Suncor does not incur direct costs associated with increasing market access for our products. Costs associated with supporting market access and monitoring transportation fuel developments and demand are integral to our business and not material. Our renewables business is operated as a revenue-generating business.

Identifier
Risk 4

Where in the value chain does the risk driver occur?
Direct operations

Risk type
Physical risk

Primary climate-related risk driver
Chronic: Changes in precipitation patterns and extreme variability in weather patterns

Type of financial impact driver
Increased operating costs (e.g., inadequate water supply for hydroelectric plants or to cool nuclear and fossil fuel plants)

Company- specific description
Suncor's upgrader facility in the Athabasca region of Northern Alberta and Suncor's refineries in Montreal, Sarnia, Edmonton and Commerce City sometimes operate in harsh weather environments, subject to expected periods of extreme cold in the winter, heat waves in the summer, and increased fire risk. The risk to Suncor is that prolonged periods of extreme cold could force these facilities to shut down for periods of time to ensure worker safety and prevent undue stress on equipment. Prolonged periods of extreme heat may lead to production cuts if adequate supply of cooling water is not available. Suncor's refineries at Montreal and Sarnia have access to extremely large bodies of cooling water, so are far less exposed. This risk exists now and into the very long term greater than 50 yrs. Terra Nova, Suncor's only operated offshore installation, off the coast of Newfoundland, operates on the edge of the Named Atlantic Windstorm Zone, an area that is subject to icebergs. There is a risk in the region of floating icebergs causing damage to our installations. Terra Nova is also located on the edge of the Named Atlantic Windstorm Zone, an area that is subject to hurricanes. In the winter these events can create conditions that require production equipment and personnel to be moved onshore and production to be shut-in for a period of time. These known risks exist now and for the expected life of the field.

Time horizon
Current

Likelihood
About as likely as not

Magnitude of impact
Medium-low

Potential financial impact
795000

Explanation of financial impact
Prolonged periods of extreme weather have the potential of disrupting production, costing millions of dollars in lost revenue. The likelihood of extreme weather events remains unknown, but through our risk management processes, we expect the magnitude of impact to remain low-medium for the foreseeable future, even if increases in extreme temperature or weather variations occur.

Management method
Many of Suncor's facilities routinely operate in an annual temp range of -40 to +40 degrees C and facilities are built to withstand extreme weather events. However, in the event of more frequent or prolonged temp extremes, additional capital expenditure may be required to install more robust equip, warming sheds, or water cooling processes. Suncor currently mitigates pack ice and iceberg risk through the design of its facilities and with its emergency response system. Activities: A continuous monitoring system tracks iceberg locations and makes projections of the expected course of the icebergs. Where an iceberg cannot be diverted, an emergency response system allows for the floating platform to be disengaged and moved to safer water, protecting the asset but resulting in production disruption. These methods lessen the likelihood and magnitude of the risk. For tropical cyclones, a continuous weather tracking service monitors storm systems in the North Atlantic. An emergency response system allows for critical equip and personnel to be brought ashore and for the floating platform to be disengaged and moved to safer water, protecting the asset but resulting in production disruption. Physical risks are primarily managed by the operations at a business-unit and facility level. We also maintain insurance for damage to, or loss of, assets as well as production interruption, with the exception of insurance coverage for Named Windstorms.

Cost of management
1000000

Comment
Risk Name: Extreme Weather Events Potential Financial Impact ($795,000/day) Note: This is a daily cost based on the loss of production due to Terra Nova completely shutting down their production. Cost of Management ($1,000,000) Note: This is the cost of Terra Nova's annual iceberg tracking and monitoring .

C2.4

(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?
Yes

C2.4a

(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.

Identifier
Opp1

Where in the value chain does the opportunity occur?
Customer

Opportunity type
Products and services

Primary climate-related opportunity driver
Development and/or expansion of low emission goods and services

Type of financial impact driver
Increased revenue through demand for lower emissions products and services

Company- specific description
Suncor continues to evaluate new opportunities across Canada to further build on its renewable energy portfolio. Wind power generation creates business opportunities for merchant sale of power to the grid and generation of carbon offset credits that can be used by Suncor or sold on the market. Currently, in Alberta, a wind development protocol exists which allows the developer to generate offset credits to be sold or used as a compliance option under the Alberta Climate Change and Emissions Management Act. Of Suncor's 111 MW installed wind energy capacity, 60 MW are situated in Alberta. This protocol provides the opportunity for Suncor to create offsets which reduce the compliance costs for other operations under this regulation through its renewable energy operations. Additionally, carbon pricing in major Canadian jurisdictions is making wind power more profitable as jurisdictional targets add additional renewable power. At the same time, the cost of wind power generation continues to decrease, making unsubsidized wind power cost-competitive in most jurisdictions.

Time horizon
Current

Likelihood
Very likely

Magnitude of impact
Medium-high

Potential financial impact
1000000

Explanation of financial impact
In 2017, Suncor and our partners are involved in four wind power facilities. Combined, these facilities have a gross generating capacity of 111MW, enough to power about 52,000 Canadian homes and avoid approximately 179,000 tonnes of carbon emissions each year. The offsets produced by our wind facilities in Ontario and Saskatchewan are retained by the government. The financial value of our offsets in Alberta is approximately $1 million/year. These offsets can be used by Suncor to offset its compliance costs. The AB compliance price is set to rise to $50/tonne by 2022, increasing the value of the credits.

Strategy to realize opportunity
In 2017, compliance obligations for our oil sands facilities were met partially through internally generated wind energy offset credits from Suncor's wind energy projects in Alberta, generating revenue for the renewables business. Each year, Suncor calculates the tonnage of offsets generated under the protocol and submits an application under the protocol. This management method highlights the benefit of Suncor's integrated value chain as the value of offsets was worth two times more in 2017 than in 2015 and will continue to increase in value. Climate change compliance costs under the Alberta regulation is expected to continue to rise increasing the value of the offsets over time.

Cost to realize opportunity
0

Comment
Name of Opportunity: Increasing Renewable Energy Demand Cost of Management Note: Wind operations area profit generating business. We experience minimal management costs associated with creating the offset credit (measurement, documentation, application) because the power is metered.

Identifier
Opp2

Where in the value chain does the opportunity occur?
Customer

Opportunity type
Products and services

Primary climate-related opportunity driver
Development and/or expansion of low emission goods and services

Type of financial impact driver
Increased revenue through demand for lower emissions products and services

Company- specific description
Suncor complies with all Renewable Fuel Standards (RFS) in the jurisdictions within which we operate and markets fuel products. Regulatory requirements for renewable fuel such as the RFS present potential revenue opportunities for Suncor in biofuels. Governments across North America are mandating the use of ethanol in transportation fuels. Canadian regulations require an average 5% renewable fuel content in gasoline; proposed Canadian regulations also require an average annual 2% renewable content in diesel fuel. Some provincial regulations require a higher percentage blending, and others have introduced other systems such as a Low Carbon Fuel Standard or Cap and Trade system. Suncor owns and operates the largest ethanol plant in Canada, and virtually all of the output is blended into gasoline and marketed under the Petro-Canada brand. In 2014, Suncor made a multi-million dollar investment in Benefuel to advance the commercialization and deployment of Benefuel's patented ENSEL® technology in Canada and the United States. Benefuel's technology produces low carbon intensity biodiesel.

Time horizon
Medium-term

Likelihood
Likely

Magnitude of impact
Medium

Potential financial impact
147000000000

Explanation of financial impact
In 2017, Suncor biofuel operations produced 407,800 m3 of ethanol and generated revenue of $147M.

Strategy to realize opportunity
Suncor expects that RFS will be amended to increase the required level of biofuel, creating a stable and increasing market for biofuels. Suncor manages this opportunity by continuously evaluating business and technology opportunities to expand into next generation biofuels markets to take advantage of renewable fuel standards and reduced carbon intensity. This could help to increase the magnitude of biofuels production/blending over the medium-long term (5-10 yr timeframe). Suncor has been blending ethanol in our retail fuels since 1992; Suncor's St. Clair Ethanol plant expanded capacity to 400 million litres per year in an effort to meet this growing North American demand.

Cost to realize opportunity
0

Comment
Name of Opportunity: Increasing Biofuels Demand Cost to Realize Opportunity Note: Suncor's biofuels business is a profit generating business. There is no net management cost.

Identifier
Opp3

Where in the value chain does the opportunity occur?
Direct operations

Opportunity type
Products and services

Primary climate-related opportunity driver
Development and/or expansion of low emission goods and services

Type of financial impact driver
Increased revenue through demand for lower emissions products and services

Company- specific description
Suncor supports the use of offsets as compliance mechanisms under existing and proposed climate change regulations. Suncor has actively engaged in the development of offset protocols where it sees opportunities to either purchase quality offsets in the market, or create offsets in our own operations. In addition to the renewable energy production (see Renewable Energy Demand opportunity in section C2.4a, above), Suncor uses natural gas cogeneration (80% efficient) to provide combined steam and power to their own facilities and exporting surplus power to the grid to displace more carbon-intensive coal-fired generation or natural gas combined cycle generation (40% efficient). Suncor operates 1.1 GW of cogeneration with surplus capacity sold to the power grid. Where surplus power is exported to the grid, Suncor is able to earn offset credits on the difference between a grid intensity level reflecting the efficiency of the cogeneration unit and a performance standard associated with natural gas combined cycle generation. This presents an opportunity for Suncor through reduction of compliance costs because these offset credits may be used as compliance instruments under the Alberta Carbon Competitiveness Incentive Regulation (CCIR). Additionally, due to the must-run nature of our operations, the cogen power sold to the grid is highly reliable compared to other forms of generation, reducing the overall pool price for power benefiting Alberta residents. Over the past few years, Suncor has developed its internal carbon marketing capability which has helped to reduce our overall compliance cost. Suncor has an opportunity with cap and trade schemes to stimulate research and innovation in energy efficiency; earn revenue from the investment made to reduce our own emissions; improve the economics of the reduction project; and develop internal capability to understand the carbon trading markets.

Time horizon
Current

Likelihood
Virtually certain

Magnitude of impact
Low

Potential financial impact
20000000

Explanation of financial impact
Suncor generated 420ktonnes CO2e in offset credits during 2017. Using a 2017 credit value of $30/tonne results in more than $12 million in 2017 in carbon offset credit value (may be used to offset compliance costs or sold on the market for revenue). The bulk of these credits are generated and used in the Alberta carbon market. Some revenue was generated in 2017 via participation in the Ontario and Quebec cap and trade markets.

