APPENDIX I

CLIMATE CHANGE TECHNICAL SUPPORT DOCUMENTS

I-1 GHG Assessment Report
I-2 Net Zero Strategy
I-3 Future Climate Projections

Net-Zero Strategy

Springpole Gold Project

First Mining Gold Corp.

ONS2104

Prepared by:
WSP Canada Inc.

October 2024

Net-Zero Strategy
Springpole Gold Project

Red Lake District, Northwest Ontario
Project #ONS2104

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EXECUTIVE SUMMARY

This Net-Zero Strategy details First Mining Gold's (FMG's) commitment and plan for a net-zero project with the purpose of embedding a climate-positive approach to all aspects of the Springpole Gold Project (Project). This strategy supports the target of reducing net greenhouse gas (GHG) emissions to zero over the life of the Project. It includes the use of technologies and practices to reduce fossil fuel use, and carbon offsets and credits to balance residual GHG emissions from the Project.

The GHG inventory prepared in support of the Environmental Impact Statement / Environmental Assessment was used to develop this Net-Zero Strategy. The strategy incorporates scheduled reviews and energy audits so that the most accurate GHG emissions data are used and that the Net-Zero Strategy is updated to reflect advances in GHG mitigation technologies.

The net GHG emissions for the Project were quantified using the following equation:

Net GHG emissions =	Direct GHG emissions (scope 1) + Acquired energy GHG emissions (scope 2) - Avoided domestic GHG emissions (GHG emissions reduced or eliminated in Canada as a result of the Project) - Offset measures (offset credits, carbon dioxide captured and stored, and corporate-level initiatives)

Source:
ECCC 2021.

The target established for the Net-Zero Strategy is for the net GHG emissions to be equal to zero. These targets will be achieved by minimizing direct GHG (scope 1) and indirect (scope 2 acquired electricity) emissions and using offset measures to mitigate residual GHG emissions.

Implementation of the Net-Zero Strategy will require the following:

- Planning and evaluation of mitigation measures and solutions during the initial years, and implementation throughout the construction, operations, and decommissioning and closure phases; and
- Consideration of renewable (zero-carbon) electricity generation, renewable fuels, carbon offsets, and onsite carbon removals throughout to achieve net-zero GHG emissions for the Project.

FMG will evaluate all methods of GHG mitigation as the Net-Zero Strategy evolves, including but not limited to the following:

- Technologies and environmental practices for GHG reduction;
- Fuel substitution, such as the use of renewable diesel;
- Renewable energy certificates and clean energy credits;
- Carbon offsets; and
- Avoided GHG emissions.

This first iteration of the Net-Zero Strategy and Road Map is based on high-level emission forecasts which produce order-of-magnitude estimates. The Net-Zero Strategy should be reviewed at the detailed design and equipment procurement stage, and again as better data become available and new technologies and practices advance in their technology readiness or feasibility for the Project.

Those technologies and environmental practices identified as likely technically feasible will be investigated further, with outreach to suppliers and/or potential partners to start reviewing mitigation opportunities at the asset level (e.g., buildings, equipment and vehicles, heating systems) to confirm the suitability given the constraints of the remote location and cold winter temperatures. This further study would include more accurate estimates of capital and operating costs, as well as a review of FMG's eligibility for government funding or incentives to implement lower carbon solutions.

PROJECT GREENHOUSE GAS EMISSIONS

The Project will have an estimated average electrical demand of 55 megawatts (MW) during operations and will benefit from the low-carbon electricity grid in Ontario, through a 230-kilovolt (kV) overhead transmission line which is proposed to tie the Project into the Wataynikaneyap 230 kV line. The main sources of GHG emissions during the construction, operations, and closure phases of the Project are from the use of fossil fuel (diesel, gasoline and propane) for mobile equipment and heat. The year-over-year GHG emissions by type are shown in

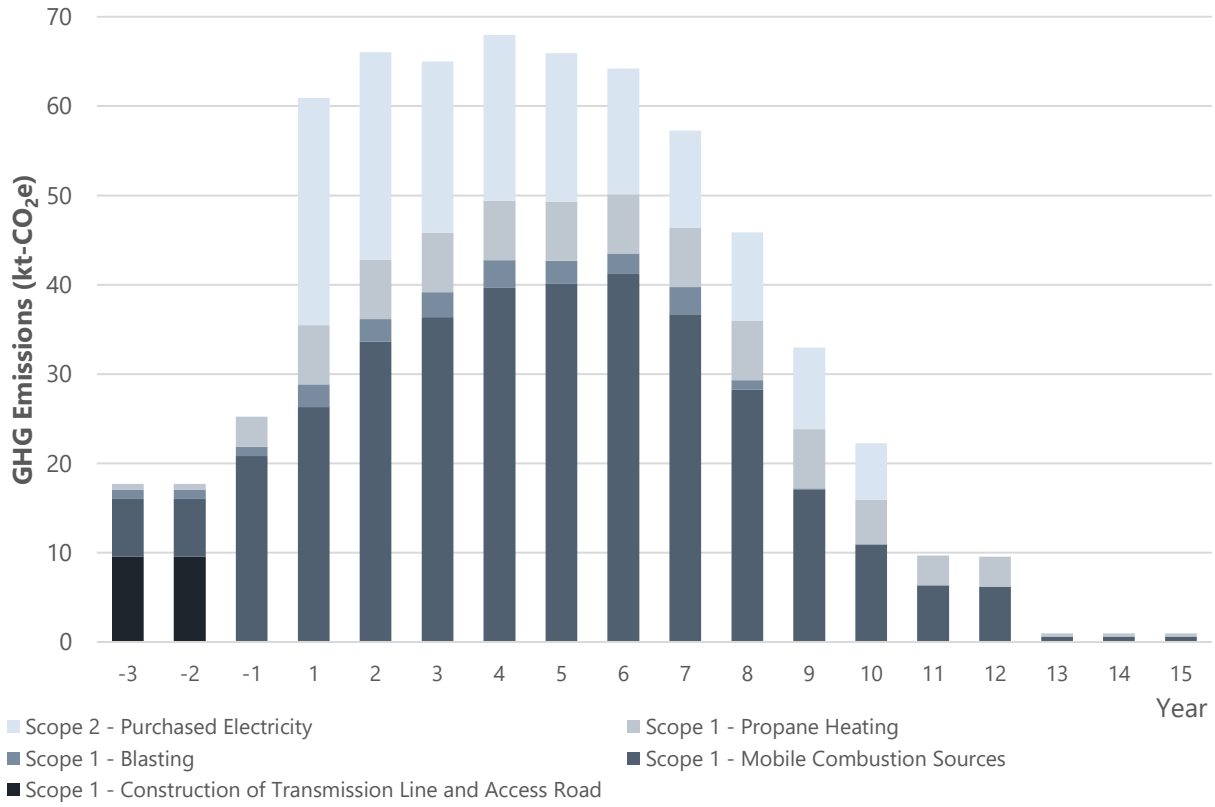


Figure ES 1-1 and the total GHG emission breakdown is shown in Figure ES 1-2.

The Net-Zero Strategy identifies technologies, environmental practices and other measures that will be evaluated to reduce the GHG emissions from the haul trucks, the mine fleet, building comfort heat and process heat. These technologies and practices are presented as a preliminary scenario for achieving net-zero, intended to inform decision-making by FMG.

In addition, onsite generation of renewable, low carbon energy options have been discussed, and renewable energy certificates or clean energy credits purchased for an equivalent megawatt of electricity consumed.

LAND USE CHANGES

GHG emissions associated with the clearing of vegetation and disturbance of soils to prepare the site are included in the Net-Zero Strategy. Measures are identified that will reduce the GHG releases associated with the land use change including minimizing the area to be cleared, promoting aerobic biodegradation with aeration of the forest residuals and investigating potential uses for this debris such as salvaged merchantable timber for the forest products industry.

CARBON OFFSETS AND REMOVALS

FMG has taken a proactive approach by identifying various offsetting measures most feasible for the Project to address unavoidable inherent residual emissions. These measures include carbon offsets, renewable energy certificates or clean energy credits, and carbon dioxide removals. All have been considered in support of achieving a net-zero project. An overview of the quantity of offsetting measures required to achieve net-zero emission for the life of mine is shown in Figure ES 1-3, in kilotonnes of carbon dioxide equivalent (kt-CO_2e).

The quantity of offsetting measures is based on what is most applicable to the Project and the most readily available technologies and practices. They may be optimized as the Project progresses.

SCOPE 3 EMISSIONS AND OTHER CONSIDERATIONS

Recognizing that climate action must extend beyond addressing direct GHG emissions, FMG will implement sustainability initiatives such as value chain mapping and setting targets for scope 3 emissions reduction, reducing consumption and increasing circularity, and promoting biodiversity and nature-based solutions.

FMG will participate in the provincial and federal mining associations' work to progress low-carbon technologies and climate action.

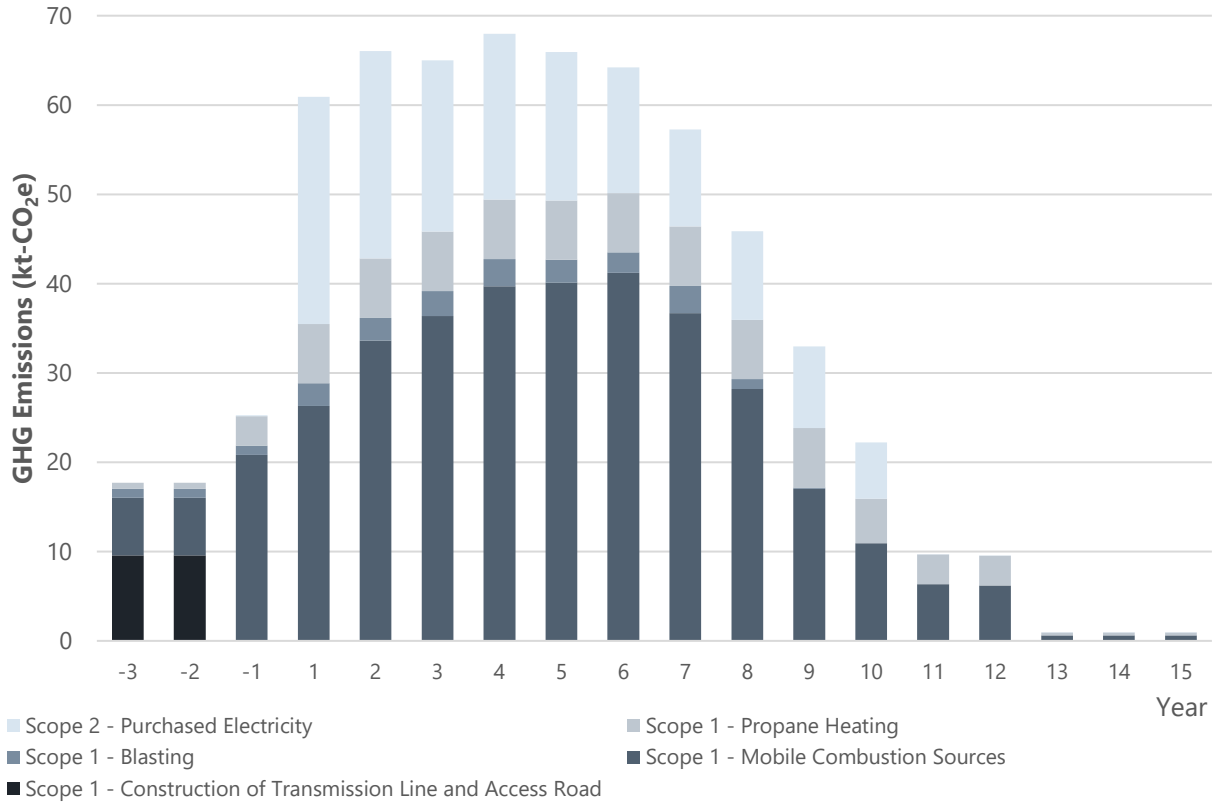
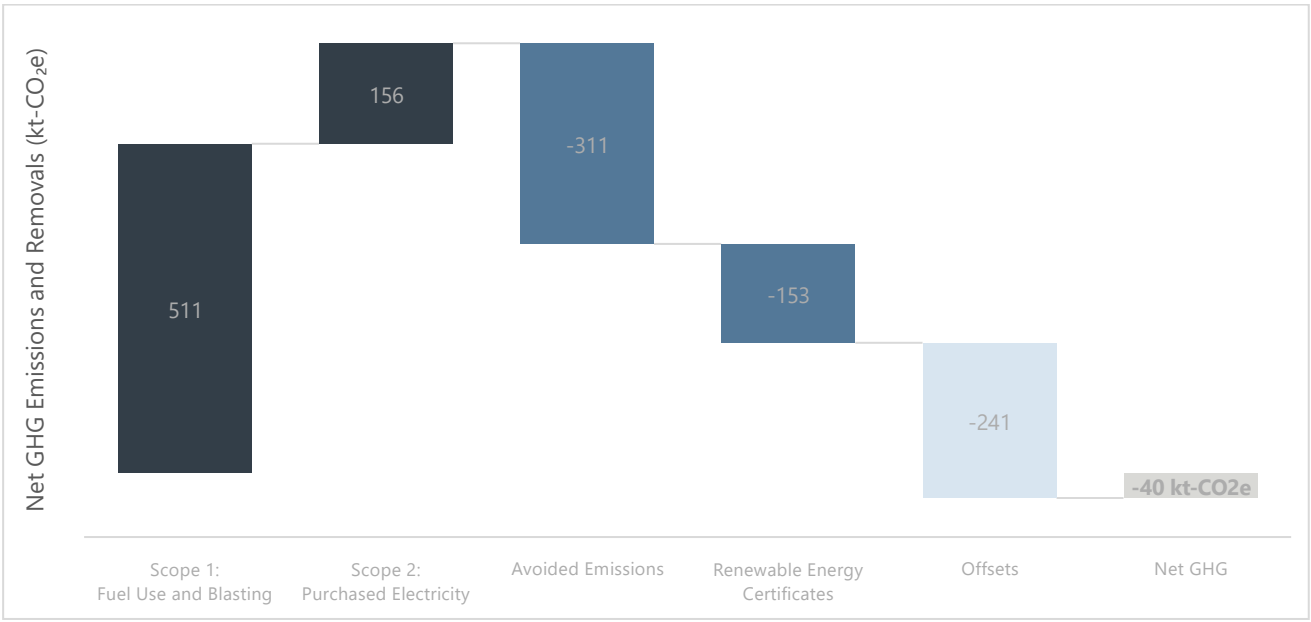


