Finniss Lithium Project

Greenhouse Gas Assessment

28 June 2021

Project No.: 0591191

The business of sustainability

Document details	
Document title	Finniss Lithium Project
Document subtitle	Greenhouse Gas Assessment
Project No.	0591191
Date	28 June 2021
Version	1.5
Author	Ryan McGloin, Angel Sanz
Client Name	Core Lithium Limited

Document history

				ERM approval to issue		
Version	Revision	Author	Reviewed by	Name	Date	Comments
Draft	00	Ryan McGloin Angel Sanz	Ryan McGloin	Bethany Warren	17.05.2021	
Draft	01	Ryan McGloin Angel Sanz	Ryan McGloin	Bethany Warren	25.05.2021	
Final	02	Ryan McGloin Angel Sanz	Ryan McGloin	Bethany Warren	31.05.2021	
Final	03	Ryan McGloin Angel Sanz	Ryan McGloin	Bethany Warren	10.06.2021	
Final	04	Ryan McGloin Angel Sanz	Ryan McGloin	Bethany Warren	25.06.2021	
Final	05	Ryan McGloin	Bethany Warren	Bethany Warren	28.06.2021	

Signature Page

28 June 2021

Finniss Lithium Project

Greenhouse Gas Assessment

Bethany Warren, PhD
Partner
CASANZ Clean Air Quality Professional (CAQP)

Environmental Resources Management Australia Pacific Pty Ltd
Level 15, 309 Kent Street
Sydney NSW 2000

CONTENTS

List of Tables

List of Figures

1. INTRODUCTION

Core Lithium Ltd (Core Lithium), is the sole owner of Lithium Developments (Grants NT) Pty Ltd. Core Lithium has a mining lease for the Finniss Lithium Project (hereby termed the “Project”). The Project lies within the Bynoe Pegmatite Field in the Northern Territory (NT), and covers over 500 square kilometres. Core Lithium has operational control of all mining, processing and other mine related activities undertaken under its mining lease and any associated ancillary mining leases.

1.1 Project Description

Core Lithium is proposing to develop open cut and underground mining operations at four high-grade (1.4% lithium oxide, Li_2O) ore reserves (Grants, BP33, Carlton and Hang Gong) within the Bynoe Pegmatite Field (see Figure 1-1).

The Project will also consist of dense medium separation (DMS) processing facilities that will produce up to 190,000 tpa of lithium concentrate (Li_2O) at 6% product grade (SC6). Commercial SC6 production is anticipated to occur over a 6.25 year period plus an initial 15 month construction/start-up period occurring prior to production (total project life of 7.5 years). The SC6 will be hauled via quad road trains from its mine site to Darwin Port. Currently Core Lithium has a contract to send a portion of the SC6 product to China for refinement. At the time of this report, it has not been determined where the remaining SC6 will be transported, however, it is expected that all the SC6 product will be shipped overseas.

1.2 Scope of Assessment

Environmental Management Resources Australia Pty Ltd (ERM) has been engaged by Core Lithium to undertake a greenhouse gas (GHG) emissions assessment of Scope 1, Scope 2 and selected Scope 3 emissions for the proposed Project.

This assessment includes:

- An assessment of the Project’s Scope 1 and Scope 2 emissions using the National Greenhouse and Energy Reporting (NGER) emission estimation methodology. Emission sources include: land clearing, fuel consumption, electricity usage and blasting.
- An assessment the Project’s Scope 3 emissions using the '*Greenhouse Gas Protocol - Technical Guidance for Calculating Scope 3 Emissions*' and emission factors published by the UK Government (2020). Emission sources include: the transport of products and consumables, business travel and employee commutes.
- A benchmarking section where the Project’s emission intensities (t-CO_2e/t of product produced) are compared against publicly available data from other SC6 production facilities.

