

Welcome to your CDP Climate Change Questionnaire 2020

C0. Introduction

C0.1

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

MEG is an energy company focused on sustainable in situ thermal oil production in the southern Athabasca region of Alberta, Canada. MEG is actively developing innovative enhanced oil recovery projects that utilize SAGD extraction methods to improve the responsible recovery of oil as well as lower carbon emissions. MEG transports and sells Access Western Blend (AWB) to refiners throughout North America and internationally. MEG owns a 100% working interest in over 700 square miles of mineral leases. In the GLJ Report, which is dated effective December 31, 2019 with a preparation date of January 15, 2020, GLJ estimated 2.1 billion barrels of gross proved plus probable reserves at the Christina Lake Project, where MEG has regulatory approval in place for 210,000 bbls/d of production. To date, MEG has developed production capacity of approximately 100,000 bbls/d at its Christina Lake Project through the implementation of three major projects (described below) as well as low-cost debottlenecking and expansion projects and the application of its proprietary reservoir technologies. The average annual production decline rate at the Christina Lake Project is approximately 10% to 15% and at current productive capacity MEG has a proved plus probable (2P) reserve life index of approximately 60 years. 2019 bitumen production averaged 93,082 bbls/d. On May 4, 2020 MEG suspended full year 2020 production guidance due to the global crude oil price environment at that time, which was experiencing multi-decade lows coupled with extreme levels of volatility driven by the unprecedented demand shock due to COVID-19. Since that time, crude oil price levels and volatility have stabilized to a level that allowed MEG to re-instate 2020 full year production guidance which is now targeted at 78,000 – 80,000 bbls/d. Compared to the original guidance of 94,000 – 97,000 bbls/d announced November 21, 2019, approximately half of the difference is due to the impact of the scheduled 70-day major turnaround at the Christina Lake Phase 1 and 2 facilities announced May 4, 2020. The remainder of the difference results from a combination of weather-related production impacts in the first quarter of 2020, voluntary price-related production curtailments in the second quarter of 2020 and the impact of reduced well capital throughout 2020. Despite the recent reduction to guidance, over time MEG has been consistently able to realize production growth at the Christina Lake Project while minimizing GHG emissions through the use of cogeneration technologies and the application of its proprietary technologies. Cogeneration, also known as combined heat and power generation, is used to create steam and power from a single heat source. MEG's eMSAGP technology, which involves co-injecting a non-condensable gas into the reservoir with steam, reduces the amount of steam required to produce a barrel of bitumen. Furthermore,



MEG continues to test its proprietary eMVAPEX technology at the Christina Lake Project, which involves the targeted injection of light hydrocarbons in replacement of steam. The application of eMSAGP and cogeneration have enabled MEG to lower its GHG intensity approximately 20% below the in situ industry average calculated based on data reported to Environment Canada, the Alberta Energy Regulator and the Alberta Electric System Operator. By applying the eMSAGP process to significant portions of the Christina Lake Project, MEG achieved an average steam oil ratio of 2.2 in 2019 compared to the in situ industry average of 3.1. MEG delivers its production to market via a long-term transportation services agreement on the Access Pipeline which connects to the Edmonton, Alberta sales hub and via additional pipelines, storage facilities and rail infrastructure to transport, store and sell AWB to refiners throughout North America and internationally. MEG has 100,000 of AWB transportation capacity on the Flanagan South and Seaway pipeline systems providing pipeline transportation directly to U.S. Gulf Coast refineries and export terminals. MEG is also a shipper on the Trans Mountain Expansion Project which, when in service, will provide MEG with 20,000 bbls/d of committed tidewater access for AWB on Canada’s West Coast. MEG has also contracted 30,000 bbls/d of rail transloading capacity and storage capacity of 2.8 million barrels in Alberta and strategic locations in the U.S., with marine export capacity associated with certain U.S. Gulf Coast terminals. This combination of pipeline access, rail capacity, storage capacity and marine export capacity advances MEG’s strategy of having long-term and reliable market access to world oil prices for its production.

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
Reporting year	January 1, 2019	December 31, 2019	No

C0.3

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

Canada

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 chosen approach for consolidating your GHG 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

Other divisions

Grid electricity supply from gas

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) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Chief Executive Officer (CEO)	<p>The CEO is a member of the Corporation’s Board of Directors. The CEO, subject to the direction of the Board of Directors, is responsible for the general supervision and control over the business affairs of the Corporation including managing the Corporation’s ESG priorities, policies, procedures and practices, including climate change issues. In 2019, the Corporation established a cross-functional management committee focused on ESG issues. The ESG committee reports to the CEO and is tasked with supporting the Corporation’s ongoing commitment to ESG, corporate social responsibility and sustainability matters. Also in 2019, the Corporation adopted CEO objectives which are fully transparent to both employees and shareholders. The purpose of the CEO objectives is to set and ensure alignment on the strategic objectives across the organization. The individual performance weighting contributes 20% of the CEO’s short-term incentive compensation. The 2019 CEO objectives, which reflect the Corporation’s commitment to continue to advance its climate strategy, included the acceleration and improvement of the Corporations health, safety and environmental performance. Also reflecting the Corporation’s commitment to continue to advance its climate strategy, the 2020 CEO objectives focus on technological development innovation, include: significantly improve ESG performance and ratings, advance multiple technology solutions to achieve net-zero and set 2030 and 2050 carbon goals.</p>
Other, please specify Board of Directors	<p>The Board of Directors is responsible for the overall stewardship of the Corporation and for overseeing the conduct of the Corporation and activities of management who are responsible for the day-to-day conduct of the business. Under the Board of Directors mandate, the Board is responsible to oversee environmental, social and governance (ESG)s issues which impact the Corporation, including (a) overseeing and monitoring management systems and processes relating to the identification, assessment and management of ESG risks and opportunities, including climate-relate issues, greenhouse gas emissions, air and water impacts, and land and wildlife management, (b) developing the Corporations approach to corporate governance issues, principles, practices and disclosure; (c) approving and monitoring a code of business conduct and ethics for directors, officers, employees and contractors; (d) overseeing and monitoring of metrics and targets used by the Corporation to assess and managed ESG risk and opportunities; and (e) reviewing the Corporation’s ESG reports and other reporting on ESG matters. The Board discharges its responsibilities for ESG matters directly and through its committees. The Board has four standing committees: Audit committee, Compensation Committee, Governance and Nominating Committee (GNC) and Health, Safety and Environment Committee (HSER Committee). For example, the Compensation Committee assists the Board to ensure that ESG matters are reflected in the Corporations compensation policies and guidelines as well as te Corporations corporate goals and objectives related to compensation. In addition, the HSER Committee assists the board in fulfilling its stewardship with respect to ensuring compliance and applicable laws pertaining to environment including climate change and GHG, and reviewing and supervising MEG’s policies and procedures designed to mitigate climate risks and liabilities. In 2019 the Board</p>

	<p>approved the 2020 Corporate Performance Scorecard and CEO Objectives which include the advancement of technology solutions to achieve net-zero emissions and setting 2030 and 2050 carbon goals. Also in 2019, the Boards commitment to continued and improved climate disclosure resulted in the publication of MEG’s first sustainability report.</p>
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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
<p>Scheduled – all meetings</p>	<p>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 Overseeing major capital expenditures, acquisitions and divestitures Monitoring and overseeing progress against goals and</p>	<p>The Board of Directors is responsible for the overall stewardship of the Corporation and for overseeing the conduct of the Corporation and activities of management who are responsible for the day-to-day conduct of the business. Under the Board of Directors mandate, the Board is responsible to oversee environmental, social and governance (ESG)s issues which impact the Corporation, including (a) overseeing and monitoring management systems and processes relating to the identification, assessment and management of ESG risks and opportunities, including climate-relate issues, greenhouse gas emissions, air and water impacts, and land and wildlife management, (b) developing the Corporations approach to corporate governance issues, principles, practices and disclosure; (c) approving and monitoring a code of business conduct and ethics for directors, officers, employees and contractors; (d) overseeing and monitoring of metrics and targets used by the Corporation to assess and managed ESG risk and opportunities; and (e) reviewing the Corporation’s ESG reporting on ESG matters. The Board discharges its responsibilities for ESG matters directly and through its committees. The Board has four standing committees: Audit committee, Compensation Committee, Governance and Nominating Committee (GNC) and Health, Safety and Environment and Reserves Committee (HSER Committee). For example, the Compensation Committee assists the Board to ensure that ESG matters are reflected in the Corporations compensation policies and guidelines as well as te Corporations corporate</p>



	<p>targets for addressing climate-related issues</p>	<p>goals and objectives related to compensation. In addition, the HSER Committee assists the board in fulfilling its stewardship with respect to ensuring compliance and applicable laws pertaining to environment including climate change and GHG, and reviewing and supervising MEG’s policies and procedures designed to mitigate climate risks and liabilities. In 2019 the Board approved the 2020 Corporate Performance Scorecard and CEO Objectives which include the advancement of technology solutions to achieve net-zero emissions and setting 2030 and 2050 carbon goals. Also in 2019, the Boards commitment to continued and improved climate disclosure resulted in the publication of MEG’s first sustainability report. Other examples of actions taken include review and approval of continued strategic investments in MEG’s proprietary eMSAGP and eMVAPEX technologies. Reports on MEG’s GHG emissions performance are provided to the Board and HSER Committee on a quarterly basis by the COO and/or Director Environment & Regulatory. In 2019, the Corporation established a cross-functional management committee focused on ESG issues. The ESG committee reports to the CEO and is tasked with supporting the M ongoing commitment to ESG. The Committee provides guidance and oversight with respect to ESG strategy, priorities and corporate disclosures and is responsible for embedding ESG into the Corporations practices and behaviors.</p>
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C1.2

(C1.2) Provide the highest management-level 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
<p>Other, please specify Health, Safety and Environment and Reserves Committee (HSER Committee)</p>	<p>Both assessing and managing climate-related risks and opportunities</p>	<p>Quarterly</p>



Safety, Health, Environment and Quality committee	Both assessing and managing climate-related risks and opportunities	More frequently than quarterly
Sustainability committee	Both assessing and managing climate-related risks and opportunities	More frequently than 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 (do not include the names of individuals).

The Corporate Environment, Health and Safety (EH&S) Committee (EH&S Committee) is a committee of the Executive Management Committee. The EH&S Committee is responsible for providing guidance and oversight with respect to EH&S programs and consists of senior-most representatives from the following business areas: Health and Safety, Environment and Regulatory, Operations, Projects, Drilling, Site Services, Legal and Human Resources, Marketing, IT, Supply Chain, Finance and Corporate Services. Duties of the senior-most representatives include: ensuring operations follow company health, safety and environmental protection policies; assessing environmental conditions to ensure compliance with local and federal regulatory agencies and organization safety standards; ensuring compliance with various jurisdiction environmental agencies and for the protection of personnel, facilities and equipment

Its primary function is to assist MEG in carrying out its responsibilities by reviewing, reporting and making recommendations on MEG’s policies, management systems and programs with respect to environment, health and safety and exercising due diligence in ensuring such policies, systems and programs are implemented and functioning properly. The committee meets at least monthly where it reviews, reports and makes recommendations on policies, management systems and programs with respect to EH&S. On a monthly basis, the Committee monitors the company GHG emissions performance with respect to regulatory requirements and peer performance. The committee also reviews fuel efficiency, equipment and electricity trends, methane management and flaring activities to further assist in trending GHG performance. The Committee also addresses regulatory changes, risks and opportunities with respect to climate change. A monthly report capturing regulatory changes, risks and opportunities is provided to the committee.

In 2018, the Board of Directors established a Health, Safety and Environment and Reserves Committee of the Board (HSER Committee). The mandate of the committee is to assist the Board in fulfilling its stewardship with respect to ensuring compliance with applicable laws pertaining to the environment including climate change and GHG emissions. The HSER Committee is responsible for: monitoring management systems and internal controls, reviewing risk management efforts, developing and implementing policies and procedures to ensure compliance with legislation and appraising achieved results. The HSER Committee also reviews makes recommendations to the Board regarding corporate strategies to mitigate



environmental risks including climate-related risk. Examples of actions taken include review and approval of continued strategic investments in MEG’s proprietary eMSAGP and eMVAPEX technologies. Reports on MEG’s greenhouse gas emissions, performance against targets, compliance status and policy developments are provided to the Board and HSER Committee on a quarterly basis by the Chief Operating Officer and or the Director Environment & Regulatory.