Figure ES 1-1: Breakdown of Annual Greenhouse Gas Emissions



Note: The total lifetime net GHG emissions to the end of active closure (2043), for this scenario are negative (-40 kt-CO_2e) with the installation of renewable solar power generation with the production of electricity beyond the demands of the Project.

Figure ES 1-2: Project Net Greenhouse Gas Emissions and Removals

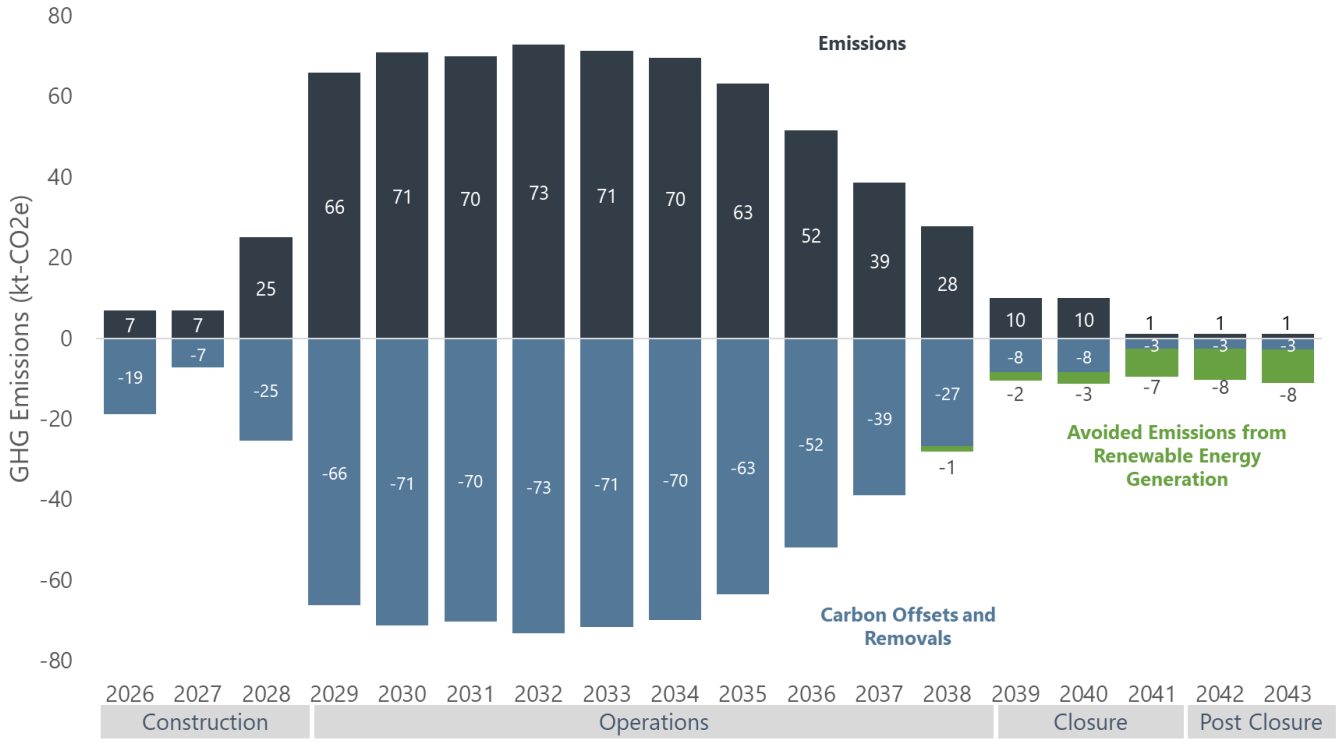


Figure ES 1-3: Yearly Project Net Greenhouse Gas Progression

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LIST OF ABBREVIATIONS

%	percent
CEC	clean energy credit
CO_2e	carbon dioxide equivalent
EPS	Emissions Performance Standards
FMG	First Mining Gold Corp.
GHG	greenhouse gas
kg	kilogram
km	kilometres
kt-CO_2e	kilotonnes of carbon dioxide equivalent
kV	kilovolt
kW	kilowatt
Mt-CO_2e	million tonnes of carbon dioxide equivalent
MW	megawatt
MWh	megawatt-hour
Project	Springpole Gold Project
REC	renewable energy credit
SACC	Strategic Assessment of Climate Change
t-CO_2e	tonnes of carbon dioxide equivalent
VCM	voluntary carbon market

GLOSSARY OF TERMS

Avoided Greenhouse Gas (GHG) Emissions	GHG emissions that are reduced or eliminated in Canada as a result of a project. The avoided GHG emissions only apply to the project's net GHG emissions. The generation and sale of surplus energy is an example of avoided GHG emissions if the energy displaces that of a higher-emitting source.
Carbon Dioxide Equivalent (CO_2e)	A unit of measure used to allow the addition of, or the comparison between, gases that have different global warming potentials. Since many GHGs exist and their global warming potentials vary, the emissions are added in a common unit, CO_2e. To express GHG emissions in units of CO_2e, the quantity of a given GHG (expressed in units of mass) is multiplied by its global warming potential.
Environmental Impact Statement Guidelines	Guidelines for the Preparation of an Environmental Impact Statement pursuant to the *Canadian Environmental Assessment Act, 2012* (S.C. 2012, c. 19, s. 52) for the Springpole Gold Project, dated June 19, 2018, and amended on March 11, 2022 (CEA Agency 2018).
Global Warming Potential	Calculated as the ratio of the time-integrated radiative forcing (i.e., the amount of heat-trapping potential) that would result from the emission of 1 kilogram (kg) of a given GHG to that from the emission of 1 kg of carbon dioxide.
Operational Boundary	The extent and parameters within which an organization measures, reports and manages its GHG emissions. Can be applied to a specific project.
Net-Zero	Project net GHG emissions will equal 0 tonnes of carbon dioxide equivalents. Net GHG emissions = Direct GHG emissions + Acquired energy GHG emissions – Avoided domestic GHG emissions – Offset measures.
Net-Zero Strategy	A credible plan for the Springpole Gold Project to achieve net-zero by 2050. A Net-Zero Strategy does not need to describe every technology or practice the Project will implement over time to achieve net-zero emissions. It is a process to follow in order to make the decisions and investments needed to achieve net-zero emissions by 2050.
Springpole Gold Project or the Project	The Springpole Gold Project is a proposed open pit mine with supporting facilities that includes construction, operations, and closure and decommissioning phases.
Temporal Boundary	The time period within which an organization measures, reports and manages its GHG emissions. Can be applied to a specific project.

1.0 INTRODUCTION

First Mining Gold Corp. (FMG) proposes to develop, operate and eventually decommission and close an open pit gold and silver mine and ore process plant with supporting facilities known as the Springpole Gold Project (Project). The Project is located in a remote area of northwestern Ontario, approximately 110 kilometres (km) northeast of the Municipality of Red Lake and 145 km north of the Municipality of Sioux Lookout (Figure 1-1.

An environmental assessment pursuant to the *Canadian Environmental Assessment Act, 2012* (S.C. 2012, c. 19, s. 52) and the Ontario *Environmental Assessment Act* (R.S.O. 1990, c. E.18) is required to be completed for the Project. This report is one of a series of Technical Support Documents prepared by WSP Canada Inc. on behalf of FMG to describe the predicted environmental effects of the Project.

1.1 Purpose

As a part of Canada's efforts to avert the impacts of climate change, the federal government enacted the *Canadian Net-Zero Emissions Accountability Act* (S.C. 2021, c.22) in June 2021. This legislation outlines the Canadian commitment to achieve net-zero greenhouse gas (GHG) emissions by 2050.

This Net-Zero Strategy demonstrates FMG's commitment to align with the *Canadian Net-Zero Emissions Accountability Act* and achieve a net-zero project. FMG plans to neutralize its emissions in support of embedding a climate-positive approach in all aspects of the Project. The Net-Zero Strategy includes the use of technologies and practices to reduce fossil fuel use, and carbon offsets and credits to balance residual GHG emissions that cannot be eliminated.

As part of the environmental assessment, a GHG inventory was prepared for the Project which outlines the GHG emissions associated with all phases of the Project and with any mitigation measures proposed to minimize the emissions. This Net-Zero Strategy was developed using the GHG inventory and incorporates scheduled review and energy audits so that the most accurate GHG emissions data are used and that the Net-Zero Strategy is updated to reflect advances in GHG mitigation technologies.

The target established for the Net-Zero Strategy is for the net GHG emissions to be equal to zero. These targets will be achieved by minimizing direct GHG (scope 1) and indirect (scope 2) emissions and using offset measures to mitigate residual GHG emissions.

The implementation of the Net-Zero Strategy involves the planning and evaluation of mitigation measures throughout the life of mine and the implementation of offset measures to neutralize residual emissions.

1.2 Project Overview

The Project is proposed to be mined as an open pit. To allow the development and safe operation of the open pit mine, dikes will be established to facilitate controlled dewatering of the open pit basin. Ore from the open pit will be processed in an onsite process plant at approximately 30,000 tonnes per day. Tailings resulting from the processing of ore will be stored in a co-disposal facility.