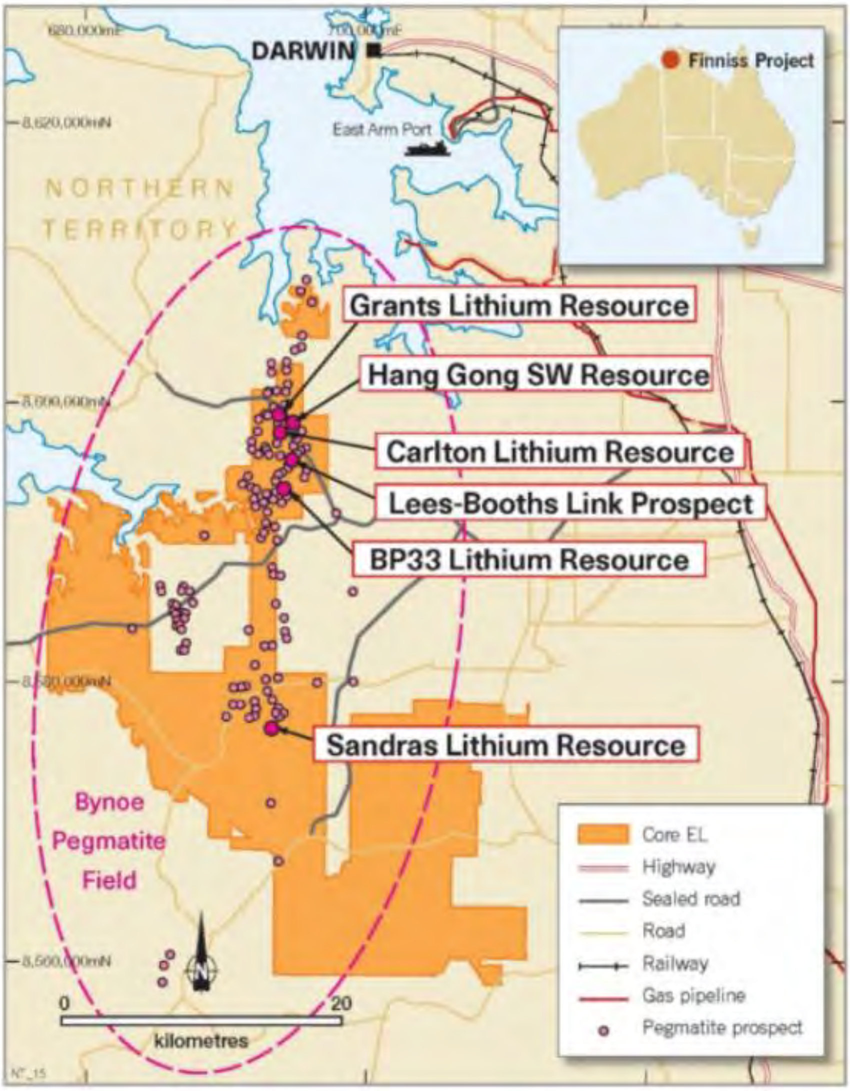

Figure 1-1: Finniss Lithium Project site location

2. LEGISLATION AND GUIDELINES

This section identifies the key international, federal and state government policies and laws regulating GHG emissions, and the prescribed methods and factors for estimating GHG emissions.

2.1 International Context

2.1.1 Intergovernmental Panel on Climate Change

The Intergovernmental Panel on Climate Change (IPCC) is a panel established in 1988 by the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP) to provide independent scientific advice on climate change. The panel was originally asked to prepare a report, based on available scientific information, on all aspects relevant to climate change and its impacts and to formulate realistic response strategies. This first assessment report of the IPCC served as the basis for negotiating the United Nations Framework Convention on Climate Change (UNFCCC).

The IPCC also produce a variety of guidance documents and recommended methodologies for GHG emissions inventories, including (for example):

- the 2006 IPCC Guidelines for National GHG Inventories (IPCC, 2006)
- the Good Practice Guidance and Uncertainty Management in National GHG Inventories (IPCC, 2000).

Since the UNFCCC entered into force in 1994, the IPCC remains the pivotal source for scientific and technical information relevant to GHG emissions and climate change science.

The IPCC operates under a mandate to provide decision-makers with an objective source of information about climate change (IPCC, 1998). The IPCC does not conduct any research nor does it monitor climate-related data or parameters. Its role is to assess on a comprehensive, objective, open and transparent basis the latest scientific, technical and socio-economic literature produced worldwide, relevant to the understanding of the risk of human-induced climate change, it’s observed and projected impacts and options for adaptation and mitigation (IPCC, 1998).

IPCC reports should be neutral with respect to policy, although they need to deal objectively with policy relevant scientific, technical and socio economic factors (IPCC, 2017). The stated aims of the IPCC are to assess scientific information relevant to:

- human-induced climate change;
- the impacts of human-induced climate change; and
- options for adaptation and mitigation.

The IPCC released its fifth assessment report in 2013/2014. The sixth assessment report is anticipated to be published in 2021/2022.

2.1.2 United Nations Framework Convention on Climate Change

The UNFCCC sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognises that the climate system is a shared resource, the stability of which can be affected by industrial and other emissions of carbon dioxide (CO_2) and other GHGs. The convention has near-universal membership, with 172 countries (parties) having ratified the treaty, the Kyoto Protocol.

Under the UNFCCC, governments:

- Gather and share information on GHG emissions, national policies and best practices.

- Launch national strategies for addressing GHG emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries.
- Cooperate in preparing for adaptation to the impacts of climate change.

2.1.3 Kyoto Protocol

The Kyoto Protocol entered into force on 16 February 2005. The Kyoto Protocol built upon the UNFCCC by committing to individual, legally binding targets to limit or reduce GHG emissions. Annex I Parties are countries that were members of the Organisation for Economic Co-operation and Development (OECD) in 1992, plus countries with economies in transition such as Russia. The GHGs included in the Kyoto Protocol are:

- carbon dioxide (CO_2);
- methane (CH_4);
- nitrous oxide (N_2O);
- hydrofluorocarbons (HFCs);
- perfluorocarbons (PFCs); and
- sulfur hexafluoride (SF_6).

Each of the above gases has a different effect on the earth's warming and this is a function of radiative efficiency and lifetime in the atmosphere for each individual gas. To account for these variables, each gas is given a 'global warming potential' (GWP) that is normalised to CO_2. For example, CH_4 has a GWP of 28 over a 100 year lifetime (refer to Table 3-1). This factor is multiplied by the total mass of gas to be released to provide a CO_2 equivalent mass, termed 'CO_2-equivalent' or CO_2-e.

The emission reduction targets were calculated based on a party's domestic GHG emission inventories (which included land use change and forestry clearing, transportation and stationary energy sectors). Domestic inventories required approval by the Kyoto Enforcement Branch. The Kyoto Protocol required developed countries to meet national targets for GHG emissions over its first commitment period of five years between 2008 and 2012.