In 2019, the Corporation established a cross-functional management committee focused on ESG issues. The ESG committee reports to the CEO and is tasked with supporting the Corporation’s ongoing commitment to ESG, corporate social responsibility and sustainability matters. The specific duties of the ESG Committee include (a) assist the CEO in setting MEG’s general strategy with respect to ESG matters, (b) to consider and recommend policies, practices and disclosures that reflect the strategy; (c)to oversee MEG’s reporting and disclosure with respect to ESG matters, including preparing MEG’s ESG and/or sustainability report; (d) assist the CEO in overseeing internal and external communications regarding MEG’s position to approach to ESG matters; (e) monitor and keep the CEO apprised of current and emerging ESG matters that may affect the business, operations, performance or public image of MEG or are otherwise pertinent to MEG and its stakeholders, and to make recommendations with respect to MEG’s polices, practices and disclosure regarding such matters; (f) assist the CEO in the identification, assessment and management of ESG-related risk and opportunities, including climate-related risk and opportunities. The role of the Committee is to provide guidance and oversight with respect to ESG strategy, priorities and corporate disclosures and is responsible for embedding ESG into the Corporations practices and behaviors. In 2019 and 2020, the work of the ESG committee included evaluating short-term, medium term-term and long-term climate related targets and potential technological developments. The Board approved the 2020 Corporate Performance Scorecard and CEO objectives which include the advancement of technological solution to achieve net-zero emissions and set 2030 and 2050 carbon goals.

C1.3

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

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).

Entitled to incentive	Type of incentive	Activity incentivized	Comment
Chief Executive Officer (CEO)	Monetary reward	Emissions reduction project Emissions reduction target Company performance against a climate-related sustainability index	In 2019, the Corporation also adopted CEO objectives which are fully transparent to both employees and shareholders. The purpose of the CEO objectives is to set and ensure alignment on the strategic objectives across the organization. The individual performance weighting contributes 20% of the CEO's short-term incentive compensation. The 2019 CEO's objectives, which reflect the Corporation's commitment to continue to advance its climate strategy, included the acceleration and improvement of the Corporation's health, safety and environment performance. Also reflecting the Corporation's commitment to continue to advance its climate strategy, the 2020 CEO objectives, with a focus on technological development and innovation include: significantly improve ESG performance scores and ratings, advance multiple technology solutions to achieve net-zero emissions and set 2030 and 2050 carbon goals.
Corporate executive team	Monetary reward	Emissions reduction project Emissions reduction target Company performance against a climate-related sustainability index	A portion of employee annual incentives are linked to environmental performance indicators including the management of climate-related issues. A Net GHG intensity target was assigned for 2019 with a weight of 2%. MEG achieved the GHG intensity target threshold for 2019. MEG made changes in late 2019 to its 2020 bonus scorecard to further align with Shareholder interests and MEG's strategic objectives and increased the weighting of the Health, Safety and Environment category from 15% to 25% in order to reflect the importance of the category. For 2020, the GHG target was reviewed and adjusted to a GHG Compliance Intensity and weight was increased from 2% to 4%. In addition, strategic targets were added to the corporate performance scorecard including: significant improvement in ESG ratings (climate-related sustainability index), establish/communicate 2030/2050 goals and near-term targets, advance technology solutions to achieve net-zero emissions and fund carbon capture initiative. This strategic performance indicator has a weight of 5%.
All employees	Monetary reward	Emissions reduction project Emissions reduction target	A portion of employee annual incentives are linked to environmental performance indicators including the management of climate-related issues. A Net GHG intensity target was assigned for 2019 with a weight of 2%. MEG achieved the GHG intensity target threshold for 2019. MEG made changes in late 2019 to its 2020 bonus scorecard to further align with Shareholder interests and



		Company performance against a climate-related sustainability index	MEG’s strategic objectives and increased the weighting of the Health, Safety and Environment category from 15% to 25% in order to reflect the importance of the category. For 2020, the GHG target was reviewed and adjusted to a GHG Compliance Intensity and weight was increased from 2% to 4%. In addition, strategic targets were added to the corporate performance scorecard including: significant improvement in ESG ratings (climate-related sustainability index), establish/communicate 2030/2050 goals and near-term targets, advance technology solutions to achieve net-zero emissions and fund carbon capture initiative. This strategic performance indicator has a weight of 5%.
All employees	Non-monetary reward	Emissions reduction project Emissions reduction target Company performance against a climate-related sustainability index	AMEG is committed to continuously improving our environmental, health and safety performance. This commitment is reinforced in our corporate Environmental Health and Safety (EHS) policy and employee evaluations. Employees are recognized for exceptional performance through internal articles published on MEG’s corporate intranet site..

C2. Risks and opportunities

C2.1

(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?

Yes

C2.1a

(C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment

Short-term	1	2	The short term horizon in MEG's strategic planning is 1 to 2 years. In the context of climate, this time frame aligns with the review cycle of greenhouse gas regulations.
Medium-term	2	5	The medium term horizon includes MEG's strategic planning time frame.
Long-term	5	30	The long term horizon considers MEG's reserve life the Government of Canada (GOC) commitment to develop a plan to a achieve net-zero emissions by 2050 which is in line with recent research from the IPCC which suggests the commitments made under the Paris Agreement must go beyond 2030 emission reductions to limit the extent of warming global temperatures and limit warming to 1.5°C. This would require human caused emissions to reach net zero around 2050, and MEG's aspirational goal to achieve net zero GHG emissions around this time frame.

C2.1b

(C2.1b) How does your organization define substantive financial or strategic impact on your business?

MEG uses a risk matrix based on likelihood and impact severity to identify and assess potential risks. MEG defines substantive financial and strategic impact as a risk, that if materialized, has the potential to materially negatively impact the value of the corporation. Strategic risks with the ability to impact value by 5% or more are considered material. Climate change and related risks are rated moderate to serious, meaning that the combination of one or more impacts could result in a value impact of up to 15%, unmitigated, although that scale of impact is considered exceptionally unlikely. Investment in mitigation activity is required to reduce risk to less than 5% potential value impact.

C2.2

(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.

Value chain stage(s) covered

Direct operations
Upstream
Downstream

Risk management process

Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment

More than once a year

Time horizon(s) covered

Short-term

Medium-term

Long-term

Description of process

The Board is responsible for (a) understanding the principal risks of the Corporation's business and confirming that systems are in place that effectively monitor and manage those risks with a view to a long-term viability of the Corporation, (b) overseeing the Corporation's enterprise risk management (ERM) program, including its design and structure and assessment of its effectiveness, (c) overseeing the Corporation's principal risks directly or, where the Board determines it to be appropriate, delegating the oversight of certain individual risks to a committee of the Board, and (d) approving management's approach to ERM and its mitigation practices, including the identification, assessment and mitigation of principal risks, and satisfying itself as to the effective oversight of risk management of individual risks by the Board or its committees through period reports from the committee chair or management as appropriate. The Health, Safety and Environment and Reserves Committee (HSER Committee) provides direction and oversight of climate related matters including climate-related risk. The senior leadership team is accountable for the management of climate-related risk and delegating management of specific risks throughout the organization. Continuous improvement is integral to MEG's compliance and Environment, Health & Safety (EHS) management system. As such, climate change risks, opportunities and mitigation strategies are monitored continuously and reported monthly MEG's corporate EH&S Committee and quarterly to the Board of Directors and HSER Committee. Potentially material climate change risks are communicated to shareholders in MEG's Annual Information Form and other continuous disclosure documents publicly available on SEDAR. MEG uses a value-driven Enterprise Risk Management (ERM) philosophy to identify key strategic risks. ERM is integrated into strategic planning, business planning, operating practices, marketing, compliance monitoring, operating performance measurement and facility design. MEG's entire leadership team is engaged in evaluation and ranking of risk areas across the organization. Risks identified in MEG's assessments are tracked in a Corporate Risk Register and evaluated based on impact severity and likelihood of occurrence, based on the current and potential future operating conditions and business or political environment. Impact severity considers: financial impact to enterprise value and free cash flow, operational impact,

environmental, safety, regulatory and reputational impact. Likelihood is ranked from remote to frequent. An overall Risk Rating is obtained by considering both impact severity and probability. Risks with a risk rating of 'low' are monitored by routine procedures and operations. Risks with a risk rating of 'catastrophic' require immediate risk treatment and mitigation plans. MEG uses a risk matrix based on likelihood and impact severity to identify and assess potential risks. MEG defines substantive financial and strategic impact as a risk, that if materialized, has the potential to materially negatively impact the value of the corporation. Strategic risk with the ability to impact value by 5% or more are considered material. Climate change and related risks are rated moderate to serious or having the ability to impact value by up to 15%, unmitigated, although the scale of impact is considered unlikely, investment in mitigation is required to reduce risks to less than 5% potential value impact.

MEG has also established a cross functional management team (EH&S Committee) to examine GHG operational performance and identify risks and areas of opportunity for efficiency improvement. Recommendations inform operational capital investments, operating strategy as well as overall corporate strategy development. Opportunities identified and assessed by this team include production technology enhancements, operational efficiency projects (including Capital projects), carbon capture and storage opportunities as well as value-added downstream technologies. Identified transitional risks including increasing cost of regulatory compliance with respect to GHG emissions; cost of managing emissions; impact on the corporates marketing alternatives due to delays in infrastructure investment; availability and cost of capital and the potential introduction of new physical risks due to changing seasonal weather patterns. The ERM process also identifies how the company currently mitigates risk and how it plans to mitigate risk in the future; including additional resource required. A partial list of current mitigations of the risks above includes: engineering design of the facility to mitigate potential physical risks, investment in technology to reduced GHG, and enhanced environmental disclosures. The potential impacts of this risk include financial impact to enterprise value and free cash flow. The ERM process helped drive the introduction of several technological strategies to enhance bitumen recovery which also improve GHG performance. These include utilization of infill wells, non-condensable gas (NCG) injection to maintain reservoir pressure and the application of solvent injection on selected wells. In 2019 MEG continued to advance these bitumen recovery technologies including eMSAGP and the continued testing its eMVAPEX technology. MEG has also identified opportunities to obtain funding for the eMVAPEX pilot in part through government grants received from Alberta Innovates, Natural Resources Canada, Emissions Reduction Alberta, and Sustainable Development Technology Canada.

C2.2a

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

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	<p>Current GHG emission regulations are identified, assessed and captured in the corporate risk register, included in corporate budgets if applicable as well as corporate strategy decisions. MEG considers international, federal and provincial regulations. Many GHG emission regulations are designed to increase in stringency overtime so as to achieve jurisdictional goals and targets. MEG regularly assesses and monitors emissions performance of its development plans to understand potential current and future financial implications. In 2019, MEG's operational GHG emissions were regulated under the CCIR, an emissions intensity-based regime requiring large emitters to reduce their emissions intensity below a prescribed level, or otherwise achieve this through a true-up obligation whereby-credits can be applied together with or as an alternative to physical abatement, with financial penalties for failure to achieve compliance. Under current regulations, MEG may face significant increase in cost in the future to mitigate this risk, MEG has introduced a number of strategies including enhanced bitumen recovery technologies. In addition, CLRP generates electricity and steam through the use of cogeneration. These strategies allowed MEG to out-perform the CCIR sector benchmark and generate emissions performance credits for 2019. On June 21, 2018 the federal GHG Pollution Pricing Act (GGPPA) came into force which includes: a fuel charge and an output-based pricing system for industrial facilities. On December 6, 2019 the federal government confirmed equivalency with the GOA's TIER under the Emissions Management and Climate Resilience Act. TIER came into force January 1, 2020 replacing the CCIR. It includes facility-specific benchmarks and sector based high-performance benchmarks. The stringency of the benchmark will increase annually beginning in 2021 until the high-performance benchmark is met. MEG will continue to implement its bitumen recovery enhancement strategies and monitor the outcomes and implications for MEG under TIER. The fuel charge under Part 1 of the GGPPA came into force in Alberta on January 1, 2020 after the Government of Alberta adopted the Carbon Tax Repeal Act in 2019. MEG's exposure to Part 1 of the GGPPA is minimal as all facility operating emissions are regulated under the TIER Regulation. Further, the TIER Regulation received federal equivalency with Part 2 of the GGPPA in December 2019 eliminating the risk of duplicative regulation and/or pricing.</p>
Emerging regulation	Relevant, always included	<p>Changes to the political landscape and regulatory regimes can lead to emerging regulations. There will likely be some financial impact of emerging GHG regulation on most oil sands industry participant, however the extent of the impact is not always known. In 2019, MEG experienced uncertainty regarding the ultimate GHG emission regulatory regime that will be applicable to MEG in 2020. Effective January 1, 2020, both provincial and federal methane regulations came into force in Alberta. These two regulations have a significant amount of duplication in the targeted source types and management</p>