Strategy to realize opportunity
Suncor manages this opportunity through measurement, reporting, and receipt of emission performance credits, as well as a regular review of its operations for the potential to generate additional offset credits. The deployment of cogen technology in Suncor's in-situ facilities continues to have a significant positive impact such that Suncor can directly control its production, maintain energy security, earn emission performance credits through the sale of competitively priced surplus power and reduce the carbon intensity of the provincial electricity grid. The power sales opportunity has led to the establishment of a real time power trading desk to capture full value of the power sold to the electricity grid. As climate regulation evolves, we believe that new offset protocols will be developed in the next 1-5 years creating investment opportunities, additional supply of lower cost compliance offsets, and stimulating new low carbon technology development, all of which would be expected to have a positive impact on Suncor and the industry.

Cost to realize opportunity
400000

Comment
Name of Opportunity: Carbon Credit Offset Generation Cost to Realize Opportunity Note: Internal capability is provided by corporate and facility based personnel with multiple duties. Total workload is approximately 2 FTE.

Identifier
Opp4

Where in the value chain does the opportunity occur?
Direct operations

Opportunity type
Resource efficiency

Primary climate-related opportunity driver
Use of more efficient production and distribution processes

Type of financial impact driver
Reduced operating costs (e.g., through efficiency gains and cost reductions)

Company- specific description
There is a strong correlation between GHG emissions and energy use in oil and gas production creating a natural incentive to reduce energy use. The acceleration of technological innovation to substantially change production processes and reduce GHG emissions in our operations is expected to lower energy use and, therefore, lower energy costs. The same technology that reduces energy consumption could also allow for easier and more cost effective extraction of complex unconventional resources.

Time horizon
Short-term

Likelihood
More likely than not

Magnitude of impact
Medium-high

Potential financial impact
140000000

Explanation of financial impact
Energy costs are the single largest input cost in our business. We estimate that a reduction of 10% in GHG emissions through the implementation of step-change technology could result in cost savings of $140-180 million per year.

Strategy to realize opportunity
One method Suncor utilizes for managing technological advancements is by being a strong advocate for carbon policy that promotes accelerated technology development. Activity: Suncor is a founding member of Canada's Oil Sands Innovation Alliance (COSIA), a 10 member org seeking to develop and share IP on environmental technology in the oil sands. Through collaboration centered around a common interest like environment and technology stewardship, Suncor and industry are able to pool resources with the goal of making significant advancement over acting alone. As a result, we expect to see advancements benefiting the environment over the next 2-10 yrs. For example, we have been working with COSIA, to advance a regional approach to industry-wide water management practices. We led the Regional Water Management Solutions project designed to test the technical, regulatory and commercial feasibility of treating and reusing tailings water for both in situ and mining operations. Over the last several years we made significant progress in taking our water strategy from the planning stage to implementation.

Cost to realize opportunity
30000000000

Comment
Suncor invested approximately $350 million in the development of innovative technology in 2017, and less than one-fifth of this expense was associated with GHG reductions .

C2.5

(C2.5) Describe where and how the identified risks and opportunities have impacted your business.

	Impact	Description
Products and services	Impacted	As identified in in C2.4a, the opportunities associated with renewable energy, biofuels and carbon credits have altered how Suncor calculates the business value with investing in projects that produce any of these products. The magnitudes of the impacts for the three opportunities are: medium-low for renewable energy, medium for biofuels, and low for carbon credits.
Supply chain and/or value chain	Impacted for some suppliers, facilities, or product lines	Novel energy efficient technologies are increasingly becoming available to the supply chain of the oil and gas industry. Some of these technologies have been designed for this industry while others have been adapted from adjacent industries; companies that are best able to recognize and move quickly on the most relevant and impactful of these technologies have a competitive advantage. In situations where Suncor's operations generate carbon offset credits (either Emissions Performance Credits or Offset Credits), consideration as to how best to deploy and monetize these credits has impacted decisions made in the value chain of projects; it has created the potential for an additional revenue stream if managed correctly. The magnitude of the impacts from the risks and opportunities associated with the incremental changes in the supply chain are small compared to the costs and revenues associated with Suncor's oil production.
Adaptation and mitigation activities	Impacted	Adaptation - Many of Suncor's facilities routinely operate in extreme temperatures and facilities are built to withstand extreme weather events. The magnitude of the impacts from the adaptations risks has resulted in minimal impact on activities associated with extreme weather events. Mitigation - Energy cost is one of Suncor's largest production inputs and therefore there is a natural business incentive to reduce overall energy use and emissions. The magnitude of the impacts from mitigation opportunities have resulted in changes in operation and sustaining capital spend on the order of several million dollars per year.
Investment in R&D	Impacted	In addition to investment in collaborative and venture capital structures, Suncor invests in research and technology to optimize current assets and develop next generation facilities. We believe that next generation technology and energy innovation will move from incremental to transformational. We are advancing a portfolio of in situ technologies with the goal of lowering the carbon intensity of producing bitumen and improve cost competitiveness. We believe the solution will be a hybrid of the technologies we're progressing with the aim to reduce energy and water use, lower capital and operating costs and improve production rates and resource recovery. The financial impact to Suncor can be seen in the change in R&D spend; Suncor increased its investments in R&D from $150 million in 2016 to $350 million in 2017.
Operations	Impacted	In order to meet Suncor's GHG Goal, Operations personnel have actively sought out energy efficient technologies and best practices to reduce fuel consumption. These improvements may deliver both GHG-intensity improvements and operating cost improvements, both of which are needed for success in the current oil industry. Based on confirmation of new emissions regulations, we have updated our estimates. The production weighted average after-tax cash cost per barrel of global upstream production over the period 2018 to 2027 is estimated at up to $0.60 per barrel.
Other, please specify	Impacted	Creation of the climate report and supporting the desire for consistency and transparency embodied in the recommendations of TCFD and improved transparency for investors. Suncor values disclosure as a foundational activity for investor engagement and believes that the full context is required to provide a complete picture of operational performance, strategic planning and risk management. Suncor continues to build on its experience in transparent disclosure of sustainability information with its first Climate Report in 2017. This report was well-received by investors and many of our stakeholders. It reaffirmed Suncor's belief in the value of transparent and clear-headed carbon risk disclosure. Our 2018 Climate Risk and Resilience Report is now publicly available at sustainability.suncor.com/en/. In 2018, Suncor publicly supported the recommendations from the Task Force on Climate-related Financial Disclosure, which provide a useful framework to describe how businesses are managing climate risk and ensuring corporate strategies remain resilient in a low-carbon future.

C2.6

(C2.6) Describe where and how the identified risks and opportunities have factored into your financial planning process.

	Relevance	Description
Revenues	Not impacted	While carbon pricing has increased operating costs, the current regulations have not materially impacted Suncor's revenues. Materiality of impact on revenue may increase with tightening regulations. From an opportunity perspective, renewable energy investments may make economic sense and Suncor is already active in wind and biofuels.
Operating costs	Impacted	Carbon pricing or cap and trade regulations apply in most of the jurisdictions in which Suncor operates assets. These prices have increased operating costs (although at some facilities, carbon credit generation has offset the cost of compliance).
Capital expenditures / capital allocation	Impacted	Financial risks associated with increasing carbon prices are affecting investment decisions within Suncor. The portfolio of growth options is being prioritized to take into account the carbon-intensity of the proposed operation.
Acquisitions and divestments	Not yet impacted	Increasing demand for oil products, stable to increasing prices of oil, and opportunities to reduce operating costs of some existing operations are currently the greatest drivers regarding the value and rate of return of Suncor's portfolio of assets. Carbon intensity and associated carbon costs of assets are considered during potential acquisitions and divestitures.
Access to capital	Not impacted	The current initiatives toward divestment of oil and gas investments has reduced the pool of investors; notwithstanding the efforts of those few to divest from oil and gas, the remaining investors have been willing to increase their investment in oil and gas so the net impact on Suncor is negligible at this time.
Assets	Not impacted	Apart from compliance costs associated with carbon pricing regulations (discussed above), value, operations and operating costs at our assets have not been impacted.
Liabilities	Not impacted	The cost of asset abandonment, remediation, and reclamation has not been affected by climate change or carbon pricing regulations.
Other	Please select	N/A

C3. Business Strategy

C3.1

(C3.1) Are climate-related issues integrated into your business strategy?

Yes

C3.1a

(C3.1a) Does your organization use climate-related scenario analysis to inform your business strategy?

Yes, qualitative and quantitative

C-AC3.1b/C-CE3.1b/C-CH3.1b/C-CO3.1b/C-EU3.1b/C-FB3.1b/C-MM3.1b/C-OG3.1b/C-PF3.1b/C-ST3.1b/C-TO3.1b/C-TS3.1b)

(C-AC3.1b/C-CE3.1b/C-CH3.1b/C-CO3.1b/C-EU3.1b/C-FB3.1b/C-MM3.1b/C-OG3.1b/C-PF3.1b/C-ST3.1b/C-TO3.1b/C-TS3.1b) Indicate whether your organization has developed a low-carbon transition plan to support the long-term business strategy.

Yes

C3.1c

(C3.1c) Explain how climate-related issues are integrated into your business objectives and strategy.

(1) The process by which the business strategy has been influenced?

a) Leadership in sustainable resource development is a Suncor strategic driver and is foundational to annual work planning and goal setting (e.g. Suncor's 2030 GHG intensity goal).

b) Company-wide risk identification, assessment and reporting of significant risks to the board. Carbon risk is considered one of Suncor's principal risks.

c) A carbon price outlook (to assess all investments/projects) utilizes a carbon price range from $30/tonne to $65/tonne on an increasing percentage of emissions to ensure projects are expected to provide a competitive IRR under expected carbon regulations. Stress testing is done as appropriate.
d) Our project and asset development model incorporates climate risks/opportunities early in the process before commitment of significant resources.
e) Suncor measures, forecasts, reports and analyzes data for all our facility emissions to understand emissions sources and opportunities for reductions.
f) Strategic planning uses 3 long-term alternative future energy scenarios to test the robustness of our business and growth strategy.

(2) Example of influence on business strategy and business decisions influenced by climate change made in the reporting year:

In 2017, Suncor continued to pursue its goal to reduce the carbon intensity of crudes and petroleum products by 30% by 2030. In support of this goal, additional resources (personnel and funding) were dedicated to low-carbon extraction technologies and other technological development associated with low carbon-intensity electricity, heat, and hydrogen. Additionally in 2017, we took the first steps in the regulatory process to replace coke-fired boilers with cogeneration units at our Oil Sands Base plant, the regulatory application and engineering design work was progressed as a result of efforts to meet Suncor's GHG goal and business impact of climate related regulations.
(3) How climate change aspects and the Paris Agreement have influenced business strategy:

Federal and provincial regulations/policies adopted in response to Canada's commitment to the Paris Agreement. The main aspect of climate change policy that influences business strategy is our management systems to meet regulatory requirements which include energy efficiency programs, carbon pricing outlook, a strategic issues management process and an asset development model.