To achieve their targets, Annex I Parties had to implement domestic policies and measures. The Kyoto Protocol provided an indicative list of policies and measures that might help mitigate climate change and promote sustainable development.

Under the Kyoto Protocol, developed countries could use a number of flexible mechanisms to assist in meeting their targets. These market-based mechanisms include:

- Joint Implementation – where developed countries invest in GHG emission reduction projects in other developed countries.
- Clean Development Mechanism (CDM) – where developed countries invest in GHG emission reduction projects in developing countries.

Annex I countries that failed to meet their emissions reduction targets during the 2008-2012 period were liable for a 30 percent penalty (additional to the level of exceedance).

In Doha, Qatar, the "Doha Amendment to the Kyoto Protocol" was adopted on 8 December 2012. The amendment includes:

- New commitments for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment period from 1 January 2013 to 31 December 2020.
- A revised list of GHGs to be reported on by Parties in the second commitment period.

- Amendments to several articles of the Kyoto Protocol which specifically referenced issues pertaining to the first commitment period and which needed to be updated for the second commitment period.

During the second commitment period, Parties committed to reduce GHG emissions by at least 18% below 1990 levels in the eight-year period from 2013 to 2020; however, the composition of Parties in the second commitment period is different from the first.

2.1.4 Paris Agreement

In 2015, an historic global climate agreement was reached under the UNFCCC at the 21st Conference of the Parties (COP21) in Paris (known as the Paris Agreement). The Paris Agreement sets in place a durable and dynamic framework for all countries to take action on climate change from 2020 (that is, after the Kyoto period), building on existing efforts in the period up to 2020. The Paris Agreement entered into force on 4 November 2016. Key outcomes of the Paris Agreement include:

- A global goal to hold average temperature increase to well below 2°C and pursue efforts to keep warming below 1.5°C above pre-industrial levels.
- All countries to set mitigation targets from 2020 and review targets every five years to build ambition over time, informed by a global stocktake.
- Robust transparency and accountability rules to provide confidence in countries' actions and track progress towards targets.
- Promoting action to adapt and build resilience to climate change.
- Financial, technological and capacity building support to help developing countries implement the Paris Agreement.

2.2 Australian Context

2.2.1 Australia and the Kyoto Protocol

Australia submitted its "instrument of ratification" on 12 December 2007. Ratification came into force for Australia on 11 March 2008 following a mandatory 90 day waiting period. Under the protocol, developed countries are legally required to take domestic action to reduce GHG emissions. Each developed country's target was negotiated and agreed. Australia's national target for the five years of the first commitment period (2008-2012) was to achieve an average of 108% of 1990 emissions. Australia met its first commitment period Kyoto Protocol target. In 2013 the Second Commitment Period (CP2) of the Kyoto Protocol started, which finished at the end of 2020. The changes made to the Kyoto Protocol for CP2 were finalised at the UNFCCC Climate Change Conference in 2012 in Doha, Qatar, leading to the Doha Amendment. Australia negotiated two emission reduction targets for CP2: an 'unconditional' target of 5 per cent to 15 per cent below 2000 emission levels by 2020, plus a 'conditional' target of 25 per cent below 2000 emission levels by 2020.

2.2.2 Australia and the Paris Agreement

In accordance with the Australian Government Department of the Environment and Energy (Energy has been recently moved to the Department of Industry, Science, Energy and Resources), Australia has set a target to reduce emissions by 26-28% below 2005 levels by 2030, which builds on Australia's 2020 target of reducing emissions by 5% below 2000 levels.

2.2.3 The National Greenhouse and Energy Reporting Act (NGER Act)

Federal parliament passed the *National Greenhouse and Energy Reporting Act 2007* (the NGER Act) in September 2007 (Australian Government, 2019). The NGER Act establishes a mandatory corporate reporting system for GHG emissions, energy consumption and production.

Several legislative instruments sit under the NGER Act, providing greater detail about corporations' obligations, which are as follows:

- The NGER Reporting Regulations 2008 (Australian Government, 2020a) sets out the details that establish compliance rules and procedures for administering the NGER Act.
- The NGER (Measurement) Determination 2008 (Australian Government, 2020b) describes the methods, standards and criteria to be applied when estimating GHG emissions, energy production and energy consumption.
- The NGER (Audit) Determination 2009 (Australian Government, 2017a) sets out the requirements for preparing, conducting and reporting on GHG and energy audits.
- The NGER Measurement Technical Guidelines for the estimation of emissions by facilities in Australia (Australian Government, 2017b), assist corporations and liable entities to understand and apply the NGER (Measurement) Determination.
- The NGER (Safeguard Mechanism) Rule 2015 (Australian Government, 2020c) sets out the details that establish compliance rules and procedures for administering the safeguard mechanism, which commenced on 1 July 2016.

The NGER Act is seen as an important first step in the establishment of a domestic emissions trading scheme. This intention is explicitly stated in the objectives for the NGER Act, as follows:

- establish a baseline of emissions for participants in a future Australian emissions trading scheme;
- inform the Australian public;
- meet international reporting obligations; and
- assist policy formulation of all Australian governments while avoiding duplication of similar reporting requirements.