		<p>approaches. In 2019, equivalency between the two regulations had not been reached and both remained in effect. In response, MEG had taken measures to ensure compliance with both sets of regulations in 2020 including enhancements to the fugitive emissions leak detection and repair and equipment retrofits. On June 6, 2020 the Government of Canada published the Order Declaring that the Provisions of the Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds (Upstream Oil and Gas Sector) Do Not Apply in Alberta in the Canada Gazette. This preliminary agreement on methane reduction regulations would permit the federal methane regulations to stand down in Alberta; however, a finalized agreement has not yet been reached at time of this submission. In the absence of a future agreement, it is anticipated that the cost of meeting the federal methane requirements will be higher than the costs of meeting Alberta's requirements alone. To mitigate this risk, a multidisciplinary team regularly monitors climate policy developments and emerging regulations for potential operational and financial impacts. Findings are communicated monthly to the corporate EH&S Committee and at least quarterly to the Board and applicable Board Committees to be factored into corporate strategy and planning. MEG actively consults with the federal and provincial governments/regulators on policy and regulatory issues and provides input into new and existing legislation in order to properly reflect a balanced approach to sustainable development. MEG consulted on the new AER methane requirements and TIER regulation.</p>
Technology	Relevant, always included	<p>MEG considers transitional risks associated with a global transition to a less carbon-intensive economy. MEG competes with the global petroleum producers as well as with other industries (alternative energy suppliers) in supplying energy, fuel and related products to consumers. Technological advancements and innovations can impact the demand for MEG's products (including bitumen and electricity) by potentially improving the price and availability of alternative energy supplies and improving the carbon performance of petroleum competitors. MEG continuously monitors the supply and demand parameters of its products as well as opportunities for technological advancement and innovation. Due to its low-decline, low cost structure and high-quality asset, MEG is well positioned and continuously working towards being the last ethically, environmentally, and economically produced barrel of oil and intends to be a leader in the carbon energy future. The transition to a less carbon-intensive economy is creating technological development opportunities to improve emissions intensities. MEG has introduced a number of technological strategies to enhance bitumen recovery including utilization of infill wells, non-condensable gas (NCG) injection to maintain reservoir pressure and the application of solvent injection on selected wells. In 2019 MEG continued to advance its bitumen recovery technologies including eMSAGP and the continued testing its eMVAPEX technology. eMVAPEX, if proven successful through expanded pilot operations, will further enhance MEG's growth potential by reducing capital requirements, while minimizing environmental impacts to land, air and water including a decrease in GHG emission intensity. The eMVAPEX pilot is funded in part through government grants received</p>



		<p>from Alberta Innovates, Natural Resources Canada, Emissions Reduction Alberta, and Sustainable Development Technology Canada. MEG is committed to continue the advancement of its climate strategy, focusing on technological development and innovation. This is demonstrated in the 2020 CEO objectives which include the advancement of multiple technology solutions and in the corporate performance scorecard which includes a strategic goal for a carbon capture initiative and 2030 and 2050 carbon goals.</p>
Legal	Relevant, always included	<p>MEG’s corporate risk assessment process has identified the potential for climate-related legal risks. This includes the failure to comply with GHG legislation and regulations which may result in the imposition of significant fines and penalties. For example, under the Climate Change and Emissions Act, a person who is guilty of an offence is liable to a fine of up to \$1,000,000 in the case of a corporation. MEG mitigates this risk by tracking its performance in regard to current regulation and regularly monitors climate policy developments and emerging regulations. Performance and potential operational and financial impacts from climate policy developments and emerging regulations are communicated monthly to the Corporate EHS Committee and quarterly to the Board of Directors. MEG has also identified climate-related legal risks including the risk of climate-related litigation, in particular against MEG’s directors and officers, for example potential litigation with respect to misleading and incomplete disclosure with respect to climate change. Such claims may be material or may be indeterminate, may affect the financial condition or results of operations, or may cause MEG to incur significant expenses or devote significant resources in defense of any litigation. MEG protects its officers and directors against such litigation with insurance, which also covers securities claims against the organization.</p>
Market	Relevant, always included	<p>The availability of pipeline capacity and other transportation and storage facilities for MEG’s bitumen could affect MEG’s operating results. MEG’s corporate risk register identifies that reputational climate-related risks can impact this availability. In terms of reputational risk, the development of the Alberta oil sands has received considerable attention on environmental and social impacts including climate change and GHG emissions. The influence of anti-fossil fuels activists (with a focus on oil sands) has negatively affected the expansion of Western Canadian pipeline capacity increasing competition for market access. In addition, future legislation or policies that limit the purchase of bitumen produced from the oil sands may be adopted by jurisdictions further limiting markets for MEG’s products. In terms of physical risk, potential increases in extreme weather events may impede operation of pipelines, storage infrastructure as well as refineries. Marketing risks are mitigated by utilizing a network of pipelines, rail and storage facilities to optimize market access for the transport and sale of bitumen to current and emerging crude oil market throughout North America and internationally. The transportation network includes transportation capacity on the Flanagan South and Seaway pipeline systems providing pipeline transportation directly to U.S. Gulf Coast refineries and export terminals, the Trans Mountain Expansion Project providing access to Canada’s West</p>

		Coast, rail transloading capacity and storage capacity in Alberta and strategic locations in the U.S. with marine export capacity with certain U.S. Gulf Coast terminals. This combination of pipeline access, rail and storage capacity and marine export capacity advances MEG’s strategy of having long-term, broadening and reliable market access to world oil prices.
Reputation	Relevant, always included	Reputational impacts which include the potential loss of stakeholder or shareholder trust are included in MEG’s risk assessment. Development of the Alberta oil sands has received considerable attention on the subjects of environmental and social impacts including climate change and GHG emissions. The influence of anti-fossil fuels activists (with a focus on oil sands) targeting equity and debt investors, lenders and insurers and changes in consumer behavior may result in policies which reduce support for or investment in the Alberta oil sands sector. In addition, evolving decarbonization policies of institutional investors, lenders and insurers could affect the Corporation’s ability to access capital pools. Certain insurance companies have taken actions or announced policies to limit available coverage for companies which derive some or all of their revenue from the oil sands sector. As a result of these policies, premiums and deductibles for some or all of the Corporation’s insurance policies could increase substantially. In some instances, coverage may become unavailable or available only for reduced amounts of coverage. As a result, the Corporation may not be able to extend or renew existing policies, or procure other desirable insurance coverage, either on commercially reasonable terms, or at all. Negative consequences which could arise as a result of changes to the current regulatory environment include, but are not limited to, changes in environmental and emissions regulation of current and future projects by governmental authorities, which could result in changes to facility design and operating requirements, potentially increasing the cost of construction, operation and abandonment. In addition, legislation or policies that limit the purchase of crude oil or bitumen produced from the oil sands may be adopted in domestic and/or foreign jurisdictions, which, in turn, may limit the world market for this crude oil, reduce its price and may result in stranded assets or an inability to further develop oil resources. MEG is committed to further integrate ESG practices throughout the business including advancing its climate change strategy, continue to monitor and manage risks and drive more impactful disclosure to continue working towards being the last ethically, environmentally, and economically produced barrel of oil.
Acute physical	Relevant, always included	Climate change may introduce new risks to its business such acute physical risks including fires, lightning, earthquakes, extreme cold weather or extreme weather events such as storms. These may cause damage to MEG’s infrastructure, impact accessibility to MEG’s properties and cause interruptions to production. These are identified in the ERM process and cannot be controlled; therefore these risks are mitigated through engineering design and operational procedures. For example, MEG implements a Fire Smart program to protect infrastructure from wildfire hazards and conditions equipment against other extreme weather events. MEG assesses hazards such as trees that could potentially strike infrastructure such



		<p>as power lines as a result of weather conditions and has a trouble tree program in place. MEG's facilities are located in a geographical area that is not prone to significant weather events such as hurricanes or flooding. The area does experience extreme weather temperatures and MEG's facilities are designed to handle these extreme temperatures and standards are in place to ensure worker health and safety and reliability, therefore the potential impact of these risks is considered to be low. MEG has updated the previous climate change assessment completed in 2008 with more recent data and modelling information from the latest Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report (AR5). The assessment update provided more recent climate trend comparisons locally and projections of changes in temperature, precipitation and other extreme events that could be expected out to 2050 and 2080. The intent of the revision was to support design reviews and develop mitigations (if necessary) to minimize the impacts of potential changes in environmental extremes.</p>
<p>Chronic physical</p>	<p>Relevant, always included</p>	<p>Climate change may introduce new risks to its business such chronic physical risks including changes to seasonal weather patterns including changes in temperature extremes and precipitation patterns. These may cause damage to MEG's infrastructure, impact accessibility to MEG's properties and cause interruptions to production. These are identified in the ERM process and cannot be controlled; therefore these risks are mitigated through engineering design and operational procedures. The design of MEG's facilities ensure that storm water run-off facilities have sufficient capacity to manage potential increase in flows and storm events and were designed to handle 1 in 100 year 24 hour rainfall events. MEG also has an extensive environmental monitoring program in place for water and wetlands that will identify trends and support appropriate adaption of operating practices and facilities which includes wetland and culvert monitoring to ensure unobstructed flow of surface water across site infrastructure and prevents flooding. MEG's facilities are located in a geographical area that is not prone to significant weather events such as hurricanes or flooding. The area does experience extreme weather temperatures and MEG's facilities are designed to handle these extreme temperatures and standards are in place to ensure worker health and safety and reliability. Therefore the potential impact of these risks is considered to be low. MEG has updated the previous climate change assessment completed in 2008 with more recent data and modelling information from the latest Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report (AR5). The assessment update provided more recent climate trend comparisons locally and projections of changes in temperature, precipitation and other extreme events that could be expected out to 2050 and 2080. The intent of the revision was to support design reviews and develop mitigations (if necessary) to minimize the impacts of potential changes in environmental extremes.</p>

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 & Primary climate-related risk driver

Current regulation

Carbon pricing mechanisms

Primary potential financial impact

Increased direct costs

Company-specific description

Effective January 1, 2020, both provincial and federal methane regulations came into force in Alberta. The provincially legislated “Methane Emission Reduction Regulation” seeks to deliver a 45% reduction from the upstream oil and gas sector by 2025 relative to 2014 levels while the federally legislated “Regulations Respecting Reduction in the Release of Methane and Certain VOC’s (Upstream Oil and Gas Sector)” seeks to achieve a 40 to 45% reduction by 2025 relative to 2012 levels. These two regulations have a significant amount of duplication in the targeted source types and management approaches. The new regulations require enhancements to the scope and frequency of fugitive emissions leak

detection and repair, and equipment retrofits. Compliance under both regulations occurs in the form of monitoring, source-level management and/or redesign to achieve prescribed emission limits, and administrative measures such as reporting. On June 6, 2020 the Government of Canada published the Order Declaring that the Provisions of the Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds (Upstream Oil and Gas Sector) Do Not Apply in Alberta in the Canada Gazette. This preliminary agreement on methane reduction regulations would permit the federal methane regulations to stand down in Alberta; however, a finalized agreement has not yet been reached at time of this submission. In the absence of a future agreement, it is anticipated that the cost of meeting the federal methane requirements will be higher than the costs of meeting Alberta's requirements alone.

Time horizon

Short-term

Likelihood

Virtually certain

Magnitude of impact

Low

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

150,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Costs associated with enhancements to the scope and frequency of fugitive emissions leak detection and repair, and equipment retrofits for both provincial and federal methane regulations.

Cost of response to risk

150,000

Description of response and explanation of cost calculation

Although MEG's operations are not considered a large contributor of methane emissions relative to conventional exploration and production, primarily due to gas conservation and proactive fugitives management, MEG has taken measures to ensure compliance with both sets of regulations in 2020 which will include enhancements to the scope and frequency of fugitive emissions leak detection and repair, and equipment retrofits. Compliance under both regulations occurs in the form of monitoring, source-level management and/or redesign to achieve prescribed emission limits, and administrative measures such as reporting. The cost of management is the cost associated with the aforementioned actions.