(4) Short term climate change strategy components:

a) A corporate-wide focus on energy efficiency measures and innovative technology/processes to reduce emissions.

b) We leverage our electricity portfolio of renewable and low-carbon cogeneration assets to participate in the growing power sector. Building on our 111 MW of wind generation with 2 proposed wind projects and exploring utility-scale solar photovoltaic opportunities in Alberta. Suncor currently operates highly efficient cogeneration to provide power/steam to its own facilities. In 2017, these cogeneration facilities exported an average of 294 MW to the grid, and we're exploring the development of an additional 800 MW of cogeneration capacity. These activities provide emission compliance credits.
c) Suncor has invested in Lanzatech (a US biofuels firm) and Benefuel (a biodiesel technology company) with the potential to lower the carbon intensity of our fuels.

d) Suncor is currently piloting small-scale electric vehicle charging at retail stations to explore and evaluate commercial viability and test consumer adoption.

e) We're active in inclusive consultations with ENGOs, First Nations and Governments to develop effective climate change policy. Suncor publicly advocates for a broad-based economy-wide carbon levy as the most effective, practical and cost efficient policy tool.
f) Suncor released its 2018 Climate Risk and Resilience Report which provides our perspective of the future of energy, how we assess, govern and manage carbon risk.

(5) Long term climate change strategy components:

a) Evaluation of fuel switching opportunities at our facilities includes the opportunity to invest in incremental cogeneration capability. Combined heat and power is highly efficient and results in surplus low-carbon power, available for export to the provincial power grid.

b) To reach our long-term objective of making oil sands crude both cost and carbon competitive against other global sources, we invested ~ $350 million in 2017. These investments were in technology to optimize assets and develop next generation facilities that we believe will significantly reduce the carbon content of our products.
c) Our technology strategy includes investment in commercializing emission reduction technologies using venture capital through a joint venture called EVOK.
d) Suncor co-sponsors the COSIA Carbon X Prize to crowd source commercial uses for carbon.
e) Strategically advancing biodiesel supply sources and technology for wider use in cold climates. We have longer-term optionality to optimize our integrated asset infrastructure through investing to switch or supplement existing refining capacity to process biofuels and drop in biological crude components.
f) Suncor has an interest in every major oil development offshore of Canada's east coast (operator of Terra Nova; interests in Hibernia, White Rose and Hebron). We are a non-operating partner in the Buzzard & Golden Eagle fields (UK North Sea) with a participating interest in the Rosebank pre-development opportunity. Offshore crude oil is among the lowest carbon intensity sources of crude.

(6) How this is gaining you strategic advantage over competitors:

a) Long-term alternative energy scenarios provide insight into how our assets may perform in a carbon-constrained context. In the context of either a low or highly volatile crude oil price, a long term reserve base, such as the oil sands, sharply reduces exploration costs and risk. The unique characteristics of the resource provides resiliency to continue to deliver value to shareholders in a carbon-constrained future.
b) Our scenarios also indicate that being both cost and carbon competitive will be essential in any future energy context. Significant investment in innovation and technology, that has the potential to substantially reduce both emissions and cost. Many of our technological innovations, collaborative initiatives, and crowd-sourcing/venture capital investment have the potential for application in other industrial uses.

c) Our investment in growing power markets helps us to understand the operational, commercial & policy frameworks necessary for success. Suncor is well-positioned to take advantage of market opportunities.

(7) Forward-looking scenario analysis

a) Suncor has developed 3 long-term alternative future energy scenarios. Each is equally plausible and reflects the aspiration for a low carbon energy system, but each differs as to pace and scale. Signposts for the scenarios are monitored. This process forms the basis of the annual strategic review.

C3.1d

(C3.1d) Provide details of your organization's use of climate-related scenario analysis.

Climate-related scenarios	Details
Other, please specify (IHS Markit)	In our base case energy outlook, we take the following broad trends into consideration: o Forecasted population growth, the increasing need for energy in developing economies and the aspiration for a better quality of life. As such, we see the global demand for energy increasing steadily. Much of this increase is expected to come from developing countries in Asia, the Middle East, Latin America and Africa. o We expect a continuation of the trend towards decoupling economic growth and carbon emissions as new technologies and renewable energy starts to fundamentally change the energy mix. o National emissions reduction commitments made as part of the Paris Agreement will drive carbon pricing and complementary policy frameworks that are expected to accelerate energy efficiency and emissions reduction technology and incent broader scale adoption of alternative low-carbon energy. o We expect oil demand will continue to grow until approximately 2040 due to population growth, urbanization and increased living standards, but oil is expected to decline as a percentage of the global energy consumption mix. o Given natural declines staying at current production levels, much less meeting increased demand, will require investment in new production from global shale, deep-water and oil sands reserves - a major challenge, given the reduction in capital investment due to depressed commodity prices in recent years. o We expect that supply cost will continue to be moderated by industry efforts to optimize production and invest in technological advances. *In addition to our crude oil and refined products outlooks, we utilize three long-term energy futures scenarios, all of which are plausible and could affect our operating environment and business strategy in markedly different ways. Three scenarios defined by IHS Markit (Autonomy, Rivalry and Vertigo) were used as the basis for the development of the Suncor scenarios and have been modified to fit our unique circumstances/needs. Signposts and milestones are monitored to identify critical shifts in the external context. Signposts include changes in global energy demand and supply mix, political and economic indicators, climate data and policy trends, and also include technology advances and consumer trends. *Each scenario has an implied crude oil price range and climate change regulatory impact. Two of the three scenarios reflect the current global aspiration towards reducing carbon emissions; what differentiates the scenarios is the context, pace and scale at which that comes about. Of these scenarios, Autonomy is the scenario that we consider best represents the technology and policy context that would be essential to meet the aspiration of limiting cumulative emissions to "450 ppm". *All three scenarios point to long-term resilience being a function of aggressively lowering both costs and the carbon intensity of the entire value chain. The scenarios are reviewed annually by the Executive Leadership Team and the Board of Directors to assess the robustness of the business and growth strategy and identify strategic directions. This process continues to be a useful tool for stress testing our business on a number of key dimensions, including climate risk. In 2018, for the first time, the Alternative scenario (based on Autonomy) drove the creation of a new set of commodity and carbon price forecasts as part of our annual business planning process. Business plans will be stress tested under this scenario, which as significantly higher carbon costs than our base case. We used three scenarios defined by IHS Markit as the basis for the development of the Suncor scenarios. The IHS Markit Autonomy, Rivalry and Vertigo scenarios have been modified to fit our unique circumstances/needs.

C-AC3.1e/C-CE3.1e/C-CH3.1e/C-CO3.1e/C-EU3.1e/C-FB3.1e/C-MM3.1e/C-OG3.1e/C-PF3.1e/C-ST3.1e/C-TO3.1e/C-TS3.1e

(C-AC3.1e/C-CE3.1e/C-CH3.1e/C-CO3.1e/C-EU3.1e/C-FB3.1e/C-MM3.1e/C-OG3.1e/C-PF3.1e/C-ST3.1e/C-TO3.1e/C-TS3.1e) Disclose details of your organization's low-carbon transition plan.

Suncor' Climate Risk and Resilience Report, discloses Suncor's best assessment of the business risks associated with climate change and the transition to a low-carbon economy – as well as strategies Suncor is taking to mitigate those risks. This report is publicly available on Suncor's website (sustainability.suncor.com/en).

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?

Intensity target

C4.1b

(C4.1b) Provide details of your emissions intensity target(s) and progress made against those target(s).

Target reference number
Int 1

Scope
Scope 1+2 (location-based)

% emissions in Scope
99

% reduction from baseline year
30

Metric
Metric tons CO2e per unit of production

Base year
2014

Start year
2015

Normalized baseline year emissions covered by target (metric tons CO2e)
0.451

Target year
2030

Is this a science-based target?
No, and we do not anticipate setting one in the next 2 years

% achieved (emissions)
1.2

Target status
Underway

Please explain
Our goal is a 30% reduction in GHG emissions intensity by 2030 (Scope 1 and 2 emissions only). If current production remained flat, we would expect a similar reduction in absolute emissions. However, planned production growth during this timeframe would add incremental absolute emissions, albeit at a lower GHG emissions intensity.

% change anticipated in absolute Scope 1+2 emissions
-1.2

% change anticipated in absolute Scope 3 emissions
28.3

C4.2

(C4.2) Provide details of other key climate-related targets not already reported in question C4.1/a/b.

C-OG4.2a

(C-OG4.2a) Explain, for your oil and gas production activities, why you do not have a methane-specific emissions reduction target or do not incorporate methane into your targets reported in C4.2; and forecast how your methane emissions will change over the next five years.

In addition to participating in a voluntary methane emission reduction program, Suncor has incorporated methane emissions into the company-wide goal to reduce total GHG emission intensity of the production of oil and petroleum products by 30% by 2030. As a result of having our methane-specific emissions already incorporated in the company wide GHG intensity reduction goal, the need to have an additional methane goal is redundant. Progress on our GHG intensity goal by 2030 requires emissions reductions, including methane, across our facilities.

C4.3

(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.
Yes

C4.3a

(C4.3a) Identify the total number of projects at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of projects	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	32	
To be implemented*	54	986614
Implementation commenced*	15	227614
Implemented*	9	70517
Not to be implemented	0	0

C4.3b

(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

Activity type
Energy efficiency: Processes

Description of activity
Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
690

Scope
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)
20700

Investment required (unit currency – as specified in CC0.4)
0

Payback period
<1 year

Estimated lifetime of the initiative
21-30 years

Comment
Mine executed an initiative in both Millennium and Steep Bank mines about ‘Haul Truck Idling’. The total amount of diesel fuel saved due to this initiative from Jan 1 to Dec 31 2017 is 253,589.2 litres.

Activity type
Energy efficiency: Processes

Description of activity
Heat recovery

Estimated annual CO2e savings (metric tonnes CO2e)
16258

Scope
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)
487731

Investment required (unit currency – as specified in CC0.4)
600082

Payback period
1-3 years

Estimated lifetime of the initiative
3-5 years

Comment
Mechanical cleanings and refurbishments were performed on heat exchangers 3E-1B / 3E-1A / 3E-22B. These heat exchangers are trim heaters that transfer heat from 50# steam to hot water production used in Extraction processes.

Activity type
Energy efficiency: Processes

Description of activity
Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
31404

Scope
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)
942129

Investment required (unit currency – as specified in CC0.4)
1016000

Payback period
1-3 years

Estimated lifetime of the initiative
6-10 years

Comment
Replace the original, 300hp 91 OTSG combustion air blower motors to a 350hp motor, along with upsizing the blower fan to maintain the thermal transfer efficiency and steam requirements.