Corporate and facility reporting thresholds for GHGs, energy consumption and energy production are presented in Table 2-1. Core Lithium will be required to submit a NGER report annually for the Project site under their operational control[1] if they exceed the relevant emission thresholds. Note that the thresholds for compulsory NGER report submission are shown in Table 2-1.

[1] In accordance with Section 11 of the NGER Act, “a person has operational control over a facility if they have the authority to introduce and implement any or all of the following for the facility:
• operating policies
• health and safety policies
• environmental policies.”
Where more than one corporation has the authority to introduce and implement any or all of these policies, the corporation that has the greatest authority to introduce and implement operating policies and environmental policies has operational control over the facility.

Table 2-1: Current NGER reporting thresholds

Category	Corporate threshold	Facility threshold
Scope 1 and Scope 2 GHG emissions	50 kt CO_2-e/year a or more	25 kt CO_2-e/year or more
Energy consumption	200 TJ/year or more	100 TJ/year or more
Energy production		

kt CO_2-e = kilo tonnes CO_2-e or 1,000 tonnes CO_2-e.

2.2.4 The National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015

Together with the reporting obligations under the NGER Act 2007, the safeguard mechanism provides a framework for Australia's largest emitters to measure, report and manage their emissions. It does this by encouraging large facilities, whose net emissions exceed the safeguard threshold, to keep their emissions at or below emissions baselines set by the Clean Energy Regulator (CER).

The safeguard mechanism applies to facilities with Scope 1 covered emissions of more than 100,000 t CO_2-e per year. Emissions baselines represent the reference point against which emissions performance is measured under the safeguard mechanism.

Safeguard obligations rest with the person with operational control of the facility, the 'responsible emitter'. This person is required to keep the facility's net emissions at or below its emissions baseline. Responsible emitters with a facility that has, or is likely to, exceed its baseline have a number of options to manage the excess emissions situation. For example, the responsible emitter can reduce the facility's net emissions by purchasing and surrendering Australian Carbon Credit Units (ACCUs) to offset their emissions. Both Kyoto and non-Kyoto ACCUs can be used as offsets under the safeguard mechanism.

The safeguard mechanism is administered through the NGER scheme and is designed to minimise additional mandatory reporting requirements.

A new facility that does not have an existing baseline and is expecting to exceed 100,000 t CO_2-e per year once operational, may apply for a calculated baseline under the new facility criteria. A calculated baseline made under the new facility criteria must commence no later than 1 July 2020. From 1 July 2021, new facilities will apply for a benchmark baseline, where baselines are determined using the least emissions intensive standard for production. An application under the new facility criteria must be accompanied by an independent audit report providing assurance of the forecast production and emissions intensity (if forecast) and that the new facility criteria have been met.

2.2.5 Northern Territory

The NT Government has taken into account the climate change in the last years by creating an Office of Climate Change with a Minister for Climate Change. In July 2020, the Office of Climate Change, Department of Environment and Natural Resources of the NT Government released the "Climate Change Response: Towards 2050" (Northern Territory Government, 2020), which provides a policy framework for the NT Government's strategic management of climate change risks and opportunities.

The Response identifies four key objectives to inform future actions and guide development of mitigation and adaptation strategies:

- Achieve net zero emissions
- Build a resilient Territory
- Unlock opportunities
- Inform and involve

Additionally, the NT Government has developed a "Three-Year Action Plan" to guide the delivery of the "Climate Change Response: Towards 2050", identifying actions over the next three years to establish an effective climate change response.

3. EMISSIONS ESTIMATION METHODOLOGY

3.1 Introduction to GHGs

GHGs are gases in Earth's atmosphere that play an important role in regulating the earth's temperature. The GHG emissions associated with the proposed activities are methane (CH_4), nitrous oxide (N_2O) and carbon dioxide (CO_2). GHG emissions are all expressed as tonnes of carbon dioxide equivalents (t CO_2-e).

Global Warming Potential (GWP) is a measure of the total energy that a gas absorbs over a particular period of time (usually 100 years), compared to carbon dioxide. Carbon dioxide equivalent (CO_2-e) is a metric measure used to compare the emissions from various GHG's based on their GWP (USEPA, 2017). The GWP values used for this assessment are presented in Table 3-1 and were obtained from the IPCC Fifth Assessment Report (IPCC, 2014). These values are recommended to be used by the Greenhouse Gas Protocol (GHG Protocol, 2018) and exclude climate-carbon feedbacks.

Table 3-1: 100-year global warming potential values

GHG	GWP Values
Carbon dioxide (CO_2)	1
Methane (CH_4)	28
Nitrous oxide (N_2O)	265

Source: Table 8.7, Chapter 8 of the IPCC Fifth Assessment Report (IPCC, 2014).

GHG emissions are divided into three categories; i.e. Scope 1, Scope 2 and Scope 3. The definition of each scope, in accordance with the Greenhouse Gas Protocol (World Resources Institute, 2004), is as follows:

- Scope 1 - Direct GHG emissions occur from sources that are owned or controlled by the company, for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment. This includes fugitive emissions such as gas venting or flaring.
- Scope 2 - GHG emissions from the generation of purchased electricity consumed by the company. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organisational boundary of the company. Scope 2 emissions physically occur at the facility where electricity is generated.
- Scope 3 - An optional reporting category that allows for the treatment of all other indirect emissions. Scope 3 emissions are a consequence of the activities of the company, but occur from sources not owned or controlled by the company. Some examples of scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services.