Comment

Identifier

Risk 2

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Current regulation

Carbon pricing mechanisms

Primary potential financial impact

Increased direct costs

Company-specific description

Current and emerging GHG emission regulations are identified, assessed and captured in the corporate risk register, included in corporate budgets if applicable as well as corporate strategy decisions. MEG considers international, federal and provincial level regulations. Many GHG



emission regulations are designed to increase in stringency overtime so as to achieve established jurisdictional goals and targets. MEG regularly assesses and monitors emissions performance of its development plans in order to understand the potential current and future financial implications. In 2019 MEG’s operational GHG emissions were regulated under the Carbon Competitiveness Incentive Regulation (CCIR) which is an emissions intensity-based regime requiring large emitters to reduce their emissions intensity below a prescribed level, or otherwise achieve this through a true-up obligation whereby-credits can be applied against such required level, together with or as an alternative to physical abatement, with financial penalties for failure to achieve compliance. On December 6, 2019 the federal government confirmed equivalency with the GOA’s Technology Innovation and Emissions and Reduction Regulation (“TIER Regulation”) under the Emissions Management and Climate Resilience Act. TIER came into force January 1, 2020 replacing the CCIR. It includes facility-specific benchmarks and sector based high-performance benchmarks. The stringency of the benchmark will increase annually beginning in 2021 until the high-performance benchmark is met. MEG is developing plans to meet stringent benchmarks, but actually operating conditions may result in substantial increases in total cost to comply with the regulations, including via financial penalties. Further, the ever evolving regulatory environment results in uncertainty with respect to on-going regulatory costs for the business. Failure to comply with GHG legislation and regulations may result in the imposition of significant fines and penalties.

Time horizon

Short-term

Likelihood

Virtually certain

Magnitude of impact

Low

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

1,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Failure to comply with GHG Acts and regulations may result in the imposition of fines and penalties. As per the Climate Change and Emissions Management Act, a person who is guilty of an offence liable to a fine of not more than \$1,000,000 in the case of a corporation.

Cost of response to risk

50,000

Description of response and explanation of cost calculation

To manage the increase in reporting requirements, MEG has developed and maintains a GHG Methodology Document to document the calculation methodology, data sources and reporting process. This ensures that reporting requirements are met efficiently, consistently and high quality data. Furthermore, MEG undergoes an annual third party verification process which reviews the data controls and calculations methodologies. Costs associated with supporting administrative compliance of reporting within the CCIR.

Comment

Identifier

Risk 3

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Acute physical

Increased severity and frequency of extreme weather events such as cyclones and floods

Primary potential financial impact

Decreased revenues due to reduced production capacity

Company-specific description

Physical risks from climate change can include event driven (acute) natural events. Principal factors which could affect MEG's operating results could include severe weather patterns or catastrophic events such as major wild fires, extreme cold weather, storms, or flooding with potential to damage MEG facility, or infrastructure or impact accessibility to MEG's properties resulting in material interruptions to production.

Time horizon

Long-term

Likelihood

Exceptionally unlikely

Magnitude of impact

Low

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

100,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Estimated costs of business interruptions and damage to facility associated with acute events based risk , unmitigated by insurance coverage.

Assumes a material plant outage (> 1 month) to deal with damage caused by natural event

Cost of response to risk

3,500,000

Description of response and explanation of cost calculation

Impacts of extreme weather events or catastrophic events such as wildfires are identified in the ERM process and mitigated through engineering design, appropriate maintenance and operational procedures. MEG also purchases property and business interruption insurance which would protect MEG against a severe weather event that causes damage to the facility resulting in prolonged shut down. It also protects against shut downs in critical infrastructure (e.g. damage to Access pipeline as a result of severe weather). Cost of management is a portion of total insurance costs. As climate change data is understood, additional investment in the plant to protect against severe weather may be required.

MEG has updated the previous climate change assessment completed in 2008 with more recent data and modelling information from the latest Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report (AR5). The assessment update provided more recent climate trend comparisons locally and projections of changes in temperature, precipitation and other extreme events that could be expected out to 2050 and 2080. The intent of the revision was to support design reviews and develop mitigations (if necessary) to minimize the impacts of potential changes in environmental extremes.

Comment

Identifier

Risk 4

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Chronic physical

Changes in precipitation patterns and extreme variability in weather patterns

Primary potential financial impact

Increased capital expenditures

Company-specific description

MEG operates within the boreal forest of Alberta, a geographical area that is not prone to many significant weather events such as hurricanes. Weather impacts MEG's operations year round - with period of wet conditions, ice and dry conditions with risk of fire. MEG's facilities are designed to handle these extreme weather temperatures and standards are in place to ensure worker health and safety and reliability. The impact of variable weather is significant on-going maintenance; if weather patterns were to become increasingly variable, additional maintenance would likely be required.

Time horizon

Long-term

Likelihood

About as likely as not

Magnitude of impact

Low

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

5,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Estimated annual cost associated with increased maintenance requirements as a result of changes in precipitation or other weather patterns.

Cost of response to risk

2,000,000

Description of response and explanation of cost calculation

Impacts of seasonal weather patterns are identified in the ERM process and mitigated through engineering design, appropriate maintenance and operating procedures. Enhanced measures were scoped to further protect the facility from damage and production losses associated with lightning strikes currently and into the future, referred to as the Lightning Resistance Design Initiative. These are expected to be implemented in 2020. The defenses include isolation of the facility from consolidated overhead lines, software improvements to increase dependability of equipment historically sensitive to power disruptions and closer interval placement of lightning arrestors. In addition to measures taken at the facility the regional electrical interconnect has experienced excellent reliability and is designed with its own set of lightning protections. Specific to CLRP, there are two separate substations feeding the facility which provide a redundant service pathway. The cost of management is the total estimated cost of the Lightning Resistance Design Initiative. In order to better understand and manage future potential physical risks, MEG has updated the previous climate change assessment completed in 2008 with more recent data and modelling information from the latest Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report (AR5). The assessment update provided more recent climate trend comparisons locally and projections of changes in temperature, precipitation and other extreme events that could be expected out to 2050 and 2080. The intent of the revision was to support design reviews and develop mitigations (if necessary) to minimize the impacts of potential changes in environmental extremes.

Comment

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?

Direct operations

Opportunity type

Resource efficiency

Primary climate-related opportunity driver

Use of more efficient production and distribution processes

Primary potential financial impact

Reduced direct costs

Company-specific description

In 2019, MEG operations were subject to the Climate Change and Emissions Management Act (CCEMA) and the accompanying Carbon Competitiveness Incentive Regulation (CCIR) . The CCIR replaced the Specified Gas Emitters Regulation (SGER) starting in 2018 which applied a facility-specific emission intensity limit. The CCIR remains an emissions intensity-based regime requiring large emitters to reduce their emissions intensity below a prescribed level, or otherwise achieve this through a true-up obligation whereby credits can be applied against such required level, together with or as an alternative to physical abatement, with penalties for failure to achieve compliance. However, the CCIR has fundamental differences with the SGER as the facility specific baselines in the SGER have been replaced in the CCIR with product specific benchmarks set using top quartile performance from peers. In 2019 MEG was able to generate emission performance credits by integrating operational efficiencies, such as eMSAGP, eMVAPEX and cogeneration to out-perform the sector benchmark.

The United Conservative Party (UCP) was elected to the GOA on April 16th, 2019 and have since replaced both the CCEMA and the CCIR with the Emissions Management and Climate Resilience Act and the Technology Innovation and Emissions Reduction Regulation (TIER), respectively. The TIER Regulation is effective in Alberta starting January 1st 2020 and prescribes facility-specific benchmarks based on historical facility performance. In 2020, a 10% emission intensity reduction requirement will apply and will continue to increase in stringency by 1% per year. The compliance options will remain unchanged from those established under the CCIR therefore an opportunity continues to exist for MEG to earn emissions performance credits by continuing to seek innovative operational efficiencies, reduce fuel usage and ultimately reduce operational costs.

Time horizon

Short-term

Likelihood

Likely

Magnitude of impact

Low

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

807,900

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

In 2018, CLRP was able to generate a surplus of emission performance credits partially through efficiency gains realized from the expansion of eMSAGP and eMVAPEX from respective baseline performance. The potential financial impact is calculated as the value of the emission performance credits realized in 2018.

Cost to realize opportunity

13,000,000

Strategy to realize opportunity and explanation of cost calculation

In 2019, CLRP was able to generate a surplus of emission performance credits partially through efficiency gains realized from the expansion of eMSAGP and eMVAPEX as well as cogeneration from respective baseline performance. The potential financial impact is calculated as the value of the emission performance credits realized in 2019. MEG places significant focus on optimizing steam generation to reduce greenhouse gas emissions and reduce fuel use. An important metric for this purpose is Steam-Oil Ratio (SOR), the quantity of steam used to produce a barrel of oil. SOR is a key measure of efficiency for SAGD projects, with a lower SOR indicating that steam is more efficiently utilized. By decreasing the amount of steam used, MEG is able to reduce our per barrel water and fuel requirements which results in lower GHG intensity and more economic projects. With the SAGD industry average SOR is about 3 to 3.5, eMSAGP and eMVAPEX have enabled MEG to reduce its company-wide SOR to 2.22 for 2019. Technology continues to drive efficiency gains, resulting in cost and environmental performance improvements. The 2019 annual capital program allocated \$13 million to eMVAPEX growth capital.

Comment

Identifier

Opp2

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Products and services

Primary climate-related opportunity driver

Development of new products or services through R&D and innovation

Primary potential financial impact

Increased revenues resulting from increased production capacity

Company-specific description

The transition to a less carbon-intensive economy is creating technological development opportunities to improve emissions intensities which includes access to capital and government funding. MEG has introduced a number of technological strategies to enhance bitumen recovery including utilization of infill wells, non-condensable gas (NCG) injection to maintain reservoir pressure and the application of solvent injection on selected wells. In 2019 MEG continued to advance its bitumen recovery technologies including eMSAGP and the continued testing its eMVAPEX technology. This proprietary technology, if proven successful through expanded pilot operations, will further enhance MEG's growth potential by reducing capital requirements, while minimizing environmental impacts to land, air and water including a decrease in GHG emission intensity. MEG has obtained funding in part through government grants received from Alberta Innovates, Natural Resources Canada, Emissions Reduction Alberta, and Sustainable Development Technology Canada.

Time horizon

Medium-term

Likelihood

About as likely as not

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

No, we do not have this figure

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Technology development is still underway and commercial scale implications are considered financially sensitive due to the proprietary nature of the technology.

Cost to realize opportunity

13,000,000

Strategy to realize opportunity and explanation of cost calculation

MEG manages the potential cost impact associated with changes to GHG legislation by investing in reservoir enhancement technologies. One of these projects is eMVAPEX. In 2019 MEG continued testing its proprietary eMVAPEX technology. A modification of its eMSAGP technology, eMVAPEX has the potential to further decrease MEG's steam-oil ratio (SOR) beyond what eMSAGP can achieve, and further reduce GHG emissions intensities. SOR is a key measure of efficiency for SAGD projects, with a lower SOR indicating that the steam is more efficiently utilized. By decreasing the amount of steam used, MEG is able to reduce per barrel fuel requirements which results in lower GHG emissions intensity. MEG continued the advancement of eMVAPEX in 2019.

MEG has been granted funding from Alberta Innovates, Natural Resources Canada, Emissions Reductions Alberta, and Sustainable Development Technology Canada for continued eMVAPEX work. The potential financial impact is the total amount of funding for the continued advancement of the eMVAPEX pilot. This opportunity supports MEG strategy to produce bitumen efficiently. The application of MEG proprietary technology eMSAGP has enabled MEG to reduce its company-wide SOR to 2.22 for 2019. The 2019 annual capital program allocated \$13 million to eMVAPEX growth capital.

Comment

Identifier

Opp3

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Energy source

Primary climate-related opportunity driver

Use of lower-emission sources of energy

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

In 2015, the Government of Alberta introduced the Climate Leadership Plan to reduce carbon emissions which included a phase out of coal-generated electricity within the province by 2030. The electricity transition within the province outlines the need for approximately two-thirds of the replacement capacity to be comprised of natural gas generation. MEG has significant cogeneration capacity (provided through natural gas) that is positioned to benefit from the transitional power market in Alberta. Incrementally, MEG could continue to expand its cogeneration capacity if it expands production capacity.

Time horizon

Long-term

Likelihood

Likely

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

60,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

The potential financial impact is calculated as the power sales price x power sales in 2018 as reported in the 2018 Annual Report.

Cost to realize opportunity

0

Strategy to realize opportunity and explanation of cost calculation

Cogeneration is the process of recovering waste heat from electricity generation to efficiently produce steam. MEG operates two cogeneration facilities at its CLRP facility. Cogeneration uses natural gas more efficiently than standalone steam generators or single-cycle gas turbine generators. The steam generated from cogeneration is used for SAGD bitumen recovery and electricity to power the plant site, with excess power sold to Alberta's power grid. The electricity provided to the power grid has a lower carbon footprint than the provincial average, helping to reduce total GHG intensity for provincial consumers. The use of cogeneration reduces the net greenhouse gas intensity of MEG's oil and provides a stable source of baseload power as coal-fired generation is phased out in Alberta. Reducing electrical power production below the electricity performance standard enables MEG to earn emissions performance credits that can offset costs. No additional investment in cogeneration were made in 2019.