The main components of the Project include the following:

- Open pit;
- Dikes (west dike and east dike);
- Co-disposal facility for mine rock and tailings (north cell and south cell);
- Surficial soils stockpile;
- Ore stockpiles;
- Process plant or process plant complex;

- Buildings and supporting infrastructure;
- Water management and treatment facilities;
- Fish habitat development area;
- Accommodations complex;
- Aggregate operation(s);
- Transmission line;
- Mine access road; and
- Air strip.

1.3 Greenhouse Gas Assessment Boundaries

In accordance with the Strategic Assessment of Climate Change (SACC; ECCC 2020), the GHG Assessment (Appendix I-1) considers direct emissions from the Project including those for construction activities and land use changes, and indirect acquired energy (electricity) for mining and ore processing.

The assessment boundary for the GHG Assessment defines the scope of direct and indirect emissions for the Project. The Project boundaries encompass the activities associated with the Project that are within the Project Development Area as shown in Figure 1-2.

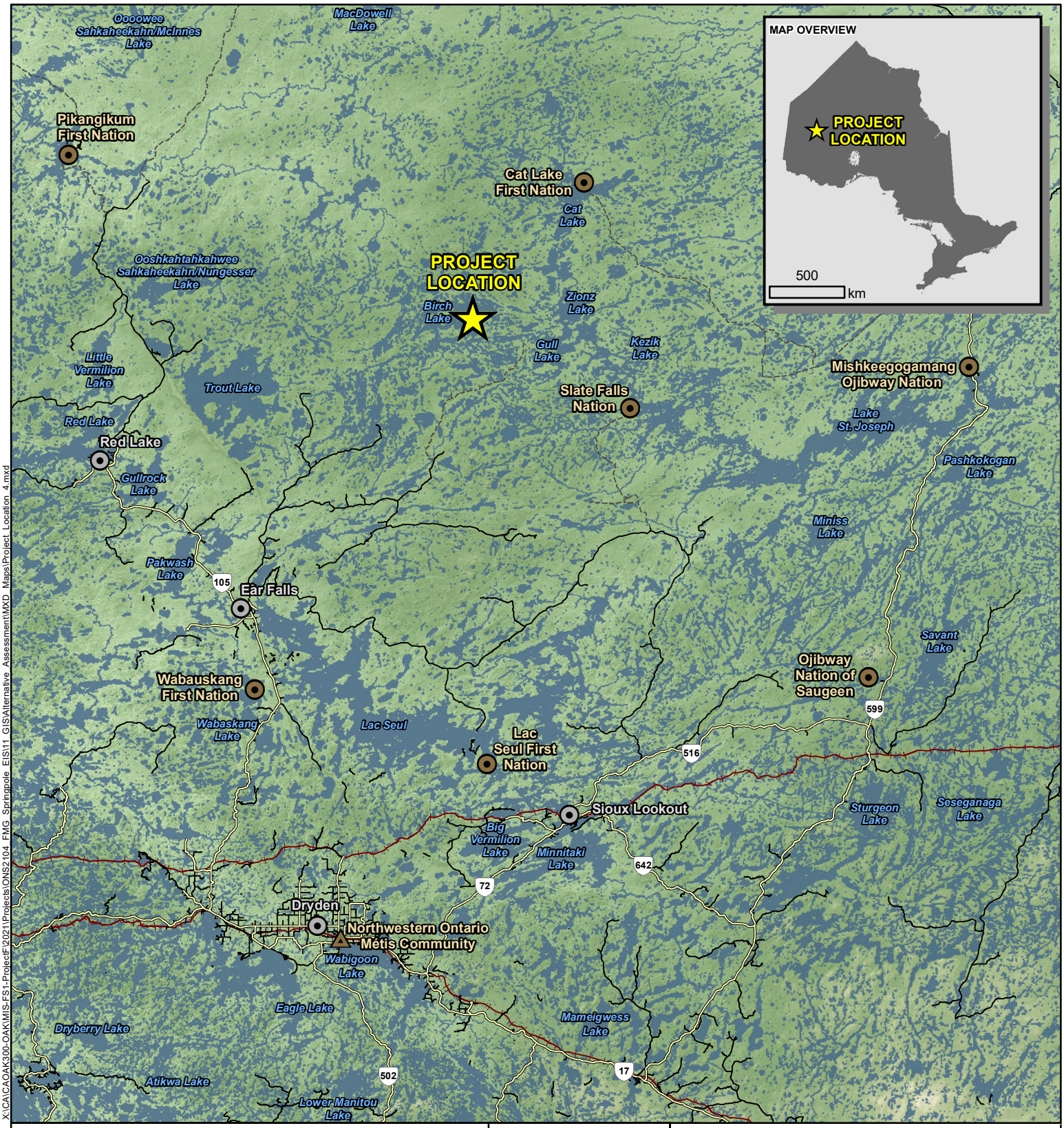
This operational boundary determines which GHG emissions sources and carbon dioxide removals are part of the net GHG determination, and which would be considered upstream or downstream (indirect scope 3), avoided emissions, or carbon offsets.

The temporal boundaries for this assessment span the construction, operations, and decommissioning and closure phases of the Project. The expected duration of the Project phases are as follows:

- Construction phase (Year -3 to Year -1: three years in length);
- Operations phase (Year 1 to Year 10: 10 years in length);
- Decommissioning and closure phase (Year 11 to Year 15: five years in length); and
- Post-closure phase (Years 16+).

After decommissioning and closure of the site, a period of environmental monitoring will follow. The period after the operations phase is represented by three years when material emissions are expected: two years of works similar to the peak construction phase year to decommission the site and one lower-intensity year for minor works after the pit has been filled.

For purposes of this strategy, it was assumed that the Project will be in the post-closure phase in 2050.



LEGEND

- Project Location
- Town
- First Nation Reserve
- Northwestern Ontario Métis Community
- Highway
- Secondary Road
- Resource / Winter Road
- Railway

0 12.5 25 50 75 100 Kilometres

NOTES:
- Topographic information extracted from LIO, MNRF.

Datum: NAD83
Projection: UTM Zone 15N

N W E S

First Mining Gold

WSP

SPRINGPOLE GOLD PROJECT

Project Location

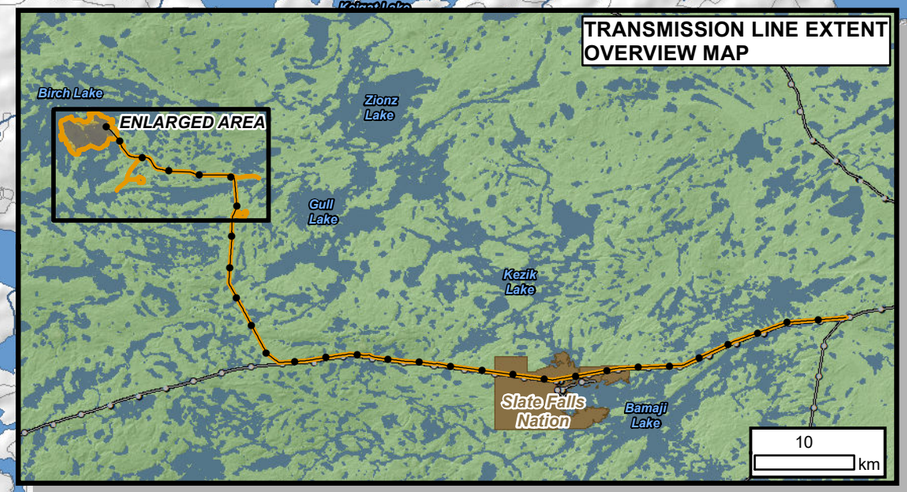
PROJECT N°: ONS2104	**FIGURE: 1-1**
SCALE: 1:1,500,000	DATE: September 2024

547500 550000 552500 555000 557500 560000 562500 565000

5695000 5692500 5690000 5687500 5685000

Birch Lake
Dole Lake
Springpole Lake (North Basin)
Springpole Lake (Southeast Arm)
Cromarty Lake
Satterly Lake
Seagrave Lake
Durkin Lake
Birch River
Wenasaga Forestry Road
L-1
L-16
L-19
L-20
L-10
L-11
L-12
L-13
L-14

TRANSMISSION LINE EXTENT OVERVIEW MAP



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LEGEND

- Project Development Area
- Proposed Mine Feature
- Existing Road
- Watercourse
- Waterbody
- Existing Transmission Line
- Contour (10 m intervals)

0 1 2 4 6 8 10 Kilometres

NOTES:
- Topographic information extracted from LIO, MNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
- 230 kV transmission line provided by First Mining Gold, April 2024.

Datum: NAD83
Projection: UTM Zone 15N

N W E S

First Mining Gold

WSP

SPRINGPOLE GOLD PROJECT

Project Development Area

PROJECT N°: ONS2104 | **FIGURE: 1-2**

SCALE: 1:52,000 | DATE: April 2024

2.0 THE NET-ZERO STRATEGY

First Mining Gold's Net-Zero Strategy describes the commitment and plan to achieve a net-zero project and to embed a climate-positive approach in all aspects of the Project. This Net-Zero Strategy was developed using the GHG emissions inventory prepared in support of the Environmental Impact Statement / Environmental Assessment.

The targets for the Net-Zero Strategy are to achieve the following:

- Net-zero annual emissions in post-closure phase (prior to 2050); and
- Net-zero project (lifetime net GHG emissions are equal to zero).

The targets align with the phases of the Project, rather than with specific years, as GHG mitigation and environmental practices will vary notably depending upon the Project phase.

The Project is estimated to be in the post-closure phase in approximately 2050, and therefore FMG has included a target of achieving a net-zero project that considers lifetime GHG emissions rather than focusing only on annual net GHG emissions. The plan to achieve a net-zero project follows the guidance of the SACC, noting that it is intended to demonstrate how the net GHG emissions will equal 0 kilotonnes of carbon dioxide equivalents (kt-CO_2e) per year by 2050 (ECCC 2021).

Tracking of progress towards achieving the net-zero targets is embedded in the Net-Zero Strategy, with a review and update of the strategy periodically and the GHG inventory annually. As planning progresses, the GHG inventory and Net-Zero Strategy will be refined such that they align with the relevant disclosure or reporting frameworks and with regulatory requirements for facilities reporting to the government programs including participation in the Ontario GHG Emissions Performance Standards (EPS) program for industrial emitters (Government of Ontario 2024).

Periodically, the Net-Zero Strategy will be updated and refined to incorporate the outcomes of the evaluation, optimization and implementation of the GHG mitigation measures. Off-cycle updates and refinements will also be made when new information becomes available or a notable change occurs during the life of mine. A mitigation hierarchy will be followed when considering various net-zero options.

To provide logical and feasible solutions, the four steps below provide the mitigation hierarchy framework which forms the basis of the Net-Zero Strategy.

- **Elimination and substitution:** Prioritize avoiding production of emissions and preventing them in the first place. This can include switching from a traditional fuel such as fossil diesel to a lower carbon fuel (e.g., natural gas or renewable diesel) or the introduction of renewable energy generation. Upon closure, surplus renewable energy generation from solar panels or other renewable sources may be used to avoid fossil fuel power generation off site.
- **Minimization:** Reduce emissions directly from the source. This includes enforcing anti-idling policies to reduce fuel usage during stagnant or idle periods of work, when it is safe to do so.
- **Carbon removals (restoration):** Use strategic vegetation or non-vegetative mechanisms on site to remove carbon dioxide from the atmosphere.
- **Offsets:** Use acquired offsets to compensate for GHG emissions that cannot be otherwise mitigated or avoided. There are several options, including those from the voluntary carbon markets (VCMs) and renewable energy credits (RECs) / clean energy credits (CECs).