A visual representation of Scope 1, Scope 2 and Scope 3 emissions are provided in Figure 3 1.

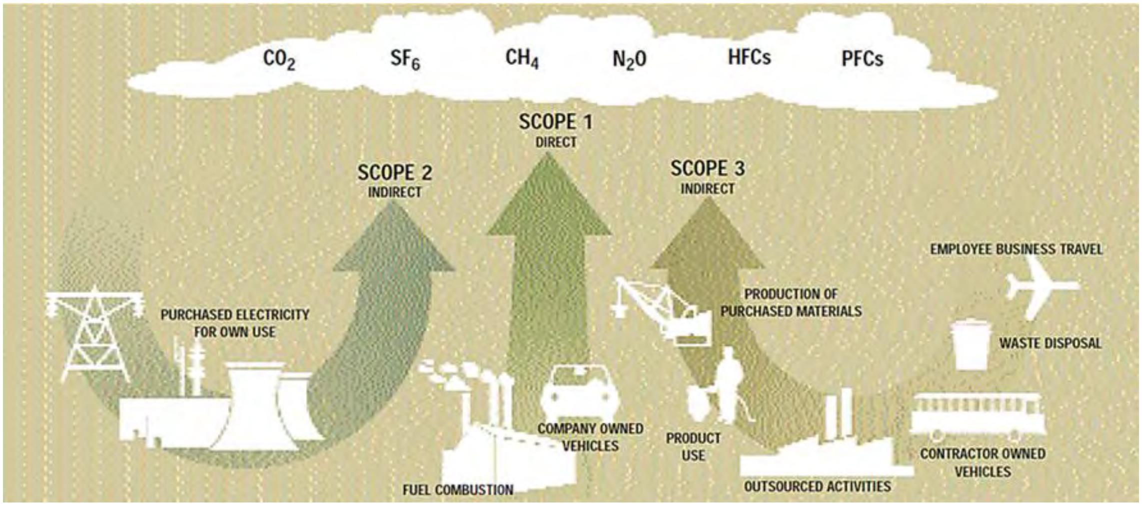

Figure 3-1: Overview of scopes and emissions across a reporting entity (WRI and WBCSD, 2004)

3.2 Methodology Documents

Scope 1 and 2 GHG emissions for this assessment were estimated based on the methods outlined in the following documents:

- NGER (Measurement) Determination 2008 (Australian Government, 2020b) – hereby referred to as the NGER Determination (as discussed in Section 2.2.3).
- NGER Measurement Technical Guidelines (Australian Government, 2017b) – hereby referred to as the NGER Technical Guidelines (as discussed in Section 2.2.3).

Scope 3 GHG emissions were estimated based on the methods outlined in:

- Greenhouse Gas Protocol - Technical Guidance for Calculating Scope 3 Emissions (World Resources Institute, 2013)

3.3 Emission Sources

The GHGs evaluated in this study are carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). The Scope 1 and Scope 2 sources of the GHG emissions identified for the Project are presented in Table 3-2, while the relevant Scope 3 emissions are identified in

Table 3-3. The emissions estimated for these sources are presented in Section 4. It should be noted that the Scope 3 emissions in

Table 3-3 do not represent the full range of Scope 3 emissions associated with the Project. For example, Scope 3 emissions could also be expanded to include the emissions associated with the production of all the equipment and materials used in producing the SC6, however, quantifying all of these emissions would be very difficult and would require activity data from other companies. Standard practice for GHG emission estimation for regulatory reporting purposes is to only include Scope 1 and Scope 2 emissions. This is because Scope 3 emissions are difficult to estimate accurately and will also include an element of 'double-counting' as the Scope 3 emissions of one entity (e.g. employee business travel) will comprise Scope 1 emissions of another entity (e.g. the airline in question). The Scope 3 emissions included in this assessment are intended to provide an indication of the overall carbon footprint of the entire lithium production process, starting with the mining operations and ending with the final refined product.

Table 3-2: GHG emission sources identified

Emission Source	Scope / GHG
Transport combustion – diesel in light vehicles	Scope 1 - CO_2, CH_4 and N_2O
Stationary combustion - diesel combustion	Scope 1 - CO_2, CH_4 and N_2O
Blasting – diesel combustion in explosives	Scope 1 - CO_2, CH_4 and N_2O
Vegetation clearing (life of Project emission source)	Scope 1 - CO_2-e
Purchased electricity consumption	Scope 2 - CO_2-e

Table 3-3: Scope 3 GHG Emission Sources Identified for the Project

Emission Source	Scope / Greenhouse Gases
Emissions from light vehicles operating on site who are not under Lithium Developments' control	Scope 3 - CO_2, CH_4 and N_2O
Emissions associated with transporting the SC6 to Darwin	Scope 3 CO_2-e
Emissions associated with transporting the SC6 from Darwin to China	Scope 3 CO_2-e
Emissions associated with refining the SC6 into refined lithium carbonate	Scope 3 CO_2-e
Emissions associated with transporting consumables and equipment to site	Scope 3 CO_2-e
Emissions associated with transporting waste from the site	Scope 3 CO_2-e
Emissions associated with employee air travel	Scope 3 CO_2-e
Emissions associated with employee commute	Scope 3 CO_2-e
Landfill Emissions	Scope 3 - CH_4

For benchmarking purposes, an emission intensity based on the quantity of production variable produced (in this case SC6) is commonly used as an indicator to compare emissions performance amongst existing facilities or projects with a similar activity. Typically, emission intensities only include Scope 1 and Scope 2 emissions. Benchmarking of the project's emission intensity scenario is presented in Section 5.1.