Comment

C3. Business Strategy

C3.1

(C3.1) Have climate-related risks and opportunities influenced your organization's strategy and/or financial planning?

Yes, and we have developed a low-carbon transition plan

C3.1a

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

No, but we anticipate using qualitative and/or quantitative analysis in the next two years

C3.1c

(C3.1c) Why does your organization not use climate-related scenario analysis to inform its strategy?

MEG recognizes the global shift towards undergoing and embedding climate scenario analysis into organizational strategy. The scope of the undertaking is being considered including the resourcing required to complete a comprehensive and relevant study. Before a scenario analysis is undertaken, MEG will review the available approaches in order to understand which is the most appropriate for the organization and its stakeholders. While the approach to scenario analysis is developed, MEG will continue to monitor and model climate-related impacts within the existing risk framework which includes exposures associated with physical change, market impacts, changes to government or policy, and disruptions to the supply chain. MEG operations are currently limited to NE Alberta where they are subject to a climate policy regime that is relatively advanced and well understood.

C3.1d

(C3.1d) Describe where and how climate-related risks and opportunities have influenced your strategy.



	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	<p>Potential climate related risks and opportunities including the changing climate regulatory landscape and a growing shift to low-carbon energy as well as opportunities for technological innovation and efficiency improvements (as reported in C2.3a Risks and Opportunities) have influenced MEG’s strategy to optimize steam generation to reduce greenhouse gas emissions associated with bitumen production through advancements in reservoir recovery technologies and through design and operation of its facilities. MEG is focused on reducing its steam-oil ration (SOR) which is a key measure of efficiency for in-situ thermal projects, with a lower SOR indicating that steam is more efficiently utilized. By decreasing the amount of steam used, MEG is able to reduce per barrel water and fuel requirements which results in lower greenhouse gas emissions intensity and more economic projects. Long-term strategies to reduce SOR include the introduction of a number of technologies to enhance bitumen recovery including infill wells, non-condensable gas (NCG) injection to maintain reservoir pressure and the application of solvent injection on selected wells. An aspect of this strategy has been the development and implementation of MEG’s patented proprietary eMSAGP technology. eMSAGP has been deployed at Phase 1, Phase 2 and Phase 2B assets and has enabled MEG to reduce companywide SOR to 2.22 for 2019 (in comparison to a 3 to 3.5 industry average). This technology allows MEG to provide a lower GHG emission intensity production to market. The magnitude of this identified opportunity is considered to be significant and the affects are anticipated to be realized in the short term timescale and beyond. In 2019 MEG allocated \$13 million to continue testing of eMVAPEX. MEG is continually monitoring the climate regulatory landscape including carbon pricing signals to evaluate potential future technology development including CCSU.</p>
Supply chain and/or value chain	Yes	<p>The availability of pipeline capacity and other transportation and storage facilities for MEG’s bitumen could affect MEG’s operating results. MEG is aware that physical risks, such as increases in extreme weather events may impede operation of pipelines, storage infrastructure as well as refineries, impacting MEG’s ability to bring product to market. Marketing risks are mitigated by utilizing a network of pipelines, rail and storage facilities to optimize market access for the transport and sale of bitumen to current and emerging crude oil market throughout North America and internationally. The transportation</p>



		<p>network includes transportation capacity on the Flanagan South and Seaway pipeline systems providing pipeline transportation directly to U.S. Gulf Coast refineries and export terminals, the Trans Mountain Expansion Project providing access to Canada’s West Coast, rail transloading capacity and storage capacity in Alberta and strategic locations in the U.S. with marine export capacity with certain U.S. Gulf Coast terminals. This combination of pipeline access, rail and storage capacity and marine export capacity advances MEG’s strategy of having long-term, broadening and reliable market access to world oil prices. The potential impact of climate related risks and opportunities on MEG’s supply chain has also impacted MEG’s strategy. Access to highline power generated through cogeneration has allowed MEG to provide electricity to remote areas surrounding our facility to support our drilling program. In the past, drilling would have been powered with diesel engines. Now, with electricity from cogeneration, we have equivalent power capabilities with an approximate 60% reduction in emissions related to drilling activities. This strategic decision reduces exposure to potential carbon pricing for fuels such as diesel.</p>
<p>Investment in R&D</p>	<p>Yes</p>	<p>Potential climate related risks and opportunities including the changing climate regulatory landscape and a growing shift to low-carbon energy as well as opportunities for technological innovation and efficiency improvements (as reported in C2.3a Risks and Opportunities) have influenced MEG’s strategy to invest in R&D and innovation in reservoir recovery technologies. eMSAGP has been deployed at Phase 1, Phase 2 and Phase 2B assets and has enabled MEG to reduce companywide SOR to 2.22 for 2019 (in comparison to a 3 to 3.5 industry average). This technology allows MEG to provide a lower GHG emission intensity production to market. The magnitude of this identified opportunity is considered to be significant and the affects are anticipated to be realized in the short term timescale and beyond. MEG has been granted funding from Alberta Innovates and Natural Resources Canada for continued testing and expansions of eMVAPEX. And in 2019 MEG allocated \$13 million to continue testing of eMVAPEX. The magnitude of this identified opportunity has the potential to be significant with a medium to long term timescale. MEG also continues to evaluate a diluent removal facility and partial upgrading technology. MEG expects to continue investing in technology to advance the economic and environmental sustainability of its business. MEG is continually monitoring the climate regulatory landscape including carbon pricing signals to evaluate potential future technology development including CCSU.</p>



Operations	Yes	<p>As part of the growing shift to low-carbon energy, in 2015 the Government of Alberta introduced the Climate Leadership Plan to reduce carbon emissions which included a phase out of coal-generated electricity within the province by 2030. The electricity transition within the province outlines the need for approximately two-thirds of the replacement capacity to be comprised of natural gas generation. This climate opportunity influenced MEG to use industrial cogeneration technology in our operations, one key element in our energy management strategy. The natural gas turbines generate electricity that is used in our operations, with surplus power sold into the Alberta electricity grid. The heat from the turbine is recovered by a heat recovery steam generator for use in the thermal heavy oil recovery process, resulting in more efficient use of natural gas and a thermal efficiency of 86%. Revenue from the sale of surplus power helps offset the company's energy costs and the electricity provided to the power grid had a lower GHG footprint in 2019 than the provincial average, helping to reduce total GHG intensity for provincial consumers. The use of cogeneration also reduces the net GHG intensity of our oil, helping MEG exceed emissions regulations and generate carbon credits. MEG has significant cogeneration capacity (provided through natural gas) that can add value and support the changing electricity market structure. The magnitude of impact is anticipated to be moderate with a short –term and beyond timescale. Cogeneration provides a stable source of baseload power as coal-fired generation is phased out in Alberta. On January 1, 2019 the Government of Alberta enacted mandated curtailment of crude oil and bitumen production which limited MEG's production output. These rules were enacted primarily to address record high differentials between West Texas Intermediate (WTI) oil prices and Canadian heavy oil prices and forced MEG to adapt its production strategy to remain within monthly production volume allocations. In doing so careful consideration was given to minimize the potential climate-related costs by maintaining a focus on efficient operations while balancing output to avoid excessive fluctuations in steam to oil ratio impacting emissions intensity.</p>
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C3.1e

(C3.1e) Describe where and how climate-related risks and opportunities have influenced your financial planning.

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues Direct costs Capital expenditures Capital allocation Acquisitions and divestments Access to capital Assets Liabilities	<p>Revenues: The impact of climate risk has contributed to political activism and delays in the development of pipeline infrastructure; this has led to significant volatility in pricing realized in the Alberta market and in 2019, resulted in curtailment in production volumes mandated by the provincial government. MEG's financial planning includes scenario analysis of various pricing scenarios and infrastructure development and includes financial management of the risk associated with price volatility, including active financial risk management contracts. Curtailment resulted in substantial changes to MEG's financial planning including the deferral of certain in progress capital projects, given the inability to grow production (and revenue) in 2019. Curtailment also influenced financial planning for risk management of MEG's revenues.</p> <p>Direct Costs: MEG's financial planning includes a forecast of the direct costs associated with climate change, namely regulatory costs associated with current regulations around GHG compliance and the cost of carbon. Sensitivities are also conducted with respect to a range of potential future regulatory outcomes. MEG's business plan continues to focus on implementation of technology that reduce SOR, energy cost and GHG emissions, including the application of eMSAGP. Planning assumes that such technologies will continue to be applied across future developments, providing economic and climate change benefits. On-going changes in regulatory environment, including introduction of curtailment in 2019, as discussed above, can impact MEG's ability to optimize SOR performance and MEG's forecasts with respect to direct carbon costs. MEG conducts sensitivity analysis with respect to cost of carbon and climate change and the regulatory landscape has created an opportunity for MEG to improve its oil production performance. MEG's reservoir technologies, including eMSAGP, have helped reduce the capital intensities required for future growth by as much as half. The application of eMSAGP to the Phase 2B producing wells costs significantly less than the capital intensity required to complete large scale projects. This technology reduced GHG intensity as well as capital intensity. Future growth capital allocates resources to the further the expansion of eMSAGP. The magnitude of this identified opportunity is considered to be significant and the effects are anticipated to be realized in the short term timescale and beyond.</p> <p>Capital expenditures/Capital allocation: The climate change regulatory landscape has created an opportunity for MEG to improve its oil production performance. MEG's reservoir technologies, including eMSAGP, have helped reduce the capital</p>

		<p>intensities required for future growth by as much as half. The application of eMSAGP to the Phase 2B producing wells costs significantly less than the capital intensity required to complete large scale projects. This technology reduced GHG intensity as well as capital intensity. Future growth capital allocates resources to the further the expansion of eMSAGP. The magnitude of this identified opportunity is considered to be significant and the effects are anticipated to be realized in the short term timescale and beyond.</p> <p>Acquisitions and divestments: From a financial planning perspective, environmental performance, climate change impacts and carbon costs are key elements considered in any evaluation of acquisitions. Given MEG’s continuous strong GHG intensity performance, MEG was able to monetize certain emissions credits in 2019, resulting in proceeds of \$12 million.</p> <p>Access to capital: MEG’s development plan and related analysis undertaken as part of our financial planning process is focused on reducing MEG’s reliance on external capital markets, in part, because climate change activism has reduced access to capital and increased cost of external financing. MEG is focused on reducing debt, outstanding and funding capital within cash flow. MEG’s balance sheet management strategies are conservative, ensuring continuing access to debt capital markets. To combat capital market risks, MEG has increased its public disclosure with respect to its comprehensive efforts to manage all ESG performance including climate change measures. Where possible, the climate change regulatory landscape has created an opportunity for MEG to invest in R&D and innovation in reservoir technologies. MEG has been granted funding from Alberta Innovates, Natural Resources Canada, Emissions Reductions Alberta, and Sustainable Development Technology Canada for continued eMVAPEX work. Future growth capital allocates resources to the expansion of eMVAPEX. These grants help to offset investment. The magnitude of this identified opportunity is considered to be low and the effects are anticipated to be realized in the short term timescale.</p> <p>Assets: Climate regulations are considered in the development timeframe of new assets such as the May River and Surmont projects. In 2019, MEG elected to defer the development of Surmont, given market conditions, reducing total probable reserves. The magnitude is anticipated to be low with a medium-term timescale.</p> <p>Liabilities: MEG uses progressive reclamation plans to minimize the footprint of disturbance and return the land to a state of equivalent capability. Physical risks from climate change including event driven or longer-term shifts in climate patterns. Principal factors which could affect MEG’s reclamation plans could include fires and seasonal weather patterns. Fires can</p>
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		<p>impact revegetation activities and success; higher rainfall events can cause erosion issues and shorter winter seasons can impact accessibility to sites. MEG participates in working groups including the Faster Forests program by Canada's Oil Sands Innovation Alliance, the Industrial Footprint Reduction Options Group and the Regional Industry Caribou Collaboration. MEG encourages innovation and application of industry leading oil sands construction, reclamation and restoration best management practices. The magnitude of this risk is anticipated to be low with a timescale of short to long term may be expected.</p>
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C3.1f

(C3.1f) Provide any additional information on how climate-related risks and opportunities have influenced your strategy and financial planning (optional).

No additional information.