The key elements of this Net-Zero Strategy are as follows:

- A Net-Zero Roadmap detailing the plan to achieve FMG's targets (Section 1.0 and Figure 6-1);
- A waterfall graph illustrating the estimated GHG reduction potential of the measures proposed in this Net-Zero Strategy (Section 1.0 and Note: The total lifetime net GHG emissions to the end of active closure (2043), for this scenario are negative (-40 kt-CO2e) with the installation of renewable solar power generation with the production of electricity beyond the demands of the Project.
- Figure 6-2); and
- Year-over-year net GHG emissions and proposed reduction measures (Section 1.0 and Figure 6-3).

3.0 FRAMEWORK AND METHOD

The *Canadian Net-Zero Emissions Accountability Act* is legislation that the federal government has enacted as part of its commitment to achieve net-zero GHG emissions by 2050. The *Canadian Net-Zero Emissions Accountability Act* establishes a legally binding process to set five-year national emissions-reduction targets and to develop credible, science-based emissions-reduction plans to achieve each target; the 2030 GHG emissions target is set at 40 to 45 percent (%) below the 2005 levels by 2050 (ECCC 2022).

The *2030 Emissions Reduction Plan* (ECCC 2022) details a roadmap of how this 2030 target will be achieved. The economy-wide target for 2030 is a reduction of 40% to 443 million tonnes of CO_2e (Mt-CO_2e); to achieve this, the target reduction for the heavy industry sector is 39% (to 52 Mt-CO_2e). Decarbonizing the heavy industry sector is essential for meeting Canada's 2030 climate target, and especially net-zero emissions by 2050, while creating jobs and building a sustainable, globally competitive economy.

3.1 Federal Strategic Assessment of Climate Change

The SACC (ECCC 2020) was developed to enable consistent, predictable, efficient, and transparent consideration of climate changes throughout the impact assessment process for designated projects under the *Impact Assessment Act* (S.C. 2019, c.28, s.1).

The Net-Zero Strategy has been prepared following the SACC guidance (ECCC 2021) where it is compatible with the *Canadian Environmental Assessment Act, 2012* and the Project Environmental Impact Statement Guidelines (CEA Agency 2018). It is based upon the GHG Assessment for the Project (Appendix I-1), where the GHG emissions associated with all phases of the Project are quantified to present the net GHG position for each year of the Project and the cumulative lifetime net GHG emissions. The net GHG emissions consider the relevant and important direct GHG emissions, acquired electricity, and the effect of land use changes on GHGs.

The net GHG emissions for the Project are determined using the following equation:

Net GHG emissions =	Direct GHG emissions (scope 1)
	+ Acquired energy GHG emissions (scope 2)
	- Avoided domestic GHG emissions (GHG emissions reduced or eliminated in Canada as a result of the Project)
	- Offset measures (offset credits, carbon dioxide captured and stored, and corporate-level initiatives)

Source:
ECCC 2021.

The Net-Zero Strategy must demonstrate how the annual net GHG emissions will be equal to 0 tonnes CO_2e (t-CO_2e) in 2050 and for each remaining year of the Project lifetime.

In addition to achieving net-zero annual emissions by 2050, FMG will be implementing measures to reduce the overall Project net GHG emissions to zero.

3.2 Provincial Guidance for the Environmental Assessment Process

Ontario's 2017 guidance document *Considering Climate Change in the Environmental Assessment Process* (Government of Ontario 2017) was also followed, which requires a climate-focused approach to reduce a project's impact on climate change (mitigation). The reduction in GHG emissions achieved with a climate-focused approach is to be compared with a "business as usual" project to illustrate the progress towards net-zero to accompany the roadmap infographic.

4.0 PROJECT NET GREENHOUSE GAS EMISSIONS – SOURCES AND CARBON SINKS

4.1 Greenhouse Gas Emissions and Emissions Sources

GHGs considered in the assessment include carbon dioxide, methane and nitrous oxide. However, as the assessed emissions are all the result of fuel combustion (either directly or indirectly), carbon dioxide emissions are the dominant contributor to total GHGs emissions in units of tonnes-CO_2e. The emissions are delineated by type, including scope 1, scope 2 and those resulting from changes in land use. There are also innovative emission offsets being planned for the Project including carbon dioxide removals, avoided GHG emissions, CECs and carbon offsets. These are discussed in more detail in Section 5.0.

Direct, Scope 1 Greenhouse Gas Emission Sources, Sinks and Reservoirs

Scope 1 emissions encompass the carbon emissions occurring from sources that are owned or controlled by FMG at the Project site, including the mine access road, airstrip, and transmission line during construction. An example of direct GHG emissions would be emissions from blasting and diesel fuel combustion for onsite material movements.

This Net-Zero Strategy includes reduction measures applicable to scope 1 emissions.

Indirect, Scope 2 Acquired Energy (Electricity)

Scope 2 emissions encompass carbon emissions from the generation of electricity purchased by the Project.

This Net-Zero Strategy does not include reduction in the GHG intensity of the electricity supply but includes reductions in electricity demand and substitution of electricity from the grid with renewable generation and the option of purchasing RECs for electricity use.

Indirect, Scope 3 Upstream and Downstream Greenhouse Gas Emissions

Scope 3 emissions encompass carbon emissions or removals which are a consequence of the Project within the Project Development Area but occur at GHG sources or sinks not owned or controlled by FMG. Landfill gases generated and released at an offsite landfill are an example of indirect GHG emissions. Upstream and downstream (indirect) GHG emissions are not included in the current calculation of net GHG emissions.

FMG will implement measures to identify and reduce upstream and downstream GHG emissions.

4.2 Greenhouse Gas Emissions Summary

A forecast of GHG emissions from the Project was prepared to understand key sources and activities that contribute to net-GHG emissions for each year of the Project; this inventory is presented in the GHG Assessment for the Project (Appendix I-1).

A breakdown of the annual GHG emissions is shown in Figure 4-1 presenting the year-over-year trend of different emission sources by Project phase. The maximum year for cumulative GHG emissions is Year 4 (approximately 2032).

The total GHG emission breakdown for the life-of-mine is outlined in Figure 4-2. This chart demonstrates that GHG emissions are primarily from diesel equipment, electricity consumption and propane heating, and therefore these will be key sources to mitigate further in this strategy. Following a mitigation hierarchy, the Project should first try and avoid diesel consumption (i.e., switching to electric fleets, implement anti-idling policies) and then try to minimize the emissions associated with diesel fuel (i.e., switch to a renewable diesel or biodiesel blend). A third step would be to acquire carbon offsets to neutralize the residual emissions.

GHG emissions from the vegetation cleared and soil disturbed to prepare the Project site have conservatively been included in the Net-Zero Strategy; this was done to account for the non-merchantable biomass that is cleared and left in situ. This biomass will undergo biodegradation, which is assumed to be mainly aerobic; however, some methane may be formed from anaerobic biodegradation if there is not enough oxygen for the aerobic microorganisms to thrive.

The sources, avoided emissions, and offset measures identified for all phases of the Project are presented in Table 4-1, and the total life-of-mine GHG emissions are presented in **Error! Reference source not found.**Table 4-2. Revegetation of the site is part of the Project and will absorb carbon dioxide from the air as a carbon sink; as the Project progresses, the carbon removals from new vegetation growth can be reflected in the annual GHG inventories.

The GHG reduction technologies and practices, including offset measures, are described in Section 5.0.

Table 4-1: Summary of Greenhouse Gas Emission Sources, Carbon Dioxide Removals and Offsets, and Avoided Emissions

Category	Total Project GHG Emissions	Source	Source Category	Energy Source
Direct GHG emissions (scope 1)	358.3 kt-CO_2e (59%)	Mobile combustion	Mine fleet (haul trucks)	Diesel fuel
		Mobile combustion	Mining equipment, service vehicles	Diesel fuel, gasoline
		Stationary combustion	Interim primary and backup power generation	Diesel
	77.1 kt-CO_2e (13%)	Stationary combustion	Building and process heat	Propane
	23.2 kt-CO_2e (4%)	Stationary combustion	In pit blasting	Explosives (fuel oil)
Acquired energy GHG emissions (indirect, scope 2)	153.5 kt-CO_2e (25%)	Purchased electricity	Electricity consumption	Ontario grid
Carbon dioxide removals or offsets	Undetermined GHG reduction potential through CO_2e removal, for future consideration	Progressive revegetation	Carbon sink (vegetation), opportunity to incorporate nature-based solutions	N/A

Notes:
Carbon sink removals and resultant GHG emissions are not presented as they are considered qualitatively in the Net-Zero Strategy.
N/A = not applicable.

Table 4-2: Project Greenhouse Gas Emissions during the Project, by Phase

Category [1]	GHG Emissions by Phase (kt-CO_2e)			Project Total GHG Emissions (kt-CO_2e)
	Construction	Operations	Decommissioning and Closure	
Mine access road construction	19.1	N/A	N/A	19.1
Biomass removal and disturbance	142.5	N/A	N/A	142.5
Diesel usage	33.4	307.8	14.3	355.5
Gasoline usage	0.3	2.3	0.1	2.7
Propane usage	4.7	64.8	7.6	77.1
Blasting	3.1	20.1	N/A	23.2
Electricity usage (indirect)	0.1	153.3	0.05	153.5
Net GHG emissions [1]	**203.2**	**548.4**	**22.1**	**773.6**

Notes:
(1) Subtotals may not add to totals due to rounding.
N/A = not applicable.