4. EMISSIONS INVENTORY

4.1 Scope 1 Emissions – Vegetation Clearing

Carbon stored in vegetation that is cleared in order to build the infrastructure associated with the Project will be released into the atmosphere as one-off CO_2 emissions. Land clearing will also result in changes to the carbon sinks in the soil and debris.

In this assessment, the GHG emissions associated with land clearing were estimated using the Full Carbon Accounting Model (FullCAM).

While FullCAM is not a prescribed methodology under the NGER legislation, it is the model used to construct Australia's national GHG emissions account for the land sector.

FullCAM estimates the carbon stock change in ecosystems including:

- above and belowground biomass
- standing and decomposing debris
- soil carbon resulting from land use and management activities.

The majority of vegetation cleared at the Project site during the clearing process will consist of woodland such as Eucalyptus Miniata, Eucalyptus Tetrodonta and Corymbia Bleeseri, and open tussock grassland (as stated in Core Lithium's responses to the GHG RFI). The vegetation that best matched these characteristics in the FullCAM database was "Tropical Eucalyptus woodland / grasslands". The default vegetation characteristics for "Tropical Eucalyptus woodland / grasslands", as well as the local soil and climate characteristics, were downloaded from the FullCAM database.

The FullCAM model was initially run for a baseline scenario with no disturbance events during the life of the Project (2022 to 2029). A second scenario was then run with a single disturbance event where all vegetation was cleared during the start-up/construction phase (January 2022). The carbon mass (C) in t/ha for the biomass, debris and soil at the end of the simulation was then multiplied by the predicted area of land clearing for the Project, 651.9 ha (as stated in Core Lithium's responses to the GHG RFI). The total C loss due to land disturbances was estimated as the difference between the total C at the end of baseline scenario and the total C at the end of the land-clearing scenario, the C loss was then converted into emissions of CO_2-e (see Table 4-1). Note that emissions for land clearing are presented as cumulative totals over the entire operation period and not on a per year basis.

Table 4-1: Total GHG emissions from land disturbance for the life of Project

Emission Source	C Content at the end of the Baseline Simulation (t)	C Content at the end of the Land-Clearing Simulation (t)	C Losses (t)	CO_2 Emissions (t CO_2-e) [a]
Vegetation	28,990	0	28,990	106,232
Debris	11,617	6,271	5,346	19,589
Soil	12,354	10,398	1,956	7,167
Total	**52,960**	**16,669**	**36,291**	**132,987**

a. Based on a total area of disturbance of 651.9 ha. Emissions rounded to the nearest tonne of CO_2-e.

4.2 Scope 1 Emissions – Fuel Combustion

4.2.1 Transport Purposes

Diesel is anticipated to be consumed in on-site light vehicles for transport purposes. Emissions of CO_2, CH_4 and N_2O were estimated using Method 1 (Division 2.4.2, *Method 1 - emissions of carbon dioxide, methane and nitrous oxide from liquid fuels other than petroleum based oils or greases* of the *NGER Determination*) using the below equation.

$$E_j = \frac{Q \times EC \times EF_{joxec}}{1000}$$

where:

E_j	=	Estimated emissions of gas type (j) from diesel combustion	(t CO_2-e/yr)
Q	=	Quantity of diesel combusted in the year	(kL/yr)
EC	=	Energy content factor of diesel	(GJ/kL)
EF_{joxec}	=	Emission factor for each gas type (j)	(kg CO_2-e/GJ)

The default emission factors from Division 4.2, Part 4, Schedule 1 of the *NGER Determination* were used to estimate light vehicles emissions, as presented in Table 4-2. These emission factors are specifically associated with transport energy purposes, including purposes for which fuel is combusted for any of the following activities:

- transport by vehicles registered for road use
- rail transport
- marine navigation
- air transport.

As such, emissions from fuel combustion in mobile mining equipment and mining vehicles are estimated using the default emissions factors for stationary energy purposes presented in Section 4.2.2 as these vehicles are not registered for road use.

Forecast total annual quantities of diesel combusted in light vehicles for the start-up/construction and commercial production phases were provided by Core Lithium, as shown in Table 4-3 and Table 4-4. The estimated annual average and total emissions for the two phases are presented in Table 4-5 and Table 4-6.

Table 4-2: Energy content and emission factors associated with fuel combustion for transport

Description	Value	Units
Default energy content factor – diesel	38.6	GJ/kL
Scope 1 default CO_2 emission factor – diesel	69.9	kg CO_2-e/ GJ
Scope 1 default CH_4 emission factor – diesel	0.01	
Scope 1 default N_2O emission factor – diesel	0.5	

Reference: Division 4.2, Part 4, Schedule 1 of the 2020 NGER Determination.