Activity type
Energy efficiency: Processes

Description of activity
Cooling technology

Estimated annual CO2e savings (metric tonnes CO2e)
8696

Scope
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)
260865

Investment required (unit currency – as specified in CC0.4)
2350000

Payback period
4 - 10 years

Estimated lifetime of the initiative
21-30 years

Comment
Bringing Bitumen/Condensate Exchanger (01-E-116) back in service which allows the bitumen to be cooled to 90°C prior to being accepted by Enbridge. Also Helps to alleviate duty on 01-E-107 Exchanger and to increase the time between cleaning.

Activity type
Energy efficiency: Processes

Description of activity
Heat recovery

Estimated annual CO2e savings (metric tonnes CO2e)
305

Scope
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)
9149

Investment required (unit currency – as specified in CC0.4)
500000

Payback period
1-3 years

Estimated lifetime of the initiative
6-10 years

Comment
23H04Convect Section cleaning

Activity type
Energy efficiency: Processes

Description of activity
Heat recovery

Estimated annual CO2e savings (metric tonnes CO2e)
3429

Scope
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)
102866

Investment required (unit currency – as specified in CC0.4)
1000000

Payback period
1-3 years

Estimated lifetime of the initiative
6-10 years

Comment
Crude 2 Heat Exchanger cleaning

Activity type
Energy efficiency: Processes

Description of activity
Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
1017

Scope
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)
30523

Investment required (unit currency – as specified in CC0.4)
500000

Payback period
1-3 years

Estimated lifetime of the initiative
11-15 years

Comment
Water recycle from sour water to crude desalter

Activity type
Energy efficiency: Processes

Description of activity
Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
10174

Scope
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)
30523

Investment required (unit currency – as specified in CC0.4)
500000

Payback period
1-3 years

Estimated lifetime of the initiative
11-15 years

Comment
Re-install trays in Sulfolane tower

Activity type
Energy efficiency: Processes

Description of activity
Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
2544

Scope
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)
76311

Investment required (unit currency – as specified in CC0.4)
1000000

Payback period
1-3 years

Estimated lifetime of the initiative
11-15 years

Comment
Optimization at hydrogen unit – fuel gas economy

Activity type
Energy efficiency: Processes

Description of activity
Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
102

Scope
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)
3052

Investment required (unit currency – as specified in CC0.4)
1000000

Payback period
1-3 years

Estimated lifetime of the initiative
11-15 years

Comment
Improved louver control system in FCCU furnace to reduce excess O2 resulting in less fuel gas usage

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Activity type
Energy efficiency: Processes

Description of activity
Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
814

Scope
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)
24419

Investment required (unit currency – as specified in CC0.4)
1000000

Payback period
1-3 years

Estimated lifetime of the initiative
11-15 years

Comment
Gasoil hydrotreater piping upgrades to permit more hydrogen recycle

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C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Dedicated budget for low-carbon product R&D	Our pursuit of new oil sands extraction technology and process innovation is one method that is used to manage the potential cost of complying with emerging carbon regulations and policy frameworks. The development of low carbon technologies is also a a key aspect of Suncor's efforts to meet its GHG goal. In 2017, Suncor spent approximately $350 million on technology development and deployment targeting the reduction of capital expenditures, lowering operating costs and environmental performance improvements. The unique nature of our processes could afford us the opportunity to fundamentally reduce our emissions intensity and enhance the way we responsibly develop Canada's oil sands resources. For example, we are piloting innovative technologies for bitumen resource recovery that use electromagnetic heating in combination with solvent dilution, potentially removing the need for water and significantly reducing the energy (GHG) required from steam generation. Another technology under development that uses no water instead uses vaporized solvents to heat a bitumen reservoir. The solvent dilutes and mobilizes bitumen for efficient and effective extraction.
Employee engagement	Suncor employees take individual accountability for reducing waste and improving energy efficiency as part of our employee engagement initiative and Green Ambassador Program. This initiative extends from lunchtime sessions on energy conservation to recognizing employees for energy efficiency and special recognition for GHG emission reduction projects through our President's Operational Excellence Awards. Additionally, initiatives are underway to engage with business units and employees in regard to methods of meeting our GHG goal.
Internal price on carbon	An internal carbon price is applied in the annual business planning process for each of our facilities to understand the impact that the expected carbon regulations will have on our operating costs. The internal cost of carbon is also applied to all of our potential growth projects and strategies to assess the viability of the projects over the long term, under both our base and stress cases.
Internal incentives/recognition programs	Annual incentives are linked to overall corporate performance targets which include energy efficiency and GHG reduction projects.
Marginal abatement cost curve	Suncor applies internal and external marginal abatement cost curves to prioritize mitigation projects and rank specific opportunities. The carbon price outlook is used to evaluate abatement economics.
Partnering with governments on technology development	Suncor collaborates with the following government based organizations: Emissions Reduction Alberta supports projects that help Alberta to reduce greenhouse gas emissions and adapt to climate change. Alberta Innovates - to help drive research and accelerate technologies that improve overall environmental performance. Sustainable Technology Development Canada (SDTC) – focuses on clean technologies that improve business performance while using resources more responsibly.
Other	Partnering with Academia - Suncor provides in-kind and/or funding support toward academic research in the areas of energy systems, energy & climate change policies, carbon lifecycle modelling and analysis, technology development and carbon sequestration initiatives. The institutions that Suncor supports include: University of Calgary University of Alberta University of Waterloo Simon Fraser University Southern Alberta Institute of Technology Massachusetts Institute of Technology.
Other	Energy Management Systems (EMS) - Energy is one of Suncor's largest inputs creating a natural incentive for us to continue to reduce our overall energy use and the related emissions. The EMS includes both installed energy monitoring equipment as well as a process followed at each of our key operating facilities that provides real time energy information to operators, allowing them to correct and optimize energy inputs on a continuous basis.
Other	Operational Reliability and Continuous Improvement driven by Suncor's focus on operational excellence is another method used by our company to increase our efficiency and thereby reducing Suncor's emissions. Suncor's operational excellence extends through our integrated business, applying consistent stringent standards and practices to improve overall performance. GHG benefits include reduced downtime and startup.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products or do they enable a third party to avoid GHG emissions?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products or that enable a third party to avoid GHG emissions.

Level of aggregation
Product

Description of product/Group of products
Cogeneration Power

Are these low-carbon product(s) or do they enable avoided emissions?
Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions
Other, please specify (Environment Canada NIR & GWP, IPCC 4)

Electricity Grid Factors – Environment Canada National Inventory Report , 1990-2011, Part 3, Annex 13 Electricity in Canada: Summary and Intensity Tables Global Warming Potentials – Environment Canada Global Warming Potentials http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=CAD07259-1 For the 2017 reporting year we have used the updated GWP's released in the IPCC fourth assessment report (2007).

% revenue from low carbon product(s) in the reporting year
0.2

Comment
With the cogeneration operations in Upstream facilities, Suncor is amongst the largest power producers in Alberta. Suncor facilities use cogeneration to produce combined steam and power, providing considerable energy efficiency gains. These facilities also export a surplus of power to the Alberta provincial power grid, reducing scope 2 emissions of end user power customers by displacing coal power generation and less efficient natural gas generation with cleaner generation.

Level of aggregation
Product

Description of product/Group of products
Wind/Renewable Power

Are these low-carbon product(s) or do they enable avoided emissions?
Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions
Other, please specify (Environment Canada NIR & GWP, IPCC 4)

Electricity Grid Factors – Environment Canada National Inventory Report , 1990-2011, Part 3, Annex 13 Electricity in Canada: Summary and Intensity Tables Global Warming Potentials – Environment Canada Global Warming Potentials http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=CAD07259-1 For the 2017 reporting year we have used the updated GWP's released in the IPCC fourth assessment report (2007). Assumptions – Capacity factors for each contributing wind farm are assumed/ calculated to be 35% (average of all wind farms).

% revenue from low carbon product(s) in the reporting year
0.1

Comment
Suncor produces renewable wind energy. The use of this power enables end users to avoid scope 2 emissions that would have otherwise been consumed through reliance on fossil-fuel power generation. The wind projects in Alberta, Saskatchewan and Ontario reduce the regional grid intensity factor. 100% is calculated based on revenue from renewable power sales as a portion of total revenue from our Renewables-Wind operations.

Level of aggregation
Product

Description of product/Group of products
Biofuels

Are these low-carbon product(s) or do they enable avoided emissions?
Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions
Other, please specify (Environment Canada NIR & GWP, IPCC 4)

Electricity Grid Factors – Environment Canada National Inventory Report , 1990-2011, Part 3, Annex 13 Electricity in Canada: Summary and Intensity Tables Global Warming Potentials – Environment Canada Global Warming Potentials http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=CAD07259-1 For the 2017 reporting year we have used the updated GWP's released in the IPCC fourth assessment report (2007).

% revenue from low carbon product(s) in the reporting year
0.8

Comment
Suncor's Ethanol Plant (St. Clair, Ontario) produces biofuel that is blended into gasoline to reduce the carbon intensity of the fuel purchased by our customers in our downstream operations.. Suncor avoids close to 0.6 million tonnes of CO2e per year through the development, deployment and operation of renewable energy facilities. These avoided emissions are not currently deducted from our reported corporate wide GHG totals. 79% is calculated based on revenue from ethanol sales as a portion of total revenue from our St. Clair Ethanol plant (excluding government funding).

C-OG4.6

(C-OG4.6) Describe your organization's efforts to reduce methane emissions from oil and gas production activities.

Suncor's methane reduction efforts begin with all registered facilities being surveyed annually for leaks. All detected leaks to atmosphere are immediately fixed as a safety hazard. We also do not vent gas streams such as associated gas, tank blankets, compressor vents or compressor starters; we conserve when we can (if a low pressure system exists that we can tie into) and flare the gas as a minimum. Some small remote sites without electrical power use natural gas to run pneumatics, but these are gradually being replaced by small instrument air or solar powered control packages.

COG4.7

(C-OG4.7) Does your organization conduct leak detection and repair (LDAR) or use other methods to find and fix fugitive methane emissions from oil and gas production activities?

Yes

C-OG4.7a

(C-OG4.7a) Describe the protocol through which methane leak detection and repair or other leak detection methods, are conducted for oil and gas production activities, including predominant frequency of inspections, estimates of assets covered, and methodologies employed.