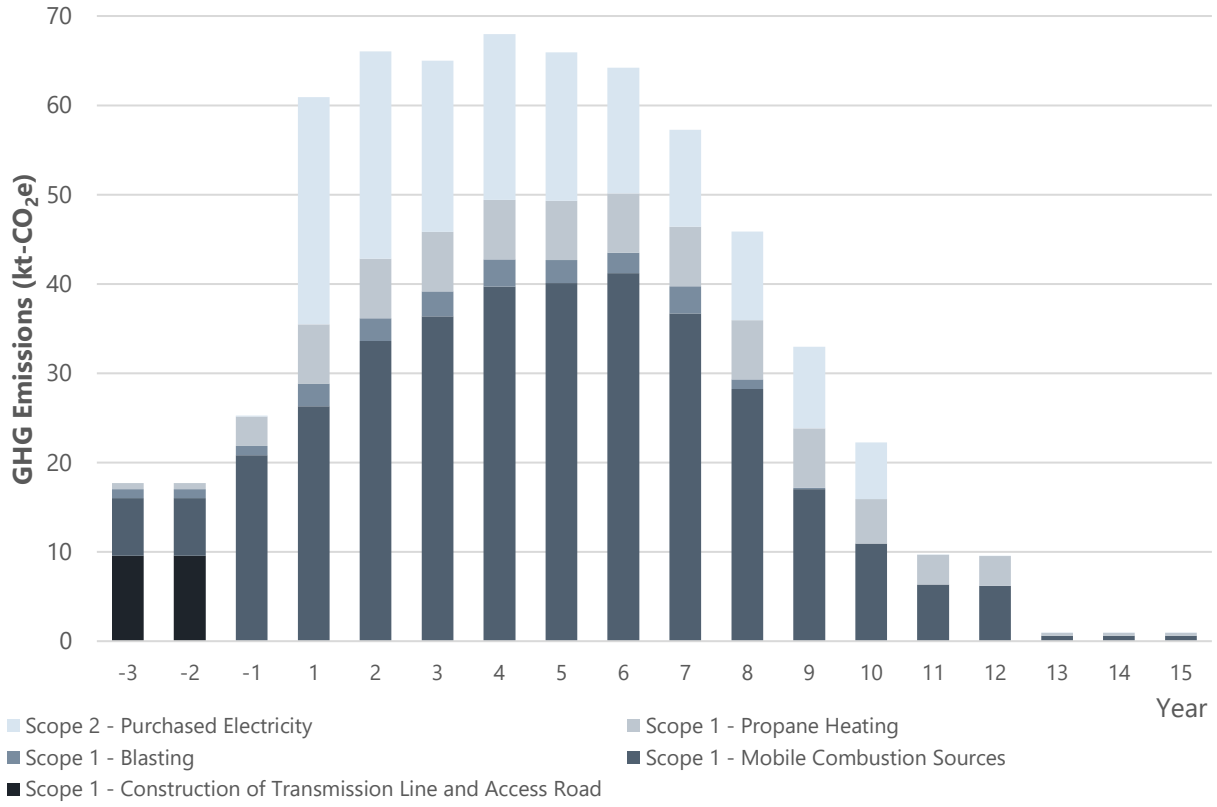


Figure 4-1: Breakdown of Annual Greenhouse Gas Emissions

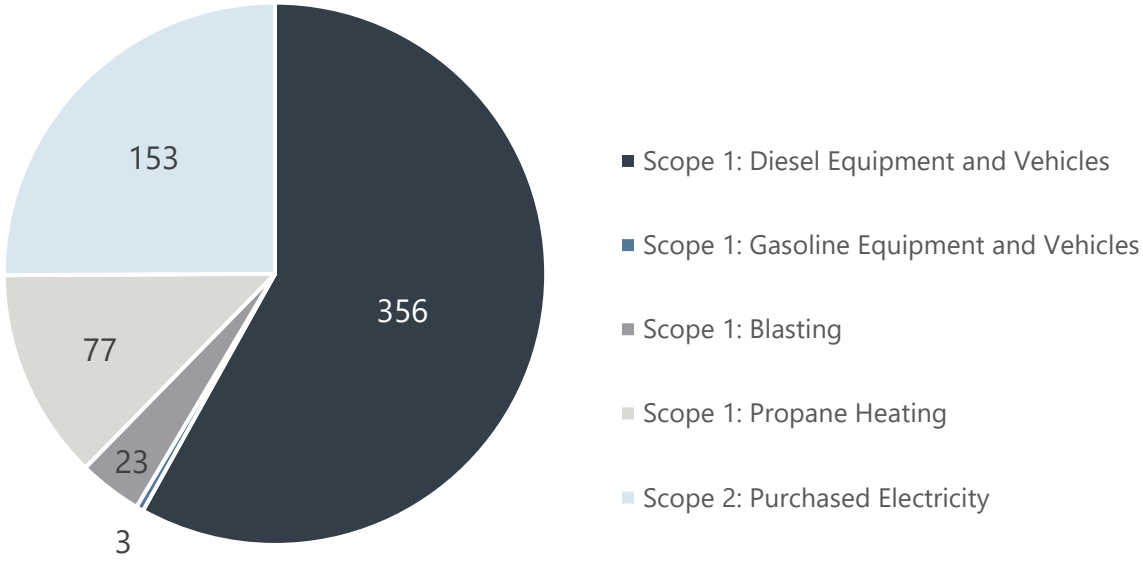


Figure 4-2: Project Net Greenhous Gas Emissions Breakdown (ktonnes-CO_2e)

5.0 GREENHOUSE GAS REDUCTION TECHNOLOGIES AND ENVIRONMENTAL PRACTICES

Achieving net-zero will require implementation of a range of measures to reduce the GHG emissions. This includes the following:

- Management planning;
- Energy and heat conservation and efficiency;
- Electrification of fleet vehicles and the use of lower emission vehicles;
- Incorporating lower carbon energy sources to minimize fossil fuel combustion;
- Incorporating onsite carbon removals (nature-based solutions, non-nature removals);
- Acquiring CECs to compensate for GHG emissions from onsite electricity consumption (scope 2) that cannot be otherwise mitigated;
- Acquiring carbon offsets to compensate for GHG emissions (scope 1) that cannot be mitigated, or generation of carbon offsets from onsite offset projects; and
- Climate-positive actions that reduce scope 3 GHG emissions (upstream and downstream) and maximize avoided emissions.

In this section, the reduction technologies and environmental practices that warrant further consideration are described. Emerging technologies or practices that may become feasible before the end of the operations phase or over the life of mine are also identified, and it is expected that the optimal combination of technologies and practices requires further evaluation of the technical and economical feasibility as the Project planning progresses.

In order to achieve net-zero, a variety of mitigation technologies and environmental practices and other options will be implemented. The measures that may be feasible for the Project are presented in Table 5-1 and will be carried forward for further assessment, and the GHG reduction potential for the measures considered in this mitigation scenario is shown in Table 5-2.

As described in Section 1.0, this Net-Zero Strategy follows a mitigation hierarchy which places emphasis on the prevention and minimization of emissions, before purchasing offsets and credits. In compliance with net-zero mandates, prioritizing actions to diminish organizational emissions is imperative, with offsets and credits serving as a last resort to tackle residual emissions.

The following will be considered when selecting which technologies to implement and the timeline of implementation:

- Capacity of the electricity transmission line to the Project;
- Technology readiness and commercial availability of low-carbon options; and
- Availability of renewable fuels and low-carbon hydrogen.

Periodic updates to the Net-Zero Strategy will allow FMG to incorporate emerging technologies and practices in GHG mitigation technologies. Measures to reduce scope 3 emissions will also be implemented, as described in Section 5.6.

5.1 Greenhouse Gas Reduction, Substitution and Elimination in Project Planning and Design

The Project includes measures incorporated into the design that mitigate GHGs; further details of this consideration can be found in the Environmental Impact Statement / Environmental Assessment, Section 4 (Alternatives Assessment) and Section 8 (Effects of the Environment of the Project) and in the GHG Assessment (Appendix I-1).

The reduction of energy use and associated GHG emissions will be implemented through measures such as the optimization of distances travelled by the haul trucks as part of the mine planning, the advancement in mine waste management from trucked filtered tailings to hydraulically transported thickened tailings, and the electrification of the elution circuit.

Per Section 3 of the Government of Ontario (2017) guidance, indirect emissions were considered in the Project design through the assessment of project alternatives (Section 4 of the Environmental Impact Statement / Environmental Assessment). This included assessing the GHG implications for onsite versus offsite ore processing, workforce accommodations, sewage treatment, explosives manufacturing and waste management.

A number of low-carbon technologies were not incorporated into the GHG emissions estimates and this initial Net-Zero Strategy due to expected constraints related to technical feasibility, economic feasibility or the electricity supply to the Project. FMG will proactively track advancements in these technologies to determine whether there is a viable opportunity to implement one of them, such as:

- Battery electric or alternative fuel haul trucks;
- Continuous miners that use rotary cutters to excavate material in lieu of blasting, commonly used in soft-rock applications;
- Trolley-assisted haulage, in which electrical power is supplied to dual-motored haul trucks by tethering to an overhead electric line; and
- In-pit crushing and conveyance, an alternative to conventional hauling, in which ore and mine rock are transported to an in-pit crusher and the ore is conveyed to the processing facility.

5.2 Carbon Dioxide Removals

Carbon Mineralization

The tailings and mine rock produced by the Project spontaneously and permanently remove carbon dioxide when exposed to the atmosphere via carbon mineralization. This process happens naturally through weathering, but its potential is enhanced through mining processes that break up the rock. Though some degree of carbon removals will occur regardless of additional actions taken by mine operators, research and development around methods for enhanced carbon removal is ongoing at this stage and the potential sequestration was not determined.

Natural Climate Solutions

Natural climate solutions will be incorporated wherever possible to realize the substantial co-benefits in terms of ecosystem preservation, biodiversity and opportunities to incorporate Indigenous Traditional Knowledge.

Nature can act as a carbon sink capable of storing carbon through natural processes. Managing natural processes to capture and store carbon can support carbon sequestration, and in some cases can even be quantified as a carbon offset. Furthermore, incorporating measures that use natural systems to support biodiversity and resiliency represents an opportunity for collaboration with communities, asset owners and other interested parties on initiatives that provide benefits extending beyond the Project boundaries.

Other co-benefits of nature-based solutions include support for biodiversity and habitat protection; forest resilience to climate change impacts, such as absorbing heat and regulating water flows; the ability of forests and trees to reduce air pollution and heat exposure; and the spiritual value forests hold for many people and communities. Any increase in canopy cover is considered beneficial; however, species selection should be in favour of a diverse mix of hardy trees that are native to the area and forecast to be robust in changed

climates over their lifespan. Consideration should also be given to tree shape and canopy size (e.g., incorporating wide spreading shade trees for cooling in hard-surfaced areas), potential contribution to biodiversity (habitat and/or food source) and local guidelines.

Nature-based solutions include activities such as tree planting and management (afforestation and reforestation) or installing green roofs on buildings to make buildings cooler (reduce building heating load), reduce heat flux (reduce building cooling load) and increase biodiversity. The leased lands for the Project include forest parcels that may have opportunity for avoided carbon through strategic management.

This Net-Zero Strategy includes the benefits of progressive revegetating areas on site to take advantage of the carbon removals.

Considering that it is difficult to accurately quantify how much decay will be oxygen starved, this Net-Zero Strategy includes measures to minimize the GHG releases associated with the land clearing by minimizing the area to be cleared by promoting aerobic biodegradation with aeration of the forest residuals and investigating potential uses for this debris.

5.3 Renewable Energy Certificates or Clean Energy Credits

Where access to renewable electricity is not available, purchase of RECs or CECs allocate electricity generated from clean or renewable zero-carbon sources to the Project through a purchase agreement. A single REC or CEC is equivalent to one megawatt-hour (MWh) of renewable or clean energy. The purchased quantity of RECs/CECs should be the same as the quantity of electricity consumed on site that is supplied by the grid; this effectively neutralizes the emissions from scope 2 emissions.

For the purpose of this Net-Zero Strategy, the term REC refers to the offset from renewable energy such as wind and solar. Conversely, the term CEC refers to the offset from clean energy such as hydroelectric and nuclear (in addition to wind and solar). Although there is a slight difference between renewable versus clean, both CECs and RECs are from sources with effectively no emissions.

The REC program is a global market-based initiative that represents the trading of renewable electricity generation. Unlike an offset which represents one metric tonne of emissions avoided, a single REC is equal to 1 MWh of renewable energy.

The holder of this REC/CEC can claim that its electricity came from a renewable source with little to no emissions, thereby offsetting scope 2 emissions associated with acquired electricity. By purchasing RECs/CECs, organizations encourage clean energy production and provide direct financial support to the maintenance or development of renewable and/or clean energy production facilities.

Mechanisms to Access Renewable Energy Certificates

In Ontario, there exists a central registry of CECs through the Midwest Renewable Energy Tracking System. This is an online platform used by organizations to track RECs/CECs, which ensures transparency, auditability and that each REC/CEC is allocated to only one user and is not transferred. For example, Ontario Power Generation creates RECs from hydroelectric power generation, and it openly sells its RECs via the brokerage company Karbone Inc. Once a credit is purchased, the transaction is registered on this portal. However, organizations may also trade RECs/CECs independently or through other means.

These credits are only valid to purchase for the year in which they were generated, with an additional four- to six-month grace period for purchasing. Furthermore, it is recommended that the buyer contact the seller prior to purchase to ensure there are enough credits available and to ensure the seller allocates a certain number of credits to the buyer. For example, a nuclear CEC generated in 2023 is referred to as a 2023 vintage and it must be purchased by the buyer to offset emissions from its 2023 operating year. This purchase must be made by June 2024 at the latest to offset emissions. After June 2024, the credit is deemed

"retired" by the seller and can no longer be purchased. Hydro Quebec launched a similar program in 2023 for its hydroelectric power. It was successful enough to warrant a similar program in 2024. Furthermore, Green-e Program portal publicly lists certified REC providers available in Canada, based on province, and in the US, based on state. Ontario RECs/CECs can be registered on the Midwest Renewable Energy Tracking System Registry, and the proceeds from the sale go on to fund the construction and maintenance of clean energy projects in Ontario.