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



Year target was set

2019

Target coverage

Company-wide

Scope(s) (or Scope 3 category)

Scope 1+2 (location-based)

Intensity metric

Other, please specify

metric tons CO2e per m3 of bitumen

Base year

2013

Intensity figure in base year (metric tons CO2e per unit of activity)

0.3871

% of total base year emissions in selected Scope(s) (or Scope 3 category) covered by this intensity figure

100

Target year

2019

Targeted reduction from base year (%)

7.8

Intensity figure in target year (metric tons CO2e per unit of activity) [auto-calculated]

0.3569062

% change anticipated in absolute Scope 1+2 emissions

-7.8

% change anticipated in absolute Scope 3 emissions

0

Intensity figure in reporting year (metric tons CO2e per unit of activity)

0.352

% of target achieved [auto-calculated]

116.2490312581

Target status in reporting year

Achieved

Is this a science-based target?

No, and we do not anticipate setting one in the next 2 years

Please explain (including target coverage)

This target corresponds to that established under the Alberta Carbon Competitiveness Incentive Regulation which uses an industry-based performance target. The Base year is 2013-2015. The target covers all Scope 1 and Scope 2 emissions company-wide.

Target reference number

Int 2

Year target was set

2019

Target coverage

Company-wide

Scope(s) (or Scope 3 category)

Scope 1+2 (market-based)



Intensity metric

Metric tons CO₂e per barrel of oil equivalent (BOE)

Base year

2016

Intensity figure in base year (metric tons CO₂e per unit of activity)

0.053

% of total base year emissions in selected Scope(s) (or Scope 3 category) covered by this intensity figure

100

Target year

2019

Targeted reduction from base year (%)

5.7

Intensity figure in target year (metric tons CO₂e per unit of activity) [auto-calculated]

0.049979

% change anticipated in absolute Scope 1+2 emissions

-5.7

% change anticipated in absolute Scope 3 emissions

0

Intensity figure in reporting year (metric tons CO₂e per unit of activity)

0.052

% of target achieved [auto-calculated]

33.1016219795

Target status in reporting year

Achieved

Is this a science-based target?

No, and we do not anticipate setting one in the next 2 years

Please explain (including target coverage)

This is an internal target set by MEG as an element of the Corporate Performance Scorecard. The target covers all Scope 1 and Scope 2 emissions company-wide.

C4.2

(C4.2) Did you have any other climate-related targets that were active in the reporting year?

Target(s) to reduce methane emissions

C4.2b

(C4.2b) Provide details of any other climate-related targets, including methane reduction targets.

Target reference number

Oth 1

Year target was set

2019

Target coverage

Company-wide

Target type: absolute or intensity

Absolute



Target type: category & Metric (target numerator if reporting an intensity target)

Methane reduction target

Other, please specify

Total methane emissions in E3m3

Target denominator (intensity targets only)

Base year

2018

Figure or percentage in base year

408

Target year

2019

Figure or percentage in target year

76

Figure or percentage in reporting year

76

% of target achieved [auto-calculated]

100

Target status in reporting year

Achieved

Is this target part of an emissions target?

Yes, this target is encompassed within Int1 and Int2

Is this target part of an overarching initiative?

No, it's not part of an overarching initiative

Please explain (including target coverage)

This target was established to support MEG's ongoing efforts to reduce GHG emissions and control the unintentional release of methane to the atmosphere. In 2019, resources were directed specifically towards improving this target through a Fugitives Task Force focused on improving the performance of production and process tank pressure relieving valves. This is an absolute reduction target to demonstrate year over year continuous improvement. The figure is the volume of Fugitive Gas Released in e3m3 from Tanks.

In MEG's operations, methane primarily results from releases of fugitive emissions which account for less than 0.5% of total facility emissions. Fugitive emissions are captured in the intensity target referenced in CC4.1b and 4.2b which includes all associated methane emissions. In addition, the Int1 and Int2 targets reported in C4.1b capture methane emissions from combustion while the target reported in 4.2b is focused specifically on fugitive sources. Due to the small contribution of methane (from fugitives and venting) to MEG's total scope 1 GHG emissions, MEG includes the methane target in the overall intensity target. MEG recognizes that reducing methane emissions is an important aspect of addressing climate change. MEG has implemented a fugitive emissions management plan for managing fugitive emissions from equipment leaks, a primary source of methane emissions. The plan utilizes several inspection techniques including comprehensive leak surveys, permanent instrument monitoring, and targeted monthly and quarterly monitoring. This has proven to be an effective approach to managing methane as it has consistently comprised less than 1% of total releases. Leaks are documented, tracked and repaired. In addition, MEG's only operating CLRP facility is subject to gas conservation requirements, which means overall venting and flaring is virtually eliminated in normal operating conditions and only flaring or venting only results when it is necessary to maintain safe plant operations. As a result of MEG's continued focus on methane reductions in operations we anticipate a continued decrease in the next 5 years or a potential plateau as the full effectiveness of the fugitive management program is realized.

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 initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	3	
To be implemented*	2	76,000
Implementation commenced*	3	1,000
Implemented*	1	4,000
Not to be implemented	0	

C4.3b

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

Initiative category & Initiative type

- Fugitive emissions reductions
- Oil/natural gas methane leak capture/prevention

Estimated annual CO2e savings (metric tonnes CO2e)

4,000

Scope(s)

Scope 1

Voluntary/Mandatory

Mandatory

Annual monetary savings (unit currency – as specified in C0.4)

120,000

Investment required (unit currency – as specified in C0.4)

150,000

Payback period

1-3 years

Estimated lifetime of the initiative

6-10 years

Comment

C4.3c

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

Method	Comment
Compliance with regulatory requirements/standards	As of January 1, 2018 MEG's Christina Lake Regional Project is subject to Alberta's CCIR regulation, which has industry bitumen and electricity benchmark, rather than a facility specific benchmark. These became MEG's targets in 2019.
Dedicated budget for energy efficiency	MEG has budgeted for future carbon compliance costs associated with Alberta's CCIR requirements. MEG also carries annual budget to support investigation of emissions reduction opportunities, including joint industry partnerships. As of January 1, 2018 MEG's Christina Lake Regional Project is subject to Alberta's Specified Gas CCIR regulation, which has industry bitumen and electricity benchmark, rather than a facility specific benchmark. These became MEG's targets in 2018.
Internal price on carbon	MEG uses an internal price of carbon set at \$30/tonne CO2e to forecast estimated compliance costs and potential savings associated with GHG emissions reduction opportunities which is in alignment with the existing carbon pricing structure applicable in Alberta where MEG operates.

Partnering with governments on technology development	MEG has been granted funding from Alberta Innovates, Natural Resources Canada, Emissions Reductions Alberta, and Sustainable Development Technology Canada for continued eMVAPEX work.
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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

Electrical power

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

Low-carbon product and avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify

CCIR co-generation calculation methodology.

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

1.5

Comment

The Christina Lake Regional Project co-generation facility uses natural gas more efficiently and produces two products; electricity and steam for oil production. The low-intensity electricity that we generate offsets the high-intensity coal-fired power prevalent on the Alberta power grid. Approximately 80% of electricity generated is sold to the Alberta power grid. Calculating emission reductions for co-generation under the CCIR aligns with the Quantification Methodologies for the Carbon Competitiveness Incentive Regulation and the Specified Gas Reporting Regulation methodology document.

C-OG4.6

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

MEG recognizes that reducing methane emissions is an important aspect to address climate change. MEG has implemented a fugitive emissions management plan (FEMP) for managing fugitive emissions from equipment leaks, a primary source of methane emissions. The plan utilizes several inspection techniques including comprehensive leak surveys, permanent instrument monitoring, targeted monthly and quarterly monitoring. This has proven to be an effective approach to managing methane as it has consistently comprised less than 1% of total GHG emissions. Through MEG's FEMP, leaks are documented, tracked and repaired. There are also on-going after-action reviews in order to identify continuous improvement opportunities for methane reduction. For example, MEG has installed new models of valves for tanks which will further reduce methane emissions from venting and fugitives. In 2019, MEG installed refurbished process equipment that was engineered to tie-in any potential methane release points to vapour recovery system. In addition, MEG's only operating CLRPP facility is subject to gas conservation requirements, which means overall venting and flaring is virtually eliminated in normal operating conditions and only flaring or venting only results when it is necessary to maintain safe plant operations. In MEG's operations, methane primarily results from releases of fugitive emissions while over 99% of MEG's greenhouse gas emissions are from combustions activities. Less than 1% of combustion greenhouse gas emissions are methane. Combustion emissions are mainly due to steam generation and therefore, MEG places significant focus on optimizing steam generation to improve greenhouse gas emissions intensity. An important metric for this purpose is Steam-Oil Ratio (SOR), the quantity of steam used to produce a barrel of oil. SOR is a key measure of efficiency for SAGD projects, with a lower SOR indicating the steam is more efficiently utilized. By decreasing the amount of steam used, MEG is able to reduce fuel requirements which result in lower greenhouse gas emissions intensity. MEG has implemented its patented eMSAGP technology which has enabled MEG to achieve a companywide SOR of 2.22.

C-OG4.7

(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.

MEG recognizes that reducing methane emissions is an important aspect of address climate change. MEG has implemented a fugitive emissions management plan for managing fugitive emissions from equipment leaks, a primary source of methane emissions. The plan utilizes several inspection techniques including comprehensive leak surveys, permanent instrument monitoring, targeted monthly and quarterly monitoring. This has proven to be an effective approach to managing methane as it has consistently comprised less than 1% of total releases. Through MEG's FEMP, leaks are documented, tracked and repaired. There are also on-going after-action reviews in order to identify continuous improvement opportunities for methane reduction. For example, MEG has installed new models of valves for tanks which will further reduce methane emissions from venting and fugitives. In 2019, MEG installed refurbished process equipment that was engineered to tie-in any potential methane release points to vapour recovery system. The Fugitive Emissions Management Plan has been developed in accordance with CAPP Best Management Practice: Management of Fugitive Emissions at Upstream Oil and Gas Facilities (Requirements in AER Directive 60 as of 2018) and includes periodic Comprehensive Surveys – comprehensive leak survey of each facility is performed every 3 to 5 years using either an infrared thermal imaging camera or US EPA Method 21; targeted Quarterly and Annual Monitoring – Regular targeted monitoring is performed on all components having a medium to high leak potential. This is done on a monthly and quarterly basis according to the types of components, their specific leak potentials and their ongoing leak performance; permanent Instrumented Monitoring - MEG currently has instrumented monitoring systems on difficult-to-access components having a high leak potential. The numbers of leaks detected annually by the proposed monitoring program will be tracked as a performance indicator. An engineering review of any chronic leakers will be performed, when required, to determine more appropriate control measures (e.g., replacement of the component with a more robust or rugged design or installation of a leak capture and treatment system).

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.

MEG’s facility is a gas conserving facility, which means overall venting and flaring is virtually eliminated in normal operating conditions. MEG has a gas conservation efficiency target of 90% where $\text{gas conservation} = (\text{Solution gas production} - \text{Flared} - \text{Vented}) / (\text{Solution gas production}) \times 100$. In 2019 MEG had an overall gas conservation of >95%. MEG only flares or vents when it is absolutely necessary to maintain safe plant operations. In 2019 GHG emissions from flaring activities contributed to 0.36% of MEG’s total GHG emissions. Due to the low contribution from flaring to overall GHG emissions, MEG does not set separate GHG emissions targets for flaring. Flaring emissions are captured in the Int1 and Int2 targets reported in C4.2b. MEG does however set internal key performance indicators for flaring activities.

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, 2013

Base year end

December 31, 2013

Base year emissions (metric tons CO2e)

1,896,700

Comment



Normalized annual emissions over baseline period.
Base year start is 01/01/2013 and base year end is 12/31/2015.

Scope 2 (location-based)

Base year start

January 1, 2013

Base year end

December 31, 2013

Base year emissions (metric tons CO₂e)

500

Comment

Normalized annual scope 2 emissions over baseline period.
Base year start is 01/01/2013 and base year end is 12/31/2015.

Scope 2 (market-based)

Base year start

Base year end

Base year emissions (metric tons CO₂e)

Comment

C5.2

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

American Petroleum Institute Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry, 2009

Canadian Association of Petroleum Producers, Calculating Greenhouse Gas Emissions, 2003

Other, please specify

- Standard for Completing Greenhouse Gas Compliance Reports (2017) and Quantification Methodologies for the Carbon competitiveness Incentive Regulation and the Specified Gas Reporting Regulation (2018)

C5.2a

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

Standard for Completing Greenhouse Gas Compliance Reports (2017)

Quantification Methodologies for the Carbon competitiveness Incentive Regulation and the Specified Gas Reporting Regulation (2018)

Environment Canada: Canada's Greenhouse Gas Inventory

C6. Emissions data

C6.1

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

Reporting year

Gross global Scope 1 emissions (metric tons CO₂e)

2,304,490

Comment

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 have operations where we are able to access electricity supplier emission factors or residual emissions factors, but are unable to report a Scope 2, market-based figure

Comment

Market-based information is not available from our electricity provider.