In compliance with provincial, state and federal regulations where Suncor operates, our facilities meet the requirements of regulatory approvals and operate in compliance with the Canadian Council of Ministers of Environment (CCME) Environmental Code of Practice for the Measurement and Control of Fugitive VOC Emissions From Equipment Leaks (Oct 1993). In addition to complying with existing regulatory requirements, Suncor works with COSIA to develop new methods of detecting fugitive methane emissions. These research efforts are followed by regulators in an effort to continuously improve methane emissions technologies, standards, and regulations. One recent example of an innovative methane emissions detection technology is GHGSat – a satellite-based methane detection sensor that can quantify methane concentrations directly above industrial facilities at a spatial resolution of approximately 50m.

C-OG4.8

(C-OG4.8) If flaring is relevant to your oil and gas production activities, describe your organization's efforts to reduce flaring, including any flaring reduction targets.

Flaring is a relevant factor in certain areas of Suncor's oil production activities and flaring emissions are included in Scope 1 emissions calculations. Where flaring activities occur, Suncor carefully manages and mitigates the activity. For example, at Suncor's Terra Nova offshore petroleum facility, flare management practices are implemented that are consistent with the World Bank Global Flaring Initiative. Flaring reduction programs are also currently covered within the scope of Suncor's GHG intensity reduction goal. This reduction goal aims to reduce total GHG emission intensity of the production of oil and petroleum products by 30% by 2030, and as a result of this goal, GHG intensive processes such as flaring, are encouraged to be reduced through energy efficiency goals applied to the business unit level.

C5. Emissions methodology

C5.1

(C5.1) Provide your base year and base year emissions (Scopes 1 and 2).

Scope 1

Base year start
January 1 2010

Base year end
December 31 2010

Base year emissions (metric tons CO2e)
17073028

Comment
Direct emission - definition and category aligned with ECCC guidance

Scope 2 (location-based)

Base year start
January 1 2010

Base year end
December 31 2010

Base year emissions (metric tons CO2e)
1841748

Comment
Purchased electricity and steam use grid electricity emission factor and general steam emission factor

Scope 2 (market-based)

Base year start
January 1 2010

Base year end
December 31 2010

Base year emissions (metric tons CO2e)
1313469

Comment
Purchased electricity and steam use supplier-specific emission factors

C5.2

(C5.2) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions.

American Petroleum Institute Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry, 2009
IPCC Guidelines for National Greenhouse Gas Inventories, 2006
ISO 14064-1
The Climate Registry: General Reporting Protocol
The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)
US EPA Climate Leaders: Direct Emissions from Stationary Combustion
US EPA Mandatory Greenhouse Gas Reporting Rule
Other, please specify (Envir. Can Greenhouse Gas Inventory 1990)

● *IPCC Fourth Assessment Report 2007* ● *World Business Council for Sustainable Development/World Resource Institute Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard 2004* ● *Environment Canada Greenhouse Gas Inventory 1990 – 2007 Report 2009* ● *Canadian Industrial End-Use Data and Analysis Centre 2009* ● *Western Climate Initiative Design for the WCI Regional Program July 2010* ● *National Renewable Energy Laboratory Life Cycle Assessment of Hydrogen Production via Natural Gas Steam Reforming* ● *Technical Guidance for Completing Specified Gas Compliance Reports (Version 7)* ● *O. Reg 452/09: Guideline for Quantification, Reporting and Verification of Greenhouse Gas Emissions July 2017* ● *Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere 2017* ● *Environment Canada Facility Greenhouse Gas Reporting Program*

C5.2a

(C5.2a) Provide details of the standard, protocol, or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions.

For Quebec: Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere 2017;

For British Columbia: Western Climate Initiative (WCI) Design for the WCI Regional Program;

For Ontario: O. Reg. 452/09: Guideline for Quantification, Reporting and Verification of Greenhouse Gas Emissions 2017;

For Alberta: Technical Guidance For Completing Specified Gas Compliance Reports (Version 7.0);

For all other Canadian operations: Environment Canada Facility Greenhouse Gas Reporting Program;

For US operations: US EPA Mandatory Greenhouse Gas Reporting Rule.

C6. Emissions data

C6.1

(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?

Row 1

Gross global Scope 1 emissions (metric tons CO2e)
18509320

End-year of reporting period
<Not Applicable>

Comment
Scope 1 (Direct Emission) are emissions from sources that are owned and controlled by Suncor. In 2017, Suncor's gross global Scope 1 emissions are calculated as per Federal Regulatory Guidance, including reporting boundary, emission category, calculation methodology and global warming potential.

C6.2

(C6.2) Describe your organization's approach to reporting Scope 2 emissions.

Row 1

Scope 2, location-based
We are reporting a Scope 2, location-based figure

Scope 2, market-based
We are reporting a Scope 2, market-based figure

Comment
Scope 2 includes emissions from energy purchased or acquired and consumed by the reporting company. It includes the emission from purchased electricity, steam, heat and cooling. In 2017, Suncor location-based Scope 2 emissions are calculated based on grid electricity emission factor and 80% efficiency natural gas boiler steam emission factor. Suncor market-based Scope 2 emissions are calculated for electricity and steam purchase from low-carbon sources (e.g. from cogeneration plants) based on supplier-specific emission factors for electricity and steam.

C6.3

(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?

Row 1

Scope 2, location-based
1717520

Scope 2, market-based (if applicable)
1368995

End-year of reporting period
<Not Applicable>

Comment
Market-based emission including the steam and power purchased from External cogeneration facilities (MacKay River and Sarnia Refinery).

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?
No

C6.5

(C6.5) Account for your organization's Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status
Relevant, calculated

Metric tonnes CO2e
1633870

Emissions calculation methodology
Invoiced purchased hydrogen volumes from supplier multiplied by life-cycle emissions intensity (tonnes CO2e/tonne H2 imported)

Percentage of emissions calculated using data obtained from suppliers or value chain partners
100

Explanation
Purchased hydrogen (using supplier-specific method).

Capital goods

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
0

Emissions calculation methodology
Not applicable.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Explanation
The emissions generated from bought equipment, machinery, and vehicles have been covered in Scope 1.

Fuel-and-energy-related activities (not included in Scope 1 or 2)

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
0

Emissions calculation methodology
Not applicable.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Explanation
This is non-operation related activities. Operation-related activities are covered by Scope 1 and Scope 2.

Upstream transportation and distribution

Evaluation status
Relevant, calculated

Metric tonnes CO2e
4553

Emissions calculation methodology
Invoiced diesel volumes from transportation company multiplied by life-cycle emissions intensity (g CO2e/L diesel).

Percentage of emissions calculated using data obtained from suppliers or value chain partners
100

Explanation
This is non-operation related activities. Operation-related activities are covered by Scope 1 and Scope 2.

Waste generated in operations

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
0

Emissions calculation methodology
Not applicable.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Explanation
Not applicable.

Business travel

Evaluation status
Relevant, calculated

Metric tonnes CO2e
11935

Emissions calculation methodology
Invoiced jet fuel volumes multiplied by standard jet fuel emission factors.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
100

Explanation
Invoiced jet fuel volumes multiplied by standard jet fuel emission factors

Employee commuting

Evaluation status
Relevant, calculated

Metric tonnes CO2e
20741

Emissions calculation methodology
Bus diesel fuel consumption, Canadian fleet vehicle gasoline and diesel fuel consumption multiplied by standard fuel emission factors.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
100

Explanation
This is non-operation related activities. Operation-related activities are covered by Scope 1 and Scope 2.

Upstream leased assets

Evaluation status
Relevant, calculated

Metric tonnes CO2e
3664

Emissions calculation methodology
Primary office buildings metered electrical use multiplied by provincial electricity grid factors.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
100

Explanation
The other source of emissions generated from leased assets are included in Scope 1 and Scope 2.

Downstream transportation and distribution

Evaluation status
Relevant, calculated

Metric tonnes CO2e
2212

Emissions calculation methodology
Invoiced diesel and gasoline volumes from transportation company multiplied by life-cycle emissions intensity (g CO2e/L diesel or gasoline).

Percentage of emissions calculated using data obtained from suppliers or value chain partners
100

Explanation
This is non-operation related activities. Operation-related activities are covered by Scope 1 and Scope 2.

Processing of sold products

Evaluation status
Relevant, calculated

Metric tonnes CO2e
201697

Emissions calculation methodology
CO2 directly metered and sold from our facilities to third parties.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
100

Explanation

Use of sold products

Evaluation status
Relevant, calculated

Metric tonnes CO2e
201697

Emissions calculation methodology
CO2 directly metered and sold from our facilities to third parties.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
100

Explanation

End of life treatment of sold products

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
0

Emissions calculation methodology
Not applicable.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Explanation
Not applicable.

Downstream leased assets

Evaluation status
Relevant, calculated

Metric tonnes CO2e
2759

Emissions calculation methodology
Primary office buildings metered electrical use multiplied by provincial electricity grid factors.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
100

Explanation
The other source of emissions generated from leased assets are included in Scope 1 and Scope 2.

Franchises

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
0

Emissions calculation methodology
Not applicable.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Explanation
The emissions generated from franchises assets are included in Scope 1 and Scope 2.

Investments

Evaluation status
Not evaluated

Metric tonnes CO2e
0

Emissions calculation methodology
Not applicable.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Explanation
Not applicable.

Other (upstream)

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
0

Emissions calculation methodology
Not applicable.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Explanation
Not applicable.

Other (downstream)

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
0

Emissions calculation methodology
Not applicable.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Explanation
Not applicable.

C6.7

(C6.7) Are carbon dioxide emissions from biologically sequestered carbon relevant to your organization?
No

C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Intensity figure
0.0006

Metric numerator (Gross global combined Scope 1 and 2 emissions)
20227055

Metric denominator
unit total revenue

Metric denominator: Unit total
32982000000

Scope 2 figure used
Location-based

% change from previous year
12

Direction of change
Decreased

Reason for change
Despite revenue increasing by 23%, emission reduction activities were a factor in emissions only increasing increased by 8%.

C-OG6.12

(C-OG6.12) Provide the intensity figures for Scope 1 emissions (metric tons CO2e) per unit of hydrocarbon category.

Unit of hydrocarbon category (denominator)
Thousand barrels of natural gas liquids

Metric tons CO2e from hydrocarbon category per unit specified
18.31

% change from previous year
5

Direction of change
Decreased

Reason for change
In 2017, the facility (North America Onshore) had extended days of shut down (around 70 days). It also had no drilling activities in 2017, which lowered the energy consumption.

Comment

Unit of hydrocarbon category (denominator)
Thousand barrels of crude oil / condensate

Metric tons CO2e from hydrocarbon category per unit specified
56.46

% change from previous year
22

Direction of change
Increased

Reason for change
In 2017, less crude oil was produced in offshore operations.