Oversight of the REC/CEC program is not done by one single entity; therefore, it is recommended that a purchasing organization only buy RECs/CECs that are of reasonable quality and verified by a third party. It is crucial to weigh reputational risks when purchasing credits as claiming emission reductions from low-quality RECs/CECs can potentially pose reputational hazards. Brokerage firms can be engaged to select offsets and credits that are pre-screened to meet market standards.

5.4 Avoided Greenhouse Gas Emissions

Avoided GHG emissions are defined as GHG emissions that are reduced or eliminated in Canada as a result of a project, in this case the Springpole Gold Project (ECCC 2021). They represent the reduction or removal of quantifiable emissions that would be otherwise released into the atmosphere. These avoided GHG emissions only apply to the Project's net GHG emissions and not to upstream or downstream sources. These avoided GHG emissions are not offset measures; avoided GHG emissions reflect diverted emissions and are not a counteractive measure such as RECs or CECs.

5.5 Carbon Offsets

Mitigation to 0 t-CO_2e emissions during mine operations is not possible considering that diesel haul trucks are not yet feasible for use at the Project; therefore, the residual CO_2e emissions will be neutralized by the purchase of carbon offsets.

A carbon offset represents an emission reduction of 1 t-CO_2e.

Offset credits are tradeable units representing verified GHG reductions achieved by a project either by reducing GHG emissions or increasing GHG removals from the atmosphere; an offset credit is equivalent to 1 t-CO_2e reduced from outside of the project GHG boundary, with high-quality offsets considered by FMG.

A carbon offset refers to a net climate benefit from a reduction in GHG emissions, or an increase in carbon storage, that is transferred from an entity outside of the organizational or project boundary to compensate for GHG emissions generated elsewhere; for the Project, it is the net GHG emissions from the Project that are to be offset.

Carbon offsets must be GHG reductions that would not have been generated in the absence of the Project, go beyond legal requirements and are not subject to carbon pollution pricing mechanisms; these include removal offsets and avoidance offsets. To provide context, a removal offset is generated from projects that pull carbon out of the atmosphere, such as tree growth, whereas avoidance offsets are activities that reduce emissions by preventing their release into the atmosphere in the first place, such as fuel switching or efficiency projects.

Focus should be on purchasing carbon offsets linked to carbon removal projects such as reforestation or afforestation. These credits are usually considered to be of higher quality since they meet higher quality criteria.

Compliance Offsets - Federal

Canada's GHG Offset Credit System "encourages municipalities, Indigenous communities, and other project developers to undertake innovative projects that reduce GHGs compared to business-as-usual practices. Proponents of offset projects can generate federal offset credits if they register and implement projects meeting requirements in the Canadian Greenhouse Gas Offset Credit System Regulations [S.O.R./2022-111] and an applicable federal offset protocol." (ECCC 2024b).

An offset tracking system and public registry has been developed federally to support the generation and purchase of offset credits.

There are currently three published protocols: Landfill Methane Recovery and Destruction, Reducing Greenhouse Gas Emissions from Refrigeration Systems, and Improved Forest Management on Private Land (ECCC 2023a,b, 2024a). Draft protocols for Reducing Enteric Methane Emissions from Beef Cattle, Direct Air Carbon Dioxide Capture and Sequestration, Enhanced Soil Organic Carbon, and Avoidance of Manure Methane Emissions through Anaerobic Digestion and Other Treatments are at various stages of development.

Federal offset credits can be sold and used for compliance by facilities covered in the federal Output-Based Pricing System, or can be sold and used by others who are looking to meet voluntary climate targets or commitments. The federal offset credits cannot be applied to provincial GHG EPS carbon-pricing obligations at the time of writing.

Voluntary Carbon Market

There are two main categories of projects: nature-based offset projects and non-nature projects.
Descriptions of potentially applicable offset projects are listed in **Error! Reference source not found.** and w ill be carried forward to further evaluation.

Mechanisms to Access Carbon Offsets

Carbon offsets procurement can be done from two types of carbon markets: 1) the compliance market, a product of government regulations aimed at curbing GHG emissions such as Canada's GHG Offset Credit System, and 2) the VCM, which encompasses diverse transactions worldwide. Ontario does not currently have its own compliance market for carbon offsets.

The province was previously part of the Western Climate Initiative, a regional carbon trading system involving California and Quebec, but it withdrew from the initiative in 2018. For the VCM, several platforms and brokerages facilitate the buying and selling of voluntary carbon offsets (e.g., Gold Standard Marketplace, Climate Action Reserve, Verra, Carbonfund.org, the American Carbon Registry).

Compliance markets also offer the possibility of buying carbon offsets credits. Canada currently has the following compliance-based offset systems: the British Columbia Greenhouse Gas Emission Offset System, the Alberta Emission Offset System, and the Québec Cap-and-Trade Offset System. Purchasing mechanisms depend on carbon offset lifecycle, and buyer purchases options vary along the way, as shown in Figure 5-1.

The right approach for the Project as a buyer will depend on required timing of the offset purchases, the quantity of credits required, the price per credit, and whether the buyer requires a broker or has the capacity to engage directly with individual projects. Generally, the further along the offset project lifecycle, the easier but more expensive it becomes to purchase offset credits.

Purchase from Carbon Exchange

The VCM consists of four main VCM carbon registries: the American Carbon Registry, Climate Action Reserve, Gold Standard and Verra Carbon Standard. The Gold Standard and Verra Carbon Standard operate internationally, and the Verra Carbon Standard is the largest registry currently operating in the VCM.

Parties can invest in an offset project in return for rights to carbon offsets that the project is able to generate. Benefits include "at cost" access to credits and influence on the quality of the offset credits. This is a longer term option, as the lead time before offset credits can be delivered may be several years and the offset credits are generally delivered over time and not in one year.

These arrangements require a contract with the project developer or partner, such as an Emission Reduction Purchase Agreements, which provides the project developer with assurance that they will be able to sell a prescribed quantity of offset credits and establish a price for offset credits for the investor.

Purchase from Offset Project Developer

There is also the option of purchasing carbon offsets directly from the offset project developer, without a contract in place. However, the availability of credits may be a constraint and the offset credit may present quality concerns.

Purchase from Offset Credit Broker

A broker may provide an analysis of the quality of the credits and can facilitate low volume purchases. The broker also can pre-screen the offset credit providers and provide options which fit the Project requirements (e.g., only local credits generated within Ontario). Note that some brokers sell offset credits from projects they have developed or invested in and may not be impartial about offset quality.

5.6 Other Considerations

Evaluation of Potential Technologies and Practices

In order to achieve net-zero for the Project, more than one technology, practice or climate-positive action will be implemented. Evaluation and selection of priority measures to implement first will consider criteria such as the GHG reduction or removal potential, technology readiness, potential supply chain constraints and availability of alternative sources of fuel, and economic feasibility.

The evaluation will also weigh any positive effects (i.e., co-benefits of carbon mitigation or carbon dioxide removals) that may also be realized. Examples of such co-benefits include biodiversity protection or enhancement, supporting resilience, socioeconomic benefits if FMG partners with communities on renewable energy projects, and furthering green technologies through investments or pilot-scale trials.

Measures to Reduce Scope 3 Emissions

Scope 3 emissions are those that occur outside of the Project operational boundary, from sources upstream and downstream. Scope 3 emissions are not explicitly reflected in the Net-Zero Strategy, consistent with the requirements of the SACC.

However, FMG understands the need to achieve GHG reductions in the supply chain to further global climate action, and therefore will complete a scope 3 mapping exercise and screening to identify priority scope 3 emissions sources to target for action.

The mapping will follow the the Greenhouse Gas Protocol corporate value chain standard (GHG Protocol 2021), which considers 15 categories of upstream and downstream emissions to be evaluated.

- Purchased goods and services;
- Capital goods;
- Fuel and energy related activities;
- Transportation and distribution;
- Waste generated in operations;
- Business travel;
- Employee commuting;
- Leased assets;
- Transportation and distribution;
- Processing of sold products;
- Use of sold products;
- End-of-life treatment of sold products;
- Leased assets;
- Franchises; and
- Investments.

Efforts to reduce consumption and increase efficiency that will, in turn, result in GHG reductions that will also be implemented for the Project. Example sustainability efforts that are demonstrated to reduce GHGs include circularity, green procurement strategies, and the protection or rehabilitation of wetlands and terrestrial habitats.

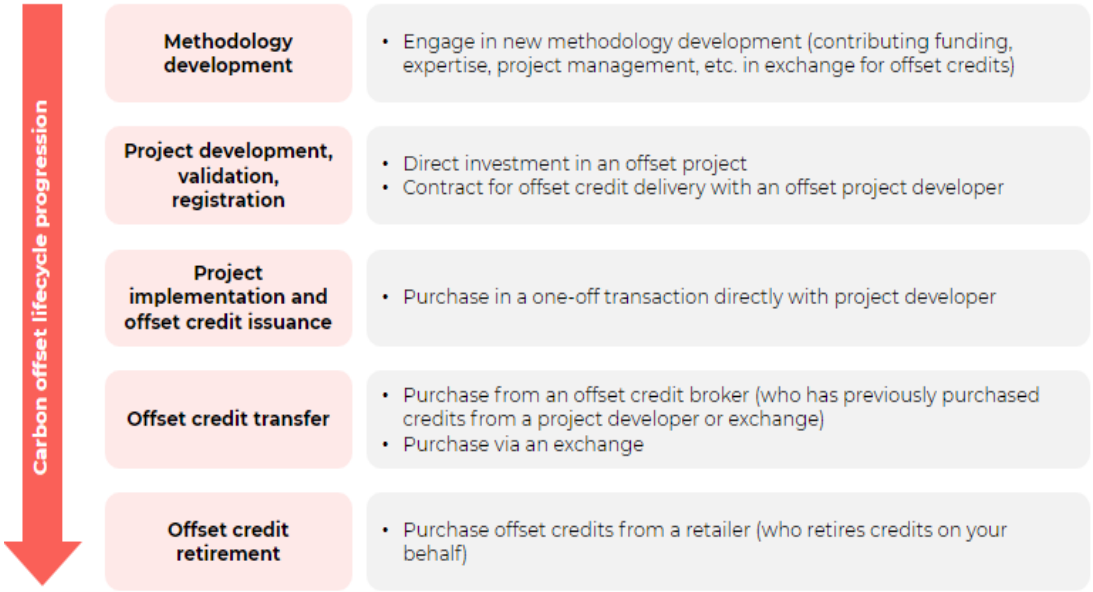


Figure 5-1: Carbon Removal Offsets Process

Table 5-1: Greenhouse Gas Mitigation Technologies, Environmental Practices and Carbon Dioxide Removals

GHG Source or Category	Technology or Practice	Description	GHG Reduction Potential Assessment for Technically Feasible Technologies
Direct GHG emissions (Scope 1)	Change in tailings management and storage	Storage of hydraulically transported thickened tailings rather than transport of dewatered tailings	Reduction in fuel consumption already considered in the baseline net GHG emissions.
	Strategic fleet management (planning and logistics)	Optimization of haul truck movements and cycle times with consideration of fuel consumption; Integrating the preferred option of purchasing zero carbon vehicles and equipment into asset management and replacement strategy	Displacement of diesel and gasoline vehicles and equipment with electric or hydrogen alternatives. Future equipment purchases will benefit from advanced technology readiness of battery electric and hydrogen options.
	Electrification of ancillary vehicles	Diesel and/or gasoline engine replacement with electric alternatives with electricity supplied by the Ontario grid and a portion by onsite renewable generations	Displacement of diesel- and gasoline-powered vehicles with lower carbon intensity vehicles; Baseline net GHG emissions assume 1%, 2% and 3% of fuel usage cumulatively is electrified in Year 5, Year 7 and Year 9, respectively.
	Hybrid electric vehicles and equipment	Eliminates exhaust emissions from fossil fuel combustion and uses equipment that operates electric motors and drivetrains powered by electricity directly (power connection) or indirectly (batteries)	Reduction in diesel or gasoline consumption, insufficient information to quantify the GHG reduction potential.
	Tethered electric equipment	Tethered electric vehicles do not require battery recharging or refueling and are suitable for equipment that does not require travel	Displacement of diesel and gasoline fuels with lower carbon intensity.
	Anti-idling policies	Avoiding or minimizing engine use when vehicles are not undertaking useful work, and equipping construction equipment with a one-minute shutoff timer; May not be feasible during cold weather as engines require warm-up and heat for drivers or equipment operators	4% (Zhang 2021).
	Fuel and energy tracking	Fuel efficiency data and fuel consumption tracking and interpretation to identify inefficiencies or equipment malfunctions	Reduction in diesel or gasoline consumption, insufficient information to quantify the GHG reduction potential. GHG reduction potential of this practice has not been included in the initial Net-Zero Strategy but can be quantified based upon energy savings estimated during scheduled reviews of the Net-Zero Strategy.