C6.3

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

Reporting year

Scope 2, location-based

0

Comment

MEG did not consume any indirect power in 2019 and therefore Scope 2 emissions are 0.

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 gross global Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status

Not relevant, explanation provided

Please explain

Fuel usage for drilling activities were included as Scope 3 emissions in 2018. As of 2019 they are included as Scope 1 emissions as per the CCIR boundary changes.

Capital goods

Evaluation status

Not evaluated

Please explain

Additional scope 3 categories will be investigated in the future.

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

Evaluation status

Relevant, calculated

Metric tonnes CO2e

1,757

Emissions calculation methodology

Fuel usage is obtained from suppliers or from MEGs internal fuel usage tracking system and emissions are calculated using fuel specific emission factors.

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

0

Please explain

This includes camp site and site service heating.

Upstream transportation and distribution

Evaluation status

Not relevant, explanation provided

Please explain

MEG extracts primary resources (Bitumen) and therefore minimal upstream transportation or distribution emissions exist. This category is not applicable to MEG.

Waste generated in operations

Evaluation status

Relevant, calculated

Metric tonnes CO2e

1,439

Emissions calculation methodology

Fuel usage is obtained from suppliers and emissions are calculated using fuel specific emission factors.

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

100

Please explain

This includes emissions associated with transportation of waste off site.

Business travel

Evaluation status

Relevant, calculated

Metric tonnes CO2e

3,017

Emissions calculation methodology

Fuel usage is obtained from suppliers and emissions are calculated using fuel specific emission factors.

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

0

Please explain

This includes air travel to CLRP.

Employee commuting

Evaluation status

Not relevant, explanation provided

Please explain

Employees commuting to the corporate office are considered negligible.

Upstream leased assets

Evaluation status

Relevant, calculated

Metric tonnes CO2e

546

Emissions calculation methodology

Head office natural gas for heat and electricity usage obtained from head office management company.

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

100

Please explain

This includes emissions at MEG's head office including emissions from electricity use and natural gas for heating.

Downstream transportation and distribution

Evaluation status

Relevant, calculated

Metric tonnes CO2e

14

Emissions calculation methodology

Fuel usage obtained from value chain partner and emissions are calculated using fuel specific emission factors.

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

100

Please explain

This includes downstream storage emissions.

Processing of sold products

Evaluation status

Relevant, not yet calculated

Please explain

MEG bitumen is processed in various upgrading and refining facilities in North America.

Use of sold products

Evaluation status

Relevant, not yet calculated

Please explain

Oil produced by MEG is used as a feedstock for a number of products thus end use of sold products is not known to MEG and could include transportation fuels, plastics, chemicals and other hydrocarbon-based products. The Scope 3 emissions will vary based on end product.

End of life treatment of sold products

Evaluation status

Relevant, not yet calculated

Please explain

Oil produced by MEG is used for a number of products thus end of life treatment of sold products is not known to MEG and could include transportation fuels, plastics, chemicals and other hydrocarbon-based products. The Scope 3 emissions for end of life treatment will vary based on the end product. Not relevant, explanation provided.

Downstream leased assets

Evaluation status

Not relevant, explanation provided

Please explain

MEG does not own any downstream leased assets. This category is not applicable to MEG

Franchises

Evaluation status

Not relevant, explanation provided

Please explain

MEG does not operate any franchises. This category is not applicable to MEG.

Investments

Evaluation status

Not relevant, explanation provided

Please explain

MEG is not a financial institution. This category is not applicable to MEG.

Other (upstream)

Evaluation status

Relevant, calculated

Metric tonnes CO₂e

26,123

Emissions calculation methodology

Annual volume of makeup solvent purchased obtained from internal records. Truck deliveries are estimated based on purchased fuel volume while processing emissions are estimated using region-based emission factors (GHG Genius 5.0c, Environment Canada, Canada's Greenhouse Gas Inventory (1990-2014), NRCAN Fuel Efficiency Benchmarking in Canada's Trucking Industry).

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

0

Please explain

Makeup solvent upstream processing and trucking emissions for eMVAPEX

Other (downstream)

Evaluation status

Not relevant, explanation provided

Please explain

No other (downstream) Scope 3 categories are applicable at this time.

C6.7

(C6.7) Are carbon dioxide emissions from biogenic 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

0.00059

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO₂e)

2,304,490

Metric denominator

unit total revenue

Metric denominator: Unit total

3,931,000,000

Scope 2 figure used

Location-based



% change from previous year

25

Direction of change

Decreased

Reason for change

The increase in revenue drove down emissions intensity resulting in a 25% decrease from previous year.

Intensity figure

0.052

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)

1,765,160

Metric denominator

barrel of oil equivalent (BOE)

Metric denominator: Unit total

34,159,134

Scope 2 figure used

Location-based

% change from previous year

1

Direction of change

Increased

Reason for change



MEG's net emissions account for electricity exported to the Alberta Electrical Grid, year-over-year the electrical grid intensity has decreased resulting in a reduced GHG benefit for electricity sales. Please note that the MEG denominator reflects barrels of bitumen sales rather than a converted unit of oil equivalent.

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 oil sands (includes bitumen and synthetic crude)

Metric tons CO2e from hydrocarbon category per unit specified

0.05

% change from previous year

1

Direction of change

Increased

Reason for change

MEG's net emissions account for electricity exported to the Alberta Electrical Grid, year-over-year the electrical grid intensity has decreased resulting in a reduced GHG benefit for electricity sales.

Comment

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

0.033

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

0

Comment

Reflects fugitive methane release as a proportion of total purchased natural gas throughput.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?

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	2,286,737	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	377	IPCC Fourth Assessment Report (AR4 - 100 year)
N2O	28	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.

Emissions category

Combustion (excluding flaring)

Value chain

Upstream

Product

Oil

Gross Scope 1 CO2 emissions (metric tons CO2)

2,273,060

Gross Scope 1 methane emissions (metric tons CH4)

81.904

Total gross Scope 1 emissions (metric tons CO2e)

27.454

Comment

Emissions category

Flaring

Value chain

Upstream

Product

Oil

Gross Scope 1 CO2 emissions (metric tons CO2)

7,296

Gross Scope 1 methane emissions (metric tons CH4)

39.793

Total gross Scope 1 emissions (metric tons CO2e)

0.116

Comment

Emissions category

Venting

Value chain

Upstream

Product

Oil

Gross Scope 1 CO2 emissions (metric tons CO2)

1.44

Gross Scope 1 methane emissions (metric tons CH4)



34.609

Total gross Scope 1 emissions (metric tons CO2e)

0

Comment

Emissions category

Fugitives

Value chain

Upstream

Product

Oil

Gross Scope 1 CO2 emissions (metric tons CO2)

0.9

Gross Scope 1 methane emissions (metric tons CH4)

218.042

Total gross Scope 1 emissions (metric tons CO2e)

0

Comment



Emissions category

Other (please specify)
Waste and wastewater

Value chain

Upstream

Product

Oil

Gross Scope 1 CO2 emissions (metric tons CO2)

0

Gross Scope 1 methane emissions (metric tons CH4)

2.334

Total gross Scope 1 emissions (metric tons CO2e)

0

Comment

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	2,304,490

C7.3

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

By facility
By activity

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
CLRP	2,304,490	55.66638	-110.71404

C7.3c

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

Activity	Scope 1 emissions (metric tons CO2e)
Electric utility generation activities	1,282,641
Oil and gas production activities (upstream)**	1,021,849

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	Comment
Oil and gas production activities (upstream)	2,304,490	
Oil and gas production activities (midstream)	0	Midstream activities are not applicable to MEG.
Oil and gas production activities (downstream)	0	Downstream activities are not applicable to MEG.



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 for in Scope 2 market-based approach (MWh)
Canada	0	0	0	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 (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
CLRP	0	0

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
Oil and gas production activities (upstream)	0	0	MEG did not consume any indirect power in 2019 and therefore Scope 2 emissions are 0.



Oil and gas production activities (midstream)	0	0	Midstream activities are not applicable to MEG.
Oil and gas production activities (downstream)	0	0	Downstream activities are not applicable to MEG.

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				Not applicable.
Other emissions reduction activities				Not applicable.
Divestment				Not applicable.
Acquisitions				Not applicable.
Mergers				

Change in output	108,000	Increased	5.1	Gross emissions increase from additional year-over-year production. Absolute production growth was approximately 6%.
Change in methodology				Not applicable.
Change in boundary	12,000	Increased	0.5	Scope 1 has been modified to include some emissions previously captured in Scope 3.
Change in physical operating conditions				Not applicable.
Unidentified				Not applicable.
Other	44,000	Increased	2	1. New sustaining production brought online with higher initial recovery efficiencies, which will decrease through time. 2. Year to year operational differences which include factors such as the Government of Alberta mandated production curtailment resulted in some inefficiencies to manage restricted output.

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 0% but less than or equal to 5%

C8.2

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

	Indicate whether your organization undertook this energy-related activity in the reporting year
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	No
Consumption of purchased or acquired cooling	No
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 (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	HHV (higher heating value)	0	11,992,418.51	11,992,418.51
Consumption of purchased or acquired electricity		0	0	0
Consumption of self-generated non-fuel renewable energy		0		0
Total energy consumption		0	11,992,418.51	11,992,418.51

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 heat	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

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

11,976,528

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

222,525



MWh fuel consumed for self-generation of steam

4,881,983.05

MWh fuel consumed for self-cogeneration or self-trigeneration

6,872,021

Emission factor

0.00214

Unit

metric tons CO2e per m3

Emissions factor source

CH4 and N2O Emission Factors source: Environment Canada, Canada's Greenhouse Gas Inventory (1990-2014) Table A8-2: Emission Factors for Natural Gas

CO2 – the Natural gas CO2 emission factor is derived from fuel carbon content and varies.

Comment

Fuels (excluding feedstocks)

Diesel

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

13,248

MWh fuel consumed for self-generation of electricity



0

MWh fuel consumed for self-generation of heat

13,248

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-cogeneration or self-trigeneration

0

Emission factor

0.00262

Unit

metric tons CO2e per liter

Emissions factor source

Quantification Methodologies for the Carbon competitiveness Incentive Regulation and the Specified Gas Reporting Regulation (2018)

Comment

Fuels (excluding feedstocks)

Propane Gas

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

2,642



MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

2,642

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-cogeneration or self-trigeneration

0

Emission factor

0.00152

Unit

metric tons CO2e per liter

Emissions factor source

Quantification Methodologies for the Carbon competitiveness Incentive Regulation and the Specified Gas Reporting Regulation (2018)

Comment

C8.2d

(C8.2d) 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	1,026,634	230,934	0	0

Heat	178,020	178,020	0	0
Steam	382,155	355,057	0	0
Cooling	0	0	0	0

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	0	MEG does not have crude oil and condensate in its production portfolio.
Natural gas liquids, million barrels	0	MEG does not have natural gas liquids in its production portfolio.
Oil sands, million barrels (includes bitumen and synthetic crude)	33.97	MEG is a sustainable in situ thermal oil production company.
Natural gas, billion cubic feet	0	MEG does not have natural gas in its production portfolio.

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.

MEG reports its reserves and other oil and gas information in accordance with the National Instruments 51-101 – Standards for Disclosure for Oil and Gas Activities, the standard governing and reporting of petroleum reserves and resources for Canadian publicly traded companies. The Instrument requires all Canadian reporting issuers engaged in oil and gas activity to provide disclosure of their estimated oil and natural gas reserves and related future net revenues on an annual basis; and all disclosure to be prepared or audited in accordance with the Canadian Oil and Gas Evaluation 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)	Comment
Row 1	1,531	1,674	2,372	

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 (%)	Comment
Crude oil/ condensate/ natural gas liquids	0	0	0	MEG does not have natural gas liquids/crude oil or natural gas liquids in its production portfolio.
Natural gas	0	0	0	MEG does not have natural gas in its production portfolio.
Oil sands (includes bitumen and synthetic crude)	100	100	100	MEG is a sustainable in situ thermal oil production company.

C-OG9.2e

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

Development type

Oil sand/extra heavy oil

In-year net production (%)

100

Net proved reserves (1P) (%)

100

Net proved + probable reserves (2P) (%)

100

Net proved + probable + possible reserves (3P) (%)

100

Net total resource base (%)

100

Comment

MEG is a pure play thermal in situ producer.

C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6

(C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6) Does your organization invest in research and development (R&D) of low-carbon products or services related to your sector activities?