Table 4-3: Fuel consumption for transport during the start-up/construction phase

Description	Value	Units
Phase length [a]	1.25	years
Annual quantity of diesel consumed in light vehicles at Finniss site [b]	60	kL/year

a. Reference: Core GHG RFI: 210520_Finniss GHG Project Emissions Calculations UPDATED INFO.xlsx.
b. It has been assumed that all light vehicles operating on site are under core Lithium's operational control, including contractor vehicles.

Table 4-4: Fuel consumption for transport during the commercial production phase

Description	Value	Units
Phase length [a]	6.25	years
Annual quantity of diesel consumed in light vehicles at Finniss site [b]	60	kL/year

a. Reference: Core GHG RFI: 210520_Finniss GHG Project Emissions Calculations UPDATED INFO.xlsx.
b. It has been assumed that all light vehicles operating on site are under core Lithium's operational control, including contractor vehicles.

Table 4-5: GHG emissions from fuel combustion for transport during the start-up/construction phase

Emission Source	Scenario	GHG Emissions (t CO_2-e)			
		CO_2	CH_4	N_2O	Total
Diesel consumption in light vehicles	Annual	189	0	1	190
	Total	236	0	2	238

Emissions rounded to the nearest tonne of CO_2-e.

Table 4-6: GHG emissions from fuel combustion for transport during the commercial production phase

Emission Source	Scenario	GHG Emissions (t CO_2-e)			
		CO_2	CH_4	N_2O	Total
Diesel consumption in light vehicles	Annual	189	0	1	190
	Total	1,180	0	9	1,189

Emissions rounded to the nearest tonne of CO_2-e.

4.2.2 Stationary Energy Purposes

It is anticipated that during the start-up/construction phase diesel fuel will be consumed in large mobile mining equipment, in the DMS processing facilities and in generators. During the commercial production phase there will be a switch from the diesel generators to grid electricity. It is also expected that some petroleum-based oil (PBO) will be used as engine lubricant (indirect combustion).

Emissions of CO_2, CH_4 and N_2O from gaseous or liquid fuel combustion were estimated using Method 1 outlined within the NGER Determination (Division 2.3.2, *Method 1 - emissions of carbon dioxide, methane and nitrous oxide from gaseous fuels or* Division 2.4.2, *Method 1 - emissions of carbon dioxide, methane and nitrous oxide from liquid fuels other than petroleum based oils or greases*) using the below equation.

$$E_j = \frac{Q \times EC \times EF_{joxec}}{1000}$$

where:

E_j	=	Estimated emissions of gas type (j) from fuel combustion	(t CO_2-e/yr)
Q	=	Estimated quantity of fuel combusted in the year	(kL/yr)
EC	=	Energy content factor of fuel	(GJ/kL)
EF_{joxec}	=	Emission factor for each gas type (j)	(kg CO_2-e/GJ)

The emission factors and energy content factors from *Schedule 1, Part 3* of the *NGER Determination* were used to estimate the emissions from diesel as presented Table 4-7. The emission factors and energy content factors from Section 2.4.2A of the 2017 NGER Technical Guidelines were used to estimate the emissions from PBO as engine lubricants, as presented in Table 4-7. The default emission factors available for PBO from Table 2.4.2A of the *NGER Technical Guidelines* assume that approximately 80% of PBO is recycled off-site.

Forecast total annual quantities of liquid fuels consumed for the start-up/construction and commercial production phases were provided by Core Lithium, as shown in Table 4-8 and Table 4-9. The estimated annual average and total emissions for the two phases are presented in Table 4-10 and Table 4-11.

Table 4-7: Energy content factor and emission factors associated with fuel combustion for stationary energy purposes

Description	Value	Units
Default energy content factor – diesel oil [a]	38.6	GJ/kL
Scope 1 default CO_2 emission factor – diesel oil [a]	69.9	kg CO_2-e/ GJ
Scope 1 default CH_4 emission factor – diesel oil [a]	0.1	
Scope 1 default N_2O emission factor – diesel oil [a]	0.2	
Default energy content factor – PBO and PBG [b]	38.8	GJ/kL
Scope 1 default CO_2 emission factor – PBO and PBG [b]	13.9	kg CO_2-e/ GJ

a. Reference: Part 3, Schedule 1, NGER Determination.

b. Reference: Table 2.4.2A, 2017 NGER Technical Guidelines. CO_2 emission factor based on an oxidation factor where 80% of PBO is recycled off-site.

Table 4-8: Activity data for fuel combustion for stationary energy purposes during the start-up/construction phase

Description	Value	Units
Phase length [a]	1.25	years
Amount of diesel combusted in large mobile mining equipment [b]	12,990	kL/year
Amount of diesel combusted in SC6 concentrate processing [c]	210	kL/year
Amount of diesel combusted for electricity generation purposes [d]	1,260	kL/year
Amount of oil used as engine lubricant [a]	40.4	kL/year

a. Reference: Core GHG RFI: 210520_Finniss GHG Project Emissions Calculations UPDATED INFO.xlsx.

b. The annual diesel usage during the construction phase was taken as the fuel usage in year one of the Project (as provided in the assumptions tab in Core Lithium's responses to the RFI).

c. Core Lithium has advised that there will be some diesel consumption in the SC6 processing facilities during the ramp up phase. It has been assumed that this consumption is the same as during the production phase.

d. Converted to an annual basis using the total 1.89 ML value for 18 months provided in Core Lithium's responses to the RFI.