Table 5-1: Greenhouse Gas Mitigation Technologies, Environmental Practices and Carbon Dioxide Removals

GHG Source or Category	Technology or Practice	Description	GHG Reduction Potential Assessment for Technically Feasible Technologies
Direct GHG emissions (scope 1)	Equipment maintenance	Regular maintenance manages engine performance and improves fuel efficiency	Reduction in diesel or gasoline consumption, insufficient information to quantify the GHG reduction potential.
	Energy efficient design	Incorporating energy efficient elements such as solar wall systems, occupancy or air quality sensors, and heat recovery systems	GHG reduction potential is unknown, to be determined using fuel and electricity consumption. GHG reduction potential of this practice has not been included in the initial Net-Zero Strategy but can be quantified based upon energy savings estimated during scheduled reviews of the Net-Zero Strategy.
	Modified composition of explosives	The fossil fuel portion of the explosive can be reduced through modification of the composition	GHG reduction potential is unknown, requires collaboration with explosives supplier.
	Renewable diesel or biodiesel	Use of 5% to 7% renewable diesel or biodiesel as a drop-in fuel, which is blended with fossil fuel–derived diesel	100% reduction for the displaced fossil diesel.
	Hydrogen	Hydrogen internal combustion engines or fuel cell vehicles, hydrogen as an energy source for heat and electricity generation	100% reduction for the displaced fossil diesel.
	Renewable natural gas	Renewable natural gas derived from methane produced when biomass degrades in an oxygen-deprived environment (anaerobic)	100% of propane displaced by renewable natural gas.
	Geothermal heating or ground source heat pumps	Reduce fossil fuel heating with the installation of geothermal or ground source heat pumps	Reduction potential unknown, to be determined using fuel and electricity consumption tracking.
Acquired energy GHG emissions (indirect, scope 2)	Renewable energy certificates (RECs) or clean energy credits (CECs)	Purchase of RECs/CECs, each of which is equivalent to 1 MWh of renewable electricity; A green energy power purchase agreement for renewable energy; In Ontario, a registry has been established for transparency of credit transactions and ownership	100% reduction of the kilowatt-hours associated with the purchased credits.
	Onsite renewable energy generation / microgrid	Installation of solar panels and/or wind turbines for electricity generation, with excess renewable electricity	GHG reductions based upon energy intensity of grid or displacement of natural gas or diesel electricity generation for a power purchase agreement for the renewable electricity.

Table 5-1: Greenhouse Gas Mitigation Technologies, Environmental Practices and Carbon Dioxide Removals

GHG Source or Category	Technology or Practice	Description	GHG Reduction Potential Assessment for Technically Feasible Technologies
Carbon dioxide removals	Natural solutions (onsite revegetation / reforestation)	Co-benefits of promoting biodiversity and habitat conservation / rehabilitation	Dependent upon the area reforested and the uptake potential of the species.
	Soil enhancements (biochar)	Increased vegetation and forest growth with high quality soils and carbon sequestration in soils	Carbon sequestration dependent on the quantity of biochar. Insufficient information to predict enhanced tree growth and carbon uptake.
	Carbon mineralization	Use of tailings and mine rock to permanently sequester carbon dioxide through reactions that form stable carbonates	Development of technologies to enhance mineralization are under development, and protocols to quantify the carbon dioxide sequestered through mineralization.

Table 5-2: Summary of Greenhouse Gas Emission and Reductions

Category	Total Project GHG Emissions	Source	Source Category	Energy Source
Direct GHG emissions (scope 1)	358.3 kt-CO_2e (59%)	Mobile combustion	Mine fleet (haul trucks)	Diesel fuel
		Mobile combustion	Mining equipment service vehicles	Diesel fuel gasoline
		Stationary combustion	Interim primary and backup power generation	Diesel
	77.1 kt-CO_2e (13%)	Stationary combustion	Building and process heat	Propane
	23.2 kt-CO_2e (4%)	Stationary combustion	In-pit blasting	Explosives (fuel oil)
Acquired energy GHG emissions (indirect, scope 2)	153.5 kt-CO_2e (25%)	Purchased electricity	Electricity consumption	Ontario grid
Carbon dioxide removals or offsets	CO_2e removal potential undetermined, for future consideration.	Revegetation, reforestation or forest protection Soil enhancements (e.g., biochar)	Nature-based solutions Enhanced natural processes	Not applicable
Renewable energy credits	-153 kt-CO_2e	Electricity	Electricity consumption	Renewable, zero-carbon electricity
Offset credits	-241 kt-CO_2e	High quality carbon credits from the VCM	Not applicable	N/A
		FMG offset credits through partnership or investment	Various	Undetermined
		Carbon mineralization (tailings and mine rock)	Enhanced natural processes	N/A
Avoided GHG emissions	-382 kt-CO_2e	Microgrid electricity generation (solar and/or wind)	Electricity consumption	Renewable energy
		Forest management and preservation	Natural solutions	N/A

Notes:
Shaded cells indicate GHG reduction potential.
Carbon sink removals and resultant GHG emissions are not presented as they are considered qualitatively in the Net-Zero Strategy.
N/A = not applicable.

Table 5-3: Potential Carbon Removal and Offset Options

Offset Project Category	Offset Project	Description
Nature-based offset projects	Forest conservation and afforestation, reforestation and Revegetation	Protecting or restoring degraded or barren land by planting trees. Of note is the United Nations Framework Convention on Climate Change's REDD+ framework (Reducing emissions from deforestation and forest degradation in developing countries) with results-based payments for emissions reductions to developing countries. As of the end of 2022, REDD+ activities implemented by developing countries cover a forest area of approximately 1.35 billion hectares (UNFCCC 2023).
	Improved forest management	Projects on lands owned or controlled by FMG, or partnerships with forest owners for committing to sequester more carbon dioxide than they otherwise could by maintaining sustainable forest management practices over the long term. It allows for sustainable harvesting of wood products. Forests that can demonstrate that carbon stocking in their forests is greater than the regional average are likely to be eligible.
	Biochar	Biochar is a highly concentrated and stable form of carbon. The production of biochar uses pyrolysis, exposing biomass to high heat in the absence of oxygen, with no carbon dioxide emissions. The porous nature of biochar can be used as a soil amendment to improves soil quality through the ability to retain nutrients and water.
	Agricultural projects	Activities to reduce emissions of methane and nitrous oxide, such as livestock and fertilizer management; agroforestry in which trees are planted in the same land areas used for crops or livestock; and regenerative agriculture practices that store sequester soil carbon, such as low-till or no-till practices, cover crop rotation and biochar.
Non-nature projects	Renewable energy	Wind and solar power generation for use off site.
	Waste management	Projects such as capturing methane from landfill and converting it into a reliable energy source or the production of renewable natural gas from the anaerobic digestion of organic wastes.

6.0 A CREDIBLE PATH TO NET-ZERO

A Net-Zero Roadmap detailing the plan to achieve FMG's targets is presented in this section. As outlined in Figure 6-1, various activities are repeated throughout the roadmap to indicate milestones at which it is proposed that this document be reviewed and updated if required. The GHG reduction potential for the technologies and practices considered in this reduction scenario are presented in Figure 6-2, and the annual GHG emissions and reductions/removals are shown in Figure 6-3.

A brief description of the tasks and milestones captured in the Net-Zero Roadmap is provided in Table 6-1 to help contextualize them and provide further guidance on how they should be implemented.

Further technical and economic analysis is required prior to selecting the preferred options for implementation. With respect to the costs associated with implementing the Net-Zero Strategy, the possibility of eligibility for government incentives or reduced financial obligations under the provincial EPS (Government of Ontario 2024) will be explored. Further, the new construction may offer opportunity for integrating energy efficiency measures.

Table 6-1: Decarbonization Roadmap Objectives

Task, Objective or Milestone	Description
Generation of annual GHG inventory	Finalize initial GHG inventory for base year. The GHG inventory will be updated each year.
Development and review of the Net-Zero Strategy	Approval of the strategy and roadmap and allocation of resources (e.g., staff, budget). The roadmap and strategy should be reviewed every four years, at minimum, or when a GHG related project is completed to re-evaluate progress towards achieving targets and implement additional measures if a risk of not achieving the net-zero target is identified.
Net-zero asset planning	Incorporate zero carbon emissions replacements in the asset management planning to account for replacing assets at the end of their useful life and minimize lifecycle carbon and costs for replacement.
Organization-wide energy audit	Conduct an energy audit for the Project and incorporate specific recommendations for retrofits and other energy conservation measures. The energy audit is to be repeated every four years to evaluate successes and identify further opportunities.
Pursuit of funding opportunities	Opportunities to help finance decarbonization may include governmental grants, energy savings and lowering carbon taxes on purchased fossil fuels.
Strategy for offsetting residual carbon emissions	Net-zero planning allows for use of carbon offsets to balance residual GHG emissions, either through purchase or partnerships.
Evaulation and implemention of mitigation measures and carbon removals	GHG mitigation technologies and practices are advancing rapidly, and decarbonization options should be revisited at least every five years to include emerging technologies being brought to market, policies, and programs that address risks and constraints over renewable energy / fuels. Natural and non-natural carbon removal solutions should be procured as options to sequester carbon from the atmosphere and support the net-zero goal.