	Investment in low-carbon R&D	Comment
Row 1	Yes	

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

(C-CO9.6a/C-EU9.6a/C-OG9.6a) Provide details of your organization's investments in low-carbon R&D for your sector activities over the last three years.

Technology area	Stage of development in the reporting year	Average % of total R&D investment over the last 3 years	R&D investment figure in the reporting year (optional)	Comment
Other energy efficiency measures in the oil and gas value chain	Pilot demonstration	81-100%	5,896,000	MEG continues to test its proprietary eMVAPEX technology at the Christina Lake Project, which involves the targeted injection of light hydrocarbons in replacement of steam. This proprietary technology, if proven successful through expanded pilot operations, will further enhance MEG's growth potential by reducing capital requirements and operating costs, while minimizing environmental impacts to land, air and water. In 2018 the expanded eMVAPEX pilot commenced and propane recycling facilities became fully operational. MEG has been granted funding from Alberta Innovates, Natural Resources Canada, Emissions Reductions Alberta, and Sustainable Development Technology Canada for continued eMVAPEX work.

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.

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 emissions, and attach the relevant statements.

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

Y

 C10.1a Scope 1.pdf

Page/ section reference

1/1

Relevant standard

Alberta Carbon Competitiveness Incentive Regulation (CCIR)

Proportion of reported emissions verified (%)

100

C10.1b

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

Scope 2 approach

Scope 2 location-based

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

Y

 C10.1b Scope 2.pdf

Page/ section reference

pg 1-2

Relevant standard

Canadian Institute of Chartered Accountants (CICA) Handbook: Assurance Section 5025

Proportion of reported emissions verified (%)

100

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
[Empty table body]			

C4. Targets and performance	Progress against emissions reduction target	Alberta CCIR ISO14064-3	The target is derived from the CCIR (Int1 in Question C4.1b). CCIR is an emissions intensity-based regime requiring large emitters to reduce their emissions intensity below a prescribed level, or otherwise achieve this through a true-up obligation whereby-credits can be applied against such required level, together with or as an alternative to physical abatement, with penalties for failure to achieve compliance. Verification for CCIR was completed annually This is a reasonable level of assurance.
C6. Emissions data	Year on year emissions intensity figure	Other: Canadian Professional Accountants – Standards for Assurance Engagements other than audits of Financial Statements and other Historical Financial Information, Handbook Section 5025.	Question C6.10, Question C6.12 Verification completed annually at a reasonable level of assurance.
C7. Emissions breakdown	Year on year change in emissions (Scope 1)	Alberta CCIR ISO14064-3	Question C7.9 Verification completed annually at a reasonable level of assurance.
C7. Emissions breakdown	Year on year change in emissions (Scope 2)	Alberta CCIR ISO14064-3	Question C7.9 Verification completed annually at a reasonable level of assurance. MEG's CLRP facility falls under the CCIR regulation in Alberta.

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 Competitive Incentive Regulation (CCIR) – ETS

Other carbon tax, please specify

Alberta Carbon Levy

C11.1b

(C11.1b) Complete the following table for each of the emissions trading schemes you are regulated by.

Alberta Carbon Competitive Incentive Regulation (CCIR) – ETS

% of Scope 1 emissions covered by the ETS

99.8

% of Scope 2 emissions covered by the ETS

100

Period start date

January 1, 2019

Period end date

December 31, 2019

Allowances allocated

1,928,572

Allowances purchased

0

Verified Scope 1 emissions in metric tons CO₂e



2,304,490

Verified Scope 2 emissions in metric tons CO2e

0

Details of ownership

Facilities we own and operate

Comment

Although total Scope 1 emissions are greater than allowances allocated, the CCIR method uses an intensity-based approach that provides an additional credit for the export of excess power generated by MEG’s cogeneration units. With the recognition of electricity export in 2019, compliance was obtained, and no additional allowances were required. The CCIR has been replaced with the Technology Innovation and Emissions Reduction Regulation for the 2020 calendar year.

C11.1c

(C11.1c) Complete the following table for each of the tax systems you are regulated by.

Other carbon tax, please specify

Period start date

January 1, 2019

Period end date

May 30, 2019

% of total Scope 1 emissions covered by tax

0.1

Total cost of tax paid

56,000

Comment

The Alberta Carbon Levy was repealed on May 30, 2019 at which time associated emissions were regulated under the Carbon Competitiveness Incentive Regulation.

C11.1d

(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?

MEG is managing compliance with regulations by minimizing emissions. This is accomplished through operation of cogeneration facilities and implementation of reservoir production enhancements. MEG places significant focus on optimizing steam generation to improve environmental outcomes. An important metric for this purpose is Steam-Oil Ratio (SOR), the quantity of steam used to produce a barrel of oil. SOR is a key measure of efficiency for SAGD projects, with a lower SOR indicating that steam is more efficiently utilized. By decreasing the amount of steam used, MEG is able to reduce our per barrel water and fuel requirements which results in lower greenhouse gas emissions intensity and more economic projects. MEG increased the application of its patented eMSAGP reservoir production technology across additional production wells. eMSAGP has improved operational performance and reduced costs, including GHG costs linked to an increasingly stringent intensity target. In addition MEG, with grants from Alberta Innovates, Natural Resources Canada, Emissions Reductions Alberta, and Sustainable Development Technology Canada MEG has advanced the development of the Enhanced Modified Vapour Extraction (eMVAPEX) production technology. The main objectives of eMVAPEX technology are to efficiently increase MEG's bitumen production rate, achieve sustainable cost savings and minimize environmental impacts to land, air and water. Early evaluation of eMVAPEX is currently capturing the GHG reduction benefits in the economic evaluation of the technology development

C11.2

(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?

Yes

C11.2a

(C11.2a) Provide details of the project-based carbon credits originated or purchased by your organization in the reporting period.

Credit origination or credit purchase

Credit origination



Project type

Energy efficiency: industry

Project identification

eMSAGP and Cogeneration

Verified to which standard

Other, please specify

Standard for Completing Greenhouse Gas Compliance Reports (2017) and Quantification Methodologies for the Carbon competitiveness Incentive Regulation and the Specified Gas Reporting Regulation (2018)

Number of credits (metric tonnes CO2e)

26,930

Number of credits (metric tonnes CO2e): Risk adjusted volume

26,930

Credits cancelled

No

Purpose, e.g. compliance

Compliance

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
Identify and seize low-carbon opportunities

GHG Scope

Scope 1

Application

MEG uses an internal price of carbon to assess risks and opportunities for capital and operational investments. MEG has an internal team that monitors and reviews carbon market trends and pricing and undertakes analysis on various carbon prices to ensure that the internal price of carbon reflects the regulatory and economic environment in which it operates.

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

30

Variance of price(s) used

MEG applies evolutionary pricing to reflect the regulatory and economic environment in which it operates. In 2019 MEG operated in Alberta, under the Climate Change and Emissions Management Act and the accompanying CCIR regulation. The CCIR is an emissions intensity-based regime requiring large emitters to reduce their emissions intensity below a prescribed level, or otherwise achieve this through a true-up obligation whereby credits can be applied against such required level, together with or as an alternative to physical abatement, with penalties for failure to achieve compliance. The CCIR has product specific benchmarks. The CCIR compliance cost begins with \$30 per tonne of carbon. TIER came into force January 1, 2020 replacing the CCIR. It includes facility-specific benchmarks and sector based high-performance benchmarks. The TIER compliance cost in 2020 will be \$30 per tonne. In its analysis, MEG includes sensitivities to a higher price of carbon.

Type of internal carbon price

Shadow price

Impact & implication

The internal carbon price is used to help manage the potential cost impact associated with GHG regulations. MEG uses an internal price of carbon set at \$30/tonne CO₂e to forecast estimated compliance costs and potential savings associated with GHG emissions reduction opportunities which is in alignment with the 2019 and 2020 carbon pricing structure applicable in Alberta where MEG operates. The carbon price is used to identify and drive toward low-carbon opportunities such as MEG's operational efficiency projects. One of MEG's operational efficiency projects is eMVAPEX. In 2019 MEG continued testing its proprietary eMVAPEX technology. A modification of its eMSAGP technology, eMVAPEX has the potential to further decrease MEG's steam-oil ratio (SOR) beyond what eMSAGP can achieve, and further reduce GHG emissions intensities. Through its operational efficiency projects MEG has built substantial GHG credits given the high performance of its facilities. The price of carbon is also considered for the carbon capture initiative project economics.

C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?

No, we do not engage

C12.1e

(C12.1e) 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?

Currently MEG produces diluted bitumen that is transported to, and processed in, various downstream facilities. Oil produced by MEG is used as a feedstock for a number of products, thus end use of sold products is not known to MEG making it difficult to engage with customers in MEG's value chain. MEG is however, exploring opportunities for supplier engagement including compliance & onboarding and engagement campaigns to educate suppliers about climate change.

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

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
Mandatory carbon reporting	Support with minor exceptions	MEG actively consults with the Federal and Provincial Governments on policy and regulatory issues. We provide input into new policy, directives and regulations, as well as existing regulations when are under review in order to properly reflect a balanced approach to sustainable development. In the past, MEG was an active participant in the Government of Alberta’s Climate Leadership Plan consultation and working groups. MEG is also an active participant in the Government of Canada’s Pan-Canadian Framework on Clean Growth and Climate Change consultation and working groups. In 2019 MEG consulted on the new Alberta Energy Regulator (AER) methane requirements that came into effect January 1, 2020 under AER Directive 17 and Directive 60 and engaged with Government of Alberta (GOA) on the Technology Innovation and Emissions Reduction regulation which came into effect January 1, 2020.	MEG is committed to responsible resource development and remaining at the forefront of technology innovation, development and deployment. We are pursuing this not only in reservoir technology, but throughout the value chain in value added processing and across industrial sectors into power generation through cogeneration. In each area our desire is the same – improve energy efficiency to reduce costs and GHG emissions. A collaborative approach to enhance competitiveness and GHG emissions reductions by recognizing and encouraging investment in technology and innovation is required.



<p>Regulation of methane emissions</p>	<p>Support with minor exceptions</p>	<p>MEG actively consults with the Federal and Provincial Governments on policy and regulatory issues. We provide input into new policy, directives and regulations, as well as existing regulations when are under review in order to properly reflect a balanced approach to sustainable development. In the past, MEG was an active participant in the Government of Alberta’s Climate Leadership Plan consultation and working groups. MEG is also an active participant in the Government of Canada’s Pan-Canadian Framework on Clean Growth and Climate Change consultation and working groups. In 2019 MEG consulted on the new Alberta Energy Regulator (AER) methane requirements that came into effect January 1, 2020 under AER Directive 17 and Directive 60 and engaged with Government of Alberta (GOA) on the Technology Innovation and Emissions Reduction regulation which came into effect January 1, 2020.</p>	<p>MEG is committed to responsible resource development and remaining at the forefront of technology innovation, development and deployment. We are pursuing this not only in reservoir technology, but throughout the value chain in value added processing and across industrial sectors into power generation through cogeneration. In each area our desire is the same – improve energy efficiency to reduce costs and GHG emissions. A collaborative approach to enhance competitiveness and GHG emissions reductions by recognizing and encouraging investment in technology and innovation is required.</p>
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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?

A continuous legislative overview is conducted that informs MEG of proposed changes. A multidisciplinary team regularly monitors developments in climate change policy and consolidates that information for the business to ensure that the business interests are protected and that policy trends are understood. To ensure that corporate guidance on activities that influence policy are consistent with MEG’s systematic approach to addressing climate risk across our organization, coordination meetings are held with all departments potentially influenced by the policy to review forthcoming engagement opportunities. Policy developments are communicated monthly to the corporate EH&S Committee and at least quarterly to the Board of Directors/applicable Board Committees to be factored into corporate strategy and planning.

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

Status

Complete

Attach the document

Y

 MEG Energy Management Information Circular May 2020.pdf

 2019_AIF_FINAL.pdf

Page/Section reference

AIF - pg. 2, 14-16, 31-34, 49-52,

MIC - pg. 3-5, 40, 58, 60,

Content elements

Strategy

Risks & opportunities

Emissions figures

Emission targets

Comment

Publication

In voluntary sustainability report

Status

Complete

Attach the document

Y

 2019MEGEnergyESGReport.pdf

Page/Section reference

ESG Report:
pg. 5 -9, 11, 12, 32

Content elements

Governance
Strategy
Emissions figures

Comment



C15. 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.

C15.1

(C15.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Chief Executive Officer (CEO)	Chief Executive Officer (CEO)

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

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



Please confirm below

I have read and accept the applicable Terms