Table 4-9: Activity data for fuel combustion for stationary energy purposes during the commercial production phase

Description	Value	Units
Phase length	6.25	years
Amount of diesel combusted in large mobile mining equipment	5,930	kL/year
Amount of diesel combusted in SC6 concentrate processing	210	kL/year
Amount of diesel combusted for electricity generation purposes	0	kL/year
Amount of oil used as engine lubricant	40.4	kL/year

Reference: Core GHG RFI: 210520_Finniss GHG Project Emissions Calculations UPDATED INFO.xlsx.

Table 4-10: GHG emissions from fuel combustion for stationary energy purposes during the start-up/construction phase

Emission Source	Scenario	GHG Emissions (t CO_2-e)			
		CO_2	CH_4	N_2O	Total
Diesel combustion - large mobile mining equipment	Annual	35,049	50	100	**35,199**
	Total	43,811	63	125	**43,999**
Diesel combustion - processing facilities	Annual	567	1	2	**569**
	Total	708	1	2	**711**
Diesel combustion - electricity generation	Annual	3,400	5	10	**3,414**
	Total	4,250	6	12	**4,268**
Petroleum oil combustion - engine lubricant	Annual	22	0	0	**22**
	Total	27	0	0	**27**

Emissions rounded to the nearest tonne of CO_2-e.

Table 4-11: GHG emissions from fuel combustion for stationary energy purposes during the commercial production phase

Emission Source	Scenario	GHG Emissions (t CO_2-e)			
		CO_2	CH_4	N_2O	Total
Diesel combustion - large mobile mining equipment	Annual	16,000	23	46	**16,069**
	Total	100,000	143	286	**100,429**
Diesel combustion - processing facilities	Annual	567	1	2	**569**
	Total	3,541	5	10	**3,557**
Diesel combustion - electricity generation	Annual	0	0	0	**0**
	Total	0	0	0	**0**
Petroleum oil combustion - engine lubricant	Annual	22	0	0	**22**
	Total	136	0	0	**136**

Emissions rounded to the nearest tonne of CO_2-e.

4.2.3 Blasting – Explosive Combustion

For blasting activities, GHG emissions are solely associated with the combustion of the fuel oil or diesel oil component contained in the explosives. Since Core Lithium has indicated that the explosives type used in the Project will be Emulsions, it is likely that the fuel used in the explosives will be diesel. Emissions of CO_2, CH_4 and N_2O from combustion of diesel for anticipated blasting were estimated using Method 1 outlined within the *NGER Determination* (*Method 1 - emissions of carbon dioxide, methane and nitrous oxide from liquid fuels other than petroleum based oils or greases*) using the below equation.

$$E_j = \frac{Q \times EC \times EF_{joxec}}{1000}$$

where:

E_j	=	Estimated emissions of gas type (j) from fuel combustion	(t CO_2-e/yr)
Q	=	Estimated quantity of fuel combusted in the year	(kL/yr)
EC	=	Energy content factor of fuel	(GJ/kL)
EF_{joxec}	=	Emission factor for each gas type (j)	(kg CO_2-e/GJ)

The quantity of diesel oil combusted during blasting was calculated using the equation below:

$$Q = \frac{T \times D}{\rho}$$

where:

Q	=	Estimated quantity of fuel combusted in the year	(kL/yr)
T	=	Estimated quantity of explosives used in a year	(kg/yr)
D	=	Typical emulsion diesel fraction (tonne diesel/tonnes explosive)	(-)
ρ	=	Density of diesel	(kg/kL)

Emission factors and energy content factors from *Schedule 1, Part 3* of the *NGER Determination* were used to estimate the emissions from diesel as presented in Table 4-12. Assumed values used to estimate the quantity of diesel oil combusted during blasting are also included in Table 4-12.

Forecast total annual quantities of explosives to be consumed during blasting were provided by Core Lithium, as shown in Table 4-13. The estimated annual and life of Project emissions are presented in Table 4-14.

Table 4-12: Energy content factor and emission factors associated with fuel combustion for blasting purposes

Description	Value	Units
Default energy content factor – diesel oil [a]	38.6	GJ/kL
Scope 1 default CO_2 emission factor – diesel oil [a]	69.9	kg CO_2-e/GJ
Scope 1 default CH_4 emission factor – diesel oil [a]	0.1	
Scope 1 default N_2O emission factor – diesel oil [a]	0.2	
Typical emulsion diesel fraction [b]	0.06	tonne of diesel/ tonne of explosive
Density of diesel [c]	0.84	kg/L

a. Reference: Part 3, Schedule 1, NGER Determination.

b. Reference: Table 8, page 21, Appendix C of National Pollutant Inventory Emission Estimation Technique Manual for Explosives Detonation and Firing Ranges Version 3.1. Note in order to be conservative, it is assumed that the percentage of diesel in the emulsion explosives is the same as the percentage of fuel oil in ANFO.

c. Reference: World Resources Institute (2015). GHG Protocol tool for stationary combustion. Version 4.1.

Table 4-13: Activity data for fuel combustion for blasting purposes

Description	Value	Units
Expected amount of explosives used during the life of the Project	26,000	tonnes/life of Project
Project length (including construction and start-up phase)	7.5	years
Reference: Core GHG RFI: 210520_Finniss GHG Project Emissions Calculations UPDATED INFO.xlsx.