Comment

Unit of hydrocarbon category (denominator)
Thousand barrels of oil sands (includes bitumen and synthetic crude)

Metric tons CO2e from hydrocarbon category per unit specified
71

% change from previous year
4

Direction of change
Decreased

Reason for change
In 2017, Suncor upstream Oil Sands Base Plant recovered from 2016 wild fire and the production went back to the level before the fire. Several project were also implemented to improve energy efficiency and therefore decrease the Scope 1 emissions.

Comment
The denominator is Suncor upstream SCO production.

Unit of hydrocarbon category (denominator)
Thousand barrels of oil sands (includes bitumen and synthetic crude)

Metric tons CO2e from hydrocarbon category per unit specified
64.63

% change from previous year
4

Direction of change
Decreased

Reason for change
In 2017, Suncor upstream in-situ facilities recovered from 2016 wild fire and the production went back to the level before the fire. Several project were also implemented to improve energy efficiency and therefore decrease the Scope 1 emissions.

Comment
The denominator is Suncor upstream in-situ bitumen production.

Unit of hydrocarbon category (denominator)
Thousand barrels of refinery net production

Metric tons CO2e from hydrocarbon category per unit specified
23.88

% change from previous year
3

Direction of change
Decreased

Reason for change
In 2017, Suncor Refineries had increased utilization and production. Several projects were also implemented to improve energy efficiency and therefore decrease the Scope 1 emissions.

Comment
The denominator is Suncor upstream product to market.

C-OG6.13

(C-OG6.13) Report your methane emissions as percentages of natural gas and hydrocarbon production or throughput.

Oil and gas business division
Upstream

Estimated total methane emitted expressed as % of natural gas production or throughput at given division
0.01

Estimated total methane emitted expressed as % of total hydrocarbon production or throughput at given division
0.02

Comment
The unit is tonne CH4 / m3 total upstream hydrocarbon production. The methane emissions are the total combined gross Scope 1 methane emissions from Suncor upstream facilities (including vents, leaks, etc.).

Oil and gas business division
Downstream

Estimated total methane emitted expressed as % of natural gas production or throughput at given division
0

Estimated total methane emitted expressed as % of total hydrocarbon production or throughput at given division
0.003

Comment
The unit is tonne CH4 / m3 total upstream hydrocarbon production. The methane emissions are the total combined gross Scope 1 methane emissions from Suncor downstream facilities (including vents, leaks, etc.).

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization have greenhouse gas emissions other than carbon dioxide?
Yes

C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	18186457	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	214126	IPCC Fourth Assessment Report (AR4 - 100 year)
N2O	106256	IPCC Fourth Assessment Report (AR4 - 100 year)
HFCs	680	IPCC Fourth Assessment Report (AR4 - 100 year)
PFCs	70	IPCC Fourth Assessment Report (AR4 - 100 year)
SF6	1731	IPCC Fourth Assessment Report (AR4 - 100 year)

C-OG7.1b

(C-OG7.1b) Break down your total gross global Scope 1 emissions from oil and gas value chain production activities by greenhouse gas type.

	Gross Scope 1 CO2 emissions (metric tons CO2)	Gross Scope 1 methane emissions (metric tons CH4)	Gross Scope 1 emissions (metric tons CO2e)	Comment
Fugitives (Oil:Total)	393248	7416	579345	The reported fugitive totals include all venting, flaring, and other sources of fugitives relating to the extraction, production, movement, storage, and refining of oil.
Fugitives (Oil: Venting)	102	262	6643	
Fugitives (Oil: Flaring)	293886	937	318011	
Fugitives (Oil: E&P, excluding venting and flaring)	99254	6013	249592	
Fugitives (Oil: All Other)	6	204	5099	
Fugitives (Gas: Total)	0	0	0	
Fugitives (Gas: Venting)	0	0	0	
Fugitives (Gas: Flaring)	0	0	0	
Fugitives (Gas: E&P, excluding venting and flaring)	0	0	0	
Fugitives (Gas: Midstream)	0	0	0	
Fugitives (Gas: All other)	0	0	0	
Combustion (Oil: Upstream, excluding flaring)	171623	262	178185	
Combustion (Gas: Upstream, excluding flaring)	11870317	423	11956083	
Combustion (Refining)	3106481	86	3108644	
Combustion (Chemicals production)	0	0	0	
Combustion (Electricity generation)	0	0	0	
Combustion (Other)	196318	4	197465	
Process emissions	0	0	0	
Emission not elsewhere classified	0	0	0	

C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/region.

Country/Region	Scope 1 emissions (metric tons CO2e)
Canada	17577179
United States of America	932141

C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By facility

C7.3b

(C7.3b) Break down your total gross global Scope 1 emissions by business facility.

Facility	Scope 1 emissions (metric tons CO2e)	Latitude	Longitude
Oil Sands Base Plant	8453179	57.0033	-111.4661
In Situ Firebag	4710059	57.2297	-110.8325
In Situ MacKay River	318971	57.03347	-111.88712
Terra Nova FPSO	629805	46.2831	-48.2851
North America Onshore - BC	19942	56.51875	-122.046875
Edmonton Refinery	1330186	53.55558	-113.33275
Montreal Refinery	1217601	45.50806	-73.57111
Sarnia Refinery	692560	42.9306	-82.4433
Montreal Sulphur Plant	22638	45.639381	-73.515457
Burrard Terminal	12389	49.283	-122.85
Pipelines	8540	57.1165	-111.1493
Renewables - St Clair Ethanol Plant	161295	42.9294	-82.4381
Renewables - Wind	14	42.32332	-82.2477

C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4

(C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4) Break down your organization's total gross global Scope 1 emissions by sector production activity in metric tons CO2e.

	Gross Scope 1 emissions, metric tons CO2e	Net Scope 1 emissions , metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Electric utility generation activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Metals and mining production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (upstream)	14131956	<Not Applicable>	
Oil and gas production activities (downstream)	4377579	<Not Applicable>	
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	<Not Applicable>	<Not Applicable>	<Not Applicable>

C7.5

(C7.5) Break down your total gross global Scope 2 emissions by country/region.

Country/Region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)	Purchased and consumed electricity, heat, steam or cooling (MWh)	Purchased and consumed low-carbon electricity, heat, steam or cooling accounted in market-based approach (MWh)
Canada	1483911	1135387	6028514	3499047
United States of America	233609	233609	294444	0

C7.6

(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

By facility

C7.6b

(C7.6b) Break down your total gross global Scope 2 emissions by business facility.

Facility	Scope 2 location-based emissions (metric tons CO2e)	Scope 2, market-based emissions (metric tons CO2e)
Oil Sands Base Plant	1039	1039
In Situ Firebag	0	0
In Situ MacKay River	811870	389943
Terra Nova FPSO	0	0
North America Onshore - BC	6	6
Edmonton Refinery	464179	464179
Montreal Refinery	1489	1489
Sarnia Refinery	171512	244915
Commerce City Refinery	233609	233609
Montreal Sulphur Plant	13	13
Burrard Terminal	190	190
Pipelines	30983	30983
Renewables - St Clair Ethanol Plant	2585	2585
Renewables - Wind	44	44

C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7

(C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7) Break down your organization's total gross global Scope 2 emissions by sector production activity in metric tons CO2e.

	Scope 2, location-based, metric tons CO2e	Scope 2, market-based (if applicable), metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Metals and mining production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (upstream)	812915	390988	
Oil and gas production activities (downstream)	904605	978007	
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	<Not Applicable>	<Not Applicable>	<Not Applicable>

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Increased

C7.9a

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined) and for each of them specify how your emissions compare to the previous year.

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	4410	Decreased	0	Biodiesel is consumed in oil sand base plant as fuel for various combustion. Biogas which is generated from fermentation is consumed in the Ethanol Plant by equipment and biomethanator flare. 2017 emissions from the above two sources are quantified and compared to 2016.
Other emissions reduction activities	75432	Decreased	0.4	A few projects were implemented in 2017 to improve energy efficiency and therefore decrease the emissions. These projects include process optimization to improve heat transfer and reliability.
Divestment	419636	Decreased	2	Suncor previously operated a lubricants business in Mississauga, Ontario, which was sold on Feb 1st, 2017. 2017 performance data reflects this sale.
Acquisitions		<Not Applicable>		
Mergers		<Not Applicable>		
Change in output		<Not Applicable>		
Change in methodology		<Not Applicable>		
Change in boundary		<Not Applicable>		
Change in physical operating conditions		<Not Applicable>		
Unidentified		<Not Applicable>		
Other	1916354	Increased	10	Other increase in emissions is due to fuel consumption increase and other operations-related activities (i.e. flaring and venting) with the production increases in 2017 compared to 2016.

C7.9b

(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Location-based

C8. Energy

C8.1

(C8.1) What percentage of your total operational spend in the reporting year was on energy?
More than 10% but less than or equal to 15%

C8.2

(C8.2) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertakes this energy-related activity
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	No
Consumption of purchased or acquired steam	Yes
Consumption of purchased or acquired cooling	Yes
Generation of electricity, heat, steam, or cooling	Yes

C8.2a

(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total MWh
Consumption of fuel (excluding feedstock)	LHV (lower heating value)	45446	79947343	79992788
Consumption of purchased or acquired electricity	<Not Applicable>	0	1873491	1873491
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	0	4449467	4449467
Consumption of purchased or acquired cooling	<Not Applicable>	0	0	0
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	0	<Not Applicable>	0
Total energy consumption	<Not Applicable>	45446	86270301	86315747

C8.2b

(C8.2b) Select the applications of your organization's consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	Yes
Consumption of fuel for the generation of steam	Yes
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	Yes

C8.2c

(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

Fuels (excluding feedstocks)
Natural Gas

Individual contributions do not equal the total natural gas (MWh) consumed by the organization. The MWh of natural gas consumed for cogeneration volumes are already reported in the volumes consumed for the generation of electricity and steam.

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
44497039

MWh fuel consumed for the self-generation of electricity
15582412

MWh fuel consumed for self-generation of heat
7952741

MWh fuel consumed for self-generation of steam
20961886

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Fuels (excluding feedstocks)
Fuel Gas

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
20933092

MWh fuel consumed for the self-generation of electricity
0

MWh fuel consumed for self-generation of heat
18661006

MWh fuel consumed for self-generation of steam
2272086

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

---

Fuels (excluding feedstocks)
Diesel

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
4001381

MWh fuel consumed for the self-generation of electricity
45577

MWh fuel consumed for self-generation of heat
3956804

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Fuels (excluding feedstocks)
Heavy Gas Oil

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
448319

MWh fuel consumed for the self-generation of electricity
0

MWh fuel consumed for self-generation of heat
82942

MWh fuel consumed for self-generation of steam
365377

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Fuels (excluding feedstocks)
Propane Liquid

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
11819

MWh fuel consumed for the self-generation of electricity
0

MWh fuel consumed for self-generation of heat
11819

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Fuels (excluding feedstocks)
Petroleum Coke

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
7965398

MWh fuel consumed for the self-generation of electricity
0

MWh fuel consumed for self-generation of heat
2789680

MWh fuel consumed for self-generation of steam
5175718

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Fuels (excluding feedstocks)
Biodiesel

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
39102

MWh fuel consumed for the self-generation of electricity
0

MWh fuel consumed for self-generation of heat
39102

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Fuels (excluding feedstocks)
Biogas

The total consumption of fuel (MWh) from renewable sources includes the sum of biodiesel and biogas volumes consumed.