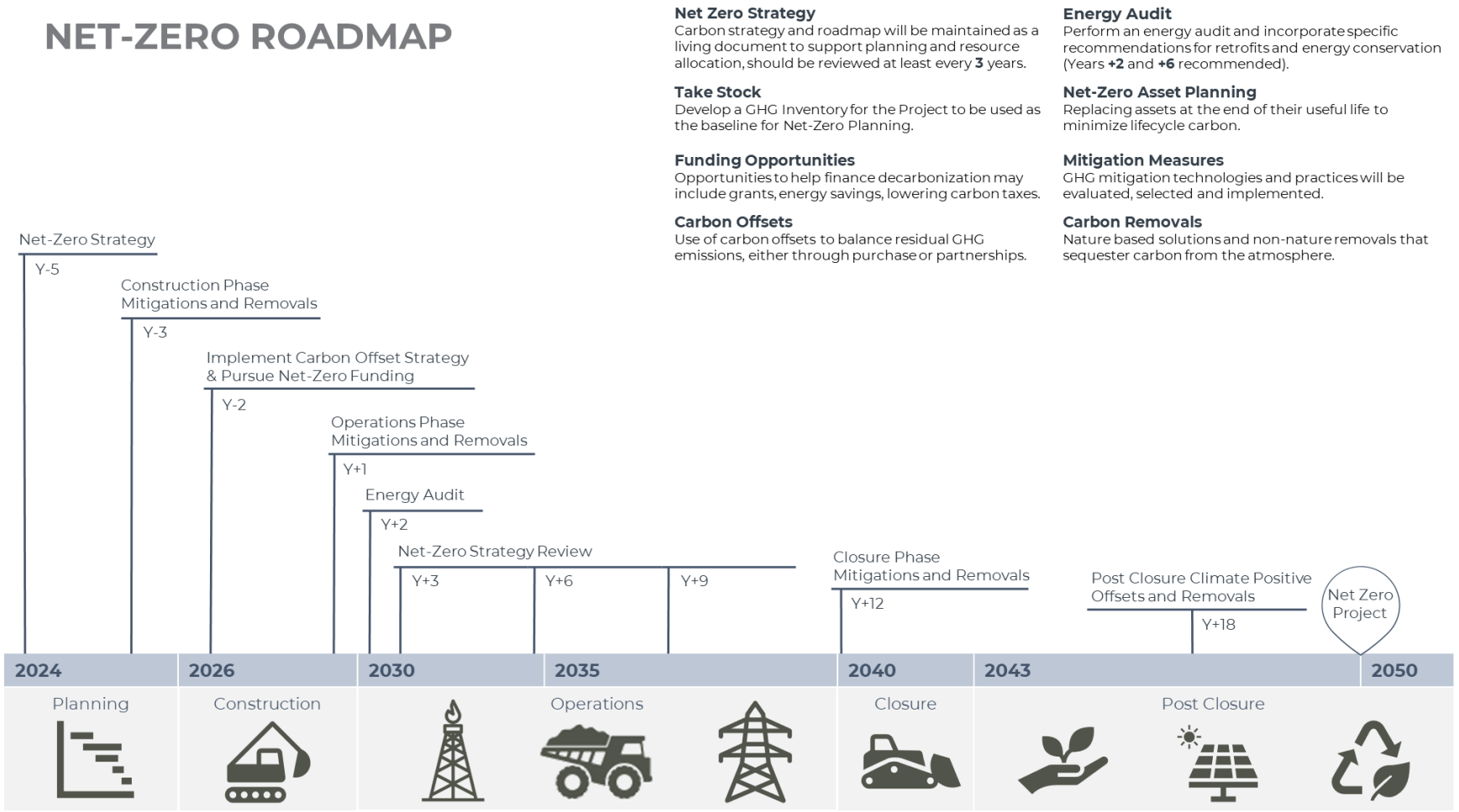
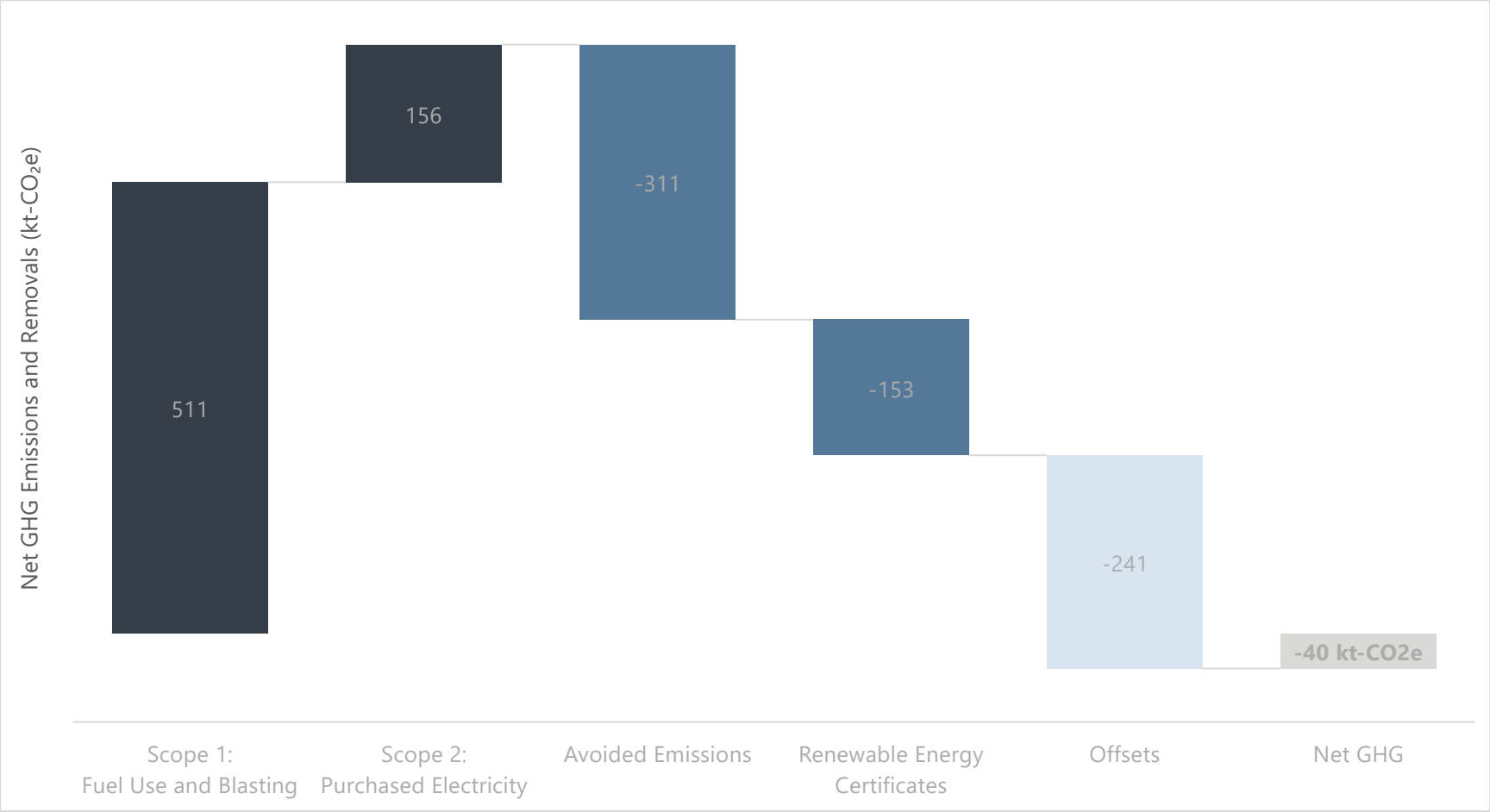


Figure 6-1: Net-Zero Roadmap



Note: The total lifetime net GHG emissions to the end of active closure (2043), for this scenario are negative (-40 kt-CO_2e) with the installation of renewable solar power generation with the production of electricity beyond the demands of the Project.

Figure 6-2: Project Net Greenhouse Gas Emissions and Removals

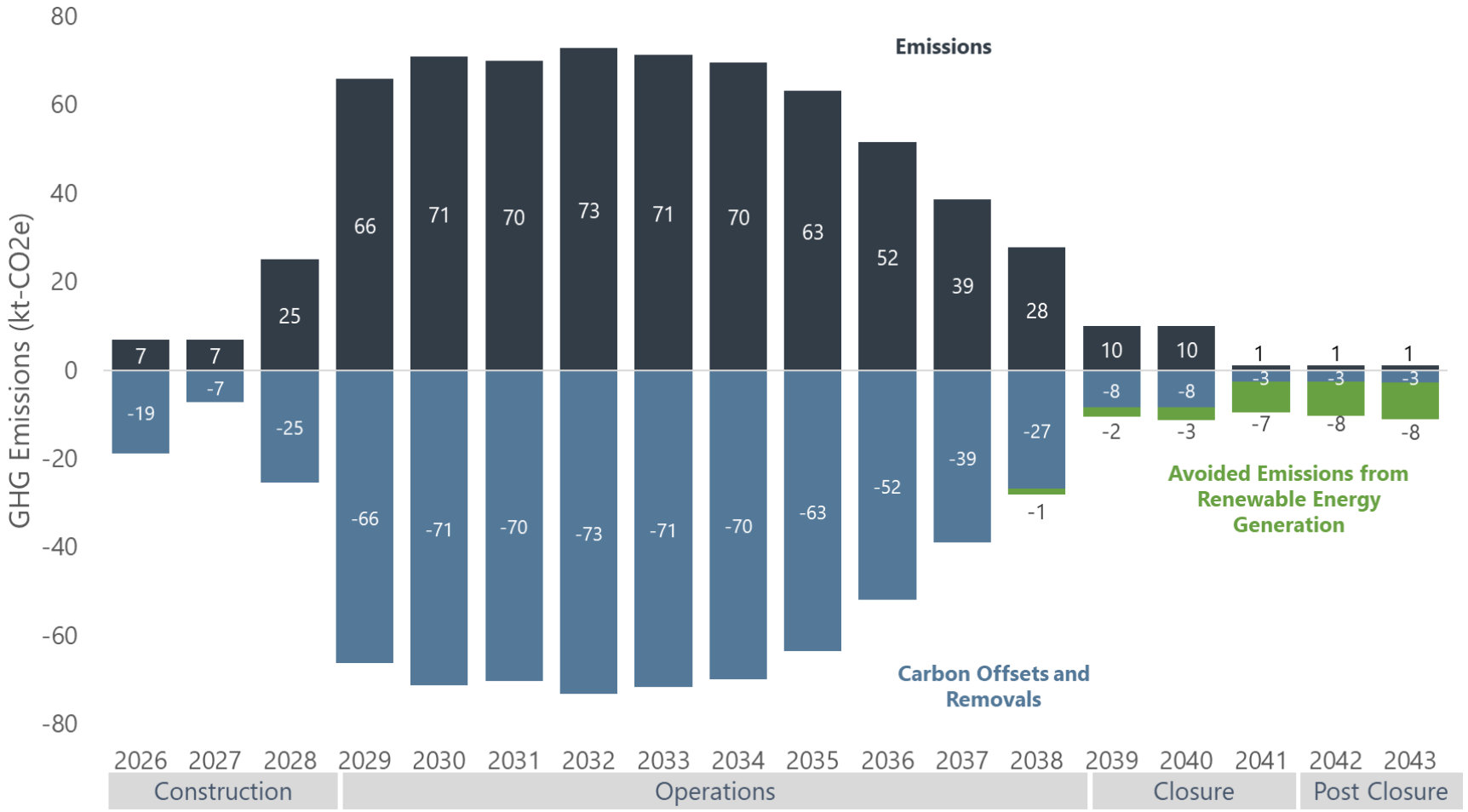


Figure 6-3: Yearly Project Net Greenhouse Gas Progression

7.0 SUMMARY

This Net-Zero Strategy details FMG's commitment for a net-zero project and its efforts to embed a climate-positive approach in all aspects of the Project. This Net-Zero Strategy is presented in support of the target to reduce the net GHG emissions to zero over the life of the project. It follows the mitigation hierarchy, which prioritizes the avoidance and minimization of emissions over the purchase of offsets and credits.

FMG will evaluate all methods of GHG mitigation as the Net-Zero Strategy is progressed, including, but not limited to the following:

- Technologies and environmental practices for GHG reduction;
- Fuel substitution, such as the use of renewable diesel;
- RECs and CECs;
- Carbon offsets; and
- Avoided GHG emissions.

This first iteration of the Net-Zero Strategy and Road Map is based on high-level emission forecasts which produce order-of-magnitude estimates. The Net-Zero Strategy should be reviewed at the detailed design and equipment procurement stage, and again as better data become available and new technologies and practices advance in their technology readiness or feasibility for the Project.

Those technologies and environmental practices identified as likely technically feasible will be investigated further, with outreach to suppliers and/or potential partners to start reviewing mitigation opportunities at the asset level (buildings, equipment and vehicles, heating systems, as examples) to confirm the suitability given the constraints of the remote location and cold winter temperatures. This further study would include more accurate estimates of capital and operating costs, as well as a review of FMG's eligibility for government funding or incentives to implement lower carbon solutions.

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