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
6343

MWh fuel consumed for the self-generation of electricity
0

MWh fuel consumed for self-generation of heat
6343

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

C8.2d

(C8.2d) List the average emission factors of the fuels reported in C8.2c.

Biodiesel

Emission factor
900.23

Unit
lb CO2 per barrel

Emission factor source
National Inventory Report – Greenhouse Gas Sources and Sinks in Canada 1990-2009 Report Part 2. Table A8-11

Comment
Default emission factors are applied

Biogas

Emission factor

Unit
Please select

Emission factor source

Comment

Diesel

Emission factor
975.24

Unit
lb CO2 per barrel

Emission factor source
2009 API Compendium, Table 4.7; National Inventory Report – Greenhouse Gas Sources and Sinks in Canada 1990-2009 Report Part 2. Table A8-11

Comment
Default emission factor are applied

Fuel Gas

Emission factor
0.00205

Unit
metric tons CO2 per m3

Emission factor source
Gas composition; 2009 API Compendium, Exhibit 4.4; AP42, Section 1.4-6, Table 1.4-2

Comment
Fuel gas compositions are obtained from lab analysis

Heavy Gas Oil

Emission factor
1102.28

Unit
lb CO2 per barrel

Emission factor source
CIDEEDAC, Development of GHG Intensity indicators from Canadian Industry 1990 to 2009 data, March 2011 Report. Table 2-1; 2009 API Compendium, Table 4.7; National Inventory Report – Greenhouse Gas Sources and Sinks in Canada 1990-2009 Report Part 2. Table A8-4

Comment
Default emission factor are applied

Natural Gas

Emission factor
0.00208

Unit
metric tons CO2e per m3

Emission factor source
NG composition; 2009 API Compendium, Exhibit 4.4; AP42, Section 1.4-6, Table 1.4-2

Comment
NG compositions are provided by NG producers

Petroleum Coke

Emission factor
3.0947

Unit
metric tons CO2e per metric ton

Emission factor source
Coke composition; 2009 API Compendium, Exhibit 4.4; CIDEEDAC, Development of GHG Intensity indicators fro Canadian Industry 1990 to 2009 data, March 2011 Report. Table 2-1

Comment
Coke compositions are obtained from lab analysis

Propane Liquid

Emission factor
540.79

Unit
lb CO2 per barrel

Emission factor source
CIDEEDAC, Development of GHG Intensity indicators for Canadian Industry 1990 to 2009 data, March 2011 Report. Table 2-1; 2009 API Compendium, Table 4-7

Comment
Default emission factor are applied

C8.2e

(C8.2e) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.

	Total Gross generation (MWh)	Generation that is consumed by the organization (MWh)	Gross generation from renewable sources (MWh)	Generation from renewable sources that is consumed by the organization (MWh)
Electricity	8277294	5809192	0	0
Heat	26800350	26800350	36356	36356
Steam	19635272	19635272	0	0
Cooling	0	0	0	0

C8.2f

(C8.2f) Provide details on the electricity, heat, steam and/or cooling amounts that were accounted for at a low-carbon emission factor in the market-based Scope 2 figure reported in C6.3.

Basis for applying a low-carbon emission factor
Contract with suppliers or utilities (e.g. green tariff), not supported by energy attribute certificates

Low-carbon technology type
Other low-carbon technology, please specify (Cogeneration)

MWh consumed associated with low-carbon electricity, heat, steam or cooling
3499047

Emission factor (in units of metric tons CO2e per MWh)
0.119

Comment
The emission factor for Cogen Power: 0.3 and Cogen Steam: 0.119.

C9. Additional metrics

C9.1

(C9.1) Provide any additional climate-related metrics relevant to your business.

C-OG9.2a

(C-OG9.2a) Disclose your net liquid and gas hydrocarbon production (total of subsidiaries and equity-accounted entities).

	In-year net production	Comment
Crude oil and condensate, million barrels	11.15	Crude oil produced from Terra Nova FPSO.
Natural gas liquids, million barrels	1.09	Natural gas liquids produced from North America Onshore.
Oil sands, million barrels (includes bitumen and synthetic crude)	159.33	Bitumen and synthetic crude oil produced from Oil Sands facilities.
Natural gas, billion cubic feet	0	No NG produced from Suncor facilities.

C-OG9.2b

(C-OG9.2b) Explain which listing requirements or other methodologies you use to report reserves data. If your organization cannot provide data due to legal restrictions on reporting reserves figures in certain countries, please explain this.

Suncor reports reserves in accordance with Canadian Securities Administrators' National Instrument 51-101 "Standards of Disclosure for Oil and Gas Activities" (NI 51-101).

Suncor's reserves were evaluated by independent qualified reserves evaluators, GLJ and Sproule, in accordance with NI 51-101 and the Canadian Oil and Gas Evaluation (COGE) Handbook.

C-OG9.2c

(C-OG9.2c) Disclose your estimated total net reserves and resource base (million boe), including the total associated with subsidiaries and equity-accounted entities.

	Estimated total net proved + probable reserves (2P) (million BOE)	Estimated total net proved + probable + possible reserves (3P) (million BOE)	Estimated net total resource base (million BOE)
Row 1	6779		

C-OG9.2d

(C-OG9.2d) Provide an indicative percentage split for 2P, 3P reserves, and total resource base by hydrocarbon categories.

	Net proved + probable reserves (2P) (%)	Net proved + probable + possible reserves (3P) (%)	Net total resource base (%)
Crude oil / condensate / Natural gas liquids			
Natural gas			
Oil sands (includes bitumen and synthetic crude)			

C-OG9.2e

(C-OG9.2e) Provide an indicative percentage split for production, 1P, 2P, 3P reserves, and total resource base by development types.

C-OG9.3a

(C-OG9.3a) Disclose your total refinery throughput capacity in the reporting year in thousand barrels per year.

	Total refinery throughput capacity (Thousand barrels per day)
Capacity	485.96

C-OG9.3b

(C-OG9.3b) Disclose feedstocks processed in the reporting year in million barrels per year.

	Throughput (Million barrels)	Comment
Oil	142.31	
Other feedstocks	24.07	
Total	166.38	

C-OG9.3c

(C-OG9.3c) Are you able to break down your refinery products and net production?

Yes

C-OG9.3d

(C-OG9.3d) Disclose your refinery products and net production in the reporting year in million barrels per year.

Product produced	Refinery net production (Million barrels) *not including products used/consumed on site
Gasolines	79.07
Diesel fuels	59.89
Fuel oils	25.13
Other, please specify (Other distillates)	10.66

C-CO9.6/C-EU9.6/C-OG9.6

(C-CO9.6/C-EU9.6/C-OG9.6) Disclose your investments in low-carbon research and development (R&D), equipment, products, and services.

Investment start date

January 1 2011

Investment end date

August 15 2018

Investment area

R&D

Technology area

Other, please specify (Thermal-Solvent Technology: ESEIEH)

Investment maturity

Pilot demonstration

Investment figure

Low-carbon investment percentage

Please explain

The ESEIEHTM field pilot is a project supported by a consortium of Suncor, Devon Canada, Nexen Energy ULC, Harris Corporation and Emissions Reduction Alberta, and testing is currently underway. ESEIEHTM uses wells configured in horizontal pairs much like a SAGD operation. With the ESEIEHTM process, steam is replaced by electromagnetic heating and solvent. If commercially successful, this technology offers the potential for the following improvements: • 50-75% reduction in GHG emissions • eliminates process water needs • reduces the size of surface facility • ability to transport with less diluent • reduction in bitumen carbon content We anticipate having results from the ESEIEHTM pilot in 2018 and 2019 that will allow us to more fully evaluate the commercial potential of the technology. Concurrently with the pilot, Suncor is advancing the commercial design of the EASE technology with Harris Corporation, and this work will be completed in 2018. Once the ESEIEHTM pilot is complete Suncor intends to implement the technology at a pad-scale In Situ Demonstration Facility.

C-OG9.7

(C-OG9.7) Disclose the breakeven price (US$/BOE) required for cash neutrality during the reporting year, i.e. where cash flow from operations covers CAPEX and dividends paid/ share buybacks.

As of the end of 2017, Suncor expects to be able to generate sufficient funds from operations at a US $40 - $45 per barrel oil price to cover our sustaining capital and our dividend. (2017 Annual Report, pg. 6)

C10. Verification

C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	No third-party verification or assurance

C10.1a

(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 and/or Scope 2 emissions and attach the relevant statements.

Scope
Scope 1

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Reasonable assurance

Attach the statement

Page/ section reference

Relevant standard
Alberta Specified Gas Emitters Regulation (SGER)

Proportion of reported emissions verified (%)
100

Scope
Scope 1

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Suncor Assurance Statement-EN.pdf

Page/ section reference
Pages 1-3

Relevant standard
ISAE3000

Proportion of reported emissions verified (%)
99

Scope
Scope 2 location-based

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Suncor Assurance Statement-EN.pdf

Page/ section reference
Pages 1-3

Relevant standard
ISAE3000

Proportion of reported emissions verified (%)
97

C10.2

(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?
Yes

C10.2a

(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C4. Targets and performance	Year on year emissions intensity figure	Third-party assurance (EY assurance statement)	

C11. Carbon pricing

C11.1

(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?

Yes

C11.1a

(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.

Alberta carbon tax
Alberta SGER
BC carbon tax
Ontario CaT
Québec CaT

C11.1b

(C11.1b) Complete the following table for each of the emissions trading systems in which you participate.

Alberta SGER

% of Scope 1 emissions covered by the ETS
95.9

Period start date
January 1 2017

Period end date
December 31 2017

Allowances allocated
13818836

Allowances purchased
379878

Verified emissions in metric tons CO2e
14812395

Details of ownership
Facilities we own and operate

Comment

Ontario CaT

% of Scope 1 emissions covered by the ETS

Period start date
January 1 2017

Period end date
December 31 2017

Allowances allocated
131593

Allowances purchased
560966

Verified emissions in metric tons CO2e
692560

Details of ownership
Facilities we own and operate

Comment

Québec CaT

% of Scope 1 emissions covered by the ETS
100

Period start date
January 1 2017

Period end date
December 31 2017

Allowances allocated
1113676

Allowances purchased
103704

Verified emissions in metric tons CO2e
1217380

Details of ownership
Facilities we own and operate

Comment

C11.1c

(C11.1c) Complete the following table for each of the tax systems in which you participate.

Alberta carbon tax

Period start date
January 1 2017

Period end date
December 31 2017

% of emissions covered by tax
84

Total cost of tax paid
141000000

Comment

BC carbon tax

Period start date
January 1 2017

Period end date
December 31 2017

% of emissions covered by tax
81

Total cost of tax paid
135000000

Comment

C11.1d

(C11.1d) What is your strategy for complying with the systems in which you participate or anticipate participating?

Suncor follows a low-cost compliance strategy where cost-effective facility emissions reductions are pursued first, followed by retiring offset credits generated from either our wind facilities or cogeneration facilities, followed by offset purchases and secondary market purchases of allowances. Suncor also has refineries in Ontario and Quebec, both of which are covered by a Cap and Trade system. Suncor has joint ownership in UK North Sea assets but these assets are operated by another company whose responsibility includes compliance with the European Union Emissions Trading Scheme.

C11.2

(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?
No

C11.3

(C11.3) Does your organization use an internal price on carbon?
Yes

C11.3a

(C11.3a) Provide details of how your organization uses an internal price on carbon.

Objective for implementing an internal carbon price
Stress test investments

GHG Scope
Scope 1

Application
All business units

Actual price(s) used (Currency /metric ton)
30

Variance of price(s) used
$30/tonne CO2e to $65/tonne CO2e

Type of internal carbon price
Implicit price

Impact & implication
As part of its ongoing business planning, Suncor assesses future costs associated with CO2 emissions in its operations and the evaluation of future projects, based on the company's outlook for the carbon price under current and pending GHG regulations, using a price range of $30 to $65/tonne of CO2e as a base case, applied against a range of policy design options.

C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?
No, we do not engage

C12.1d

(C12.1d) Why do you not engage with any elements of your value chain on climate-related issues, and what are your plans to do so in the future?

Suncor is working towards increasing engagement with value chain partners on climate-related issues.

C12.3

(C12.3) Do you engage in activities that could either directly or indirectly influence public policy on climate-related issues through any of the following?
Direct engagement with policy makers
Trade associations
Funding research organizations

C12.3a

(C12.3a) On what issues have you been engaging directly with policy makers?

Focus of legislation	Corporate position	Details of engagement	Proposed legislative solution
Cap and trade	Support with minor exceptions	Sitting on several technical working groups for the proposed federal Output Based Pricing System (OBPS), as well as providing written submissions to requests for feedback.	Use Output Based Standards for various product categories, and keep a wide range of compliance options available (e.g. emissions performance credits, offset credits, and payment into a technology fund)
Carbon tax	Support with minor exceptions	Sitting on a technical working group for the proposed Clean Fuel Standard, as well as providing written submissions to requests for feedback.	Set performance standards for carbon intensity of various fuels (gaseous, liquid, and solid) used in transportation, industrial uses, and buildings; achieve compliance by fuel switching (such as switching from bunker fuel to diesel or natural gas) and using biofuels, then purchasing credits from others who have achieved a carbon intensity better than the standard.
Regulation of methane emissions	Support with minor exceptions	Provided online responses to requests for feedback on provincial regulation for methane emissions reductions.	Set a limit on methane emissions for various types of regulated facilities, including a phase-in period; no opportunity for credits or payments, compliance is mandatory.

C12.3b

(C12.3b) Are you on the board of any trade associations or do you provide funding beyond membership?
Yes

C12.3c

(C12.3c) Enter the details of those trade associations that are likely to take a position on climate change legislation.

Trade association
Canadian Alliance of Petroleum Producers

Is your position on climate change consistent with theirs?
Inconsistent

Please explain the trade association's position
CAPP does not consistently and transparently support carbon pricing in all jurisdictions or an emissions limits.

How have you, or are you attempting to, influence the position?
Suncor remains an active member of CAPP, working to communicate our position of supporting carbon pricing, with considerations for trade exposed industries, and the Alberta provincial emissions limit on oil sands operations.

C12.3d

(C12.3d) Do you publicly disclose a list of all research organizations that you fund?
No

C12.3f

(C12.3f) What processes do you have in place to ensure that all of your direct and indirect activities that influence policy are consistent with your overall climate change strategy?

Suncor's General Manager, Strategy & Integration has accountability for energy and climate change policy and the processes to ensure that all Suncor engagement is consistent with overall corporate position. This team coordinates all policy related activities, whether direct engagement, or engagement through trade associations. The team has clear principles for climate change policy engagement, and also documents and provides guidance and key messages across organizations. This team supports reaching an aligned policy position among business units. In addition to cross-functional team collaboration, the team also uses the following Suncor tools: stakeholder information management system (SIMS); risk management process, strategic issues management process (SIMP); and internal lobbying policy and guidelines. While Suncor actively influences the policy positions and statements of those associations of which it is a member or participant, those organizations exist as separate entities and may, from time to time, have positions that are not fully aligned with Suncor's. Our membership does not indicate that they speak on our behalf and, for further clarity; we outline our corporate positions on issues such as climate change on our own Sustainability site on sustainability.suncor.com/en.

Government Relations is accountable for all relationships with governments, and ensuring communications to government go through the Government Relations department helps ensure consistency of the message.

C12.4

(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Publication
In mainstream reports

2017 Annual Report

Status
Complete

Attach the document
2017-annual-report-en.pdf

Content elements
Strategy

Publication
In mainstream reports

2017 Annual Information Form

Status
Complete

Attach the document
2017-annual-aif-en.pdf

Content elements
Strategy

Publication
In voluntary sustainability report

2018 Report on Sustainability

Status
Complete

Attach the document
2018-report-on-sustainability-EN.pdf

Content elements
Strategy
Risks & opportunities
Emissions figures

Publication
In voluntary sustainability report

2018 Climate Risk and Resilience Report

Status
Complete

Attach the document
2018-climate-risk-and-resilience-report-EN.pdf

Content elements
Strategy
Risks & opportunities
Emissions figures

C14. Signoff

C-FI

(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

[Advisories] Forward-Looking Statements: These responses contain certain forward-looking statements and forward-looking information (collectively, forward-looking statements) based on Suncor's current expectations, estimates, projections and assumptions that were made by Suncor in light of information available at the time these responses were prepared. Some of the forward-looking statements may be identified by words like "expected", "will", "estimates", "could", "anticipates", "intends", "may", "forecasts", "potential", "strategy", "goal", "objective", "outlook", "target" and similar expressions. Forward-looking statements in these responses include references to: Suncor's strategies; expected regulatory changes, the impact thereof, including compliance costs, and resulting opportunities for Suncor; estimated impacts of risks and responses thereto; Suncor's goal to reduce GHG intensity; plans and expectations, including potential benefits, around technologies and technology development; Suncor's growth plans; Suncor's strategy for energy efficiency and advancing carbon reduction technology; Suncor's carbon price outlook; the expectation of a competitive rate of return over the life of Suncor's assets; expectations for demand for oil and refined petroleum products and for refining capacity; initiatives to gain access to new international markets for Suncor's crude oil and refined products; Suncor's position with respect to low carbon transportation fuels; potential opportunities with respect to renewable energy; plans, expectations (including as to cost and timing) and results (including CO2e savings and monetary savings) for projects, initiatives and activities undertaken by Suncor or in which Suncor is involved; the expectation that the characteristics of oil sands provide resiliency to continue to deliver value to shareholders; trends related to Suncor's base case energy outlook; potential incremental cogeneration capacity and fuel switching opportunities; the objective of making oil sands crude both cost and carbon competitive; the expected oil price required to cover Suncor's sustaining capital and dividend; estimated emissions intensities and absolute emissions levels; and reserves estimates. Forward-looking statements are not guarantees of future performance and involve a number of risks and uncertainties, some that are similar to other oil and gas companies and some that are unique to our company. Suncor's actual results may differ materially from those expressed or implied by our forward-looking statements and you are cautioned not to place undue reliance on them. Suncor's Management's Discussion & Analysis for the second quarter of 2018 and its most recently filed Annual Information Form/Form 40-F, Annual Report to Shareholders and other documents it files from time to time with securities regulatory authorities describe the risks, uncertainties, material assumptions and other factors that could influence actual results and such factors are incorporated herein by reference. Copies of these documents are available without charge from Suncor or by referring to the company's profile on SEDAR at sedar.com or EDGAR at sec.gov. Except as required by applicable securities laws, Suncor disclaims any intention or obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise. Non-GAAP Measures: Certain financial measures in these responses – namely funds from operations – are not prescribed by Canadian generally accepted accounting principles (GAAP). Funds from operations is defined and reconciled to the most directly comparable GAAP measure in Suncor's Management's Discussion & Analysis for the year ended December 31, 2017. These non-GAAP financial measures do not have any standardized meaning and therefore are unlikely to be comparable to similar measures presented by other companies. These non-GAAP financial measures are included because management uses the information to analyze business performance, leverage and liquidity, and should not be considered in isolation or as a substitute for measures of performance prepared in accordance with GAAP. Reserves and BOEs: Certain natural gas volumes have been converted to barrels of oil equivalent (boe) on the basis of one barrel to six thousand cubic feet. Any figure presented in boe may be misleading, particularly if used in isolation. A conversion ratio of one barrel of crude oil or natural gas liquids to six thousand cubic feet of natural gas is based on an energy equivalency conversion method primarily applicable at the burner tip and does not necessarily represent a value equivalency at the wellhead. Given that the value ratio based on the current price of crude oil as compared to natural gas is significantly different from the energy equivalency of 6:1, utilizing a conversion on a 6:1 basis may be misleading as an indication of value. The responses contained herein contain certain information derived from Suncor's Statement of Reserves Data and Other Oil and Gas Information dated March 1, 2018 with an effective date of December 31, 2017 (Reserves Statement). Reserves evaluations have not been updated since the effective date of the Reserves Statement and, thus, do not reflect changes in our reserves since that date. The full particulars relating to Suncor's reserves, including risk factors, uncertainties and application definitions, are contained in Suncor's Annual Information Form dated March 1, 2018 which can be obtained without charge from Suncor or by referring to the company's profile on SEDAR at sedar.com or EDGAR at sec.gov.

C14.1

(C14.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Director in Outreach and Disclosure at Suncor Energy.	Environment/Sustainability manager

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	Public or Non-Public Submission	I am submitting to
I am submitting my response	Public	Investors

Please state the main reason why you are declining to respond to your Customers

Request not received directly from Customers

Please confirm below

I have read and accept the applicable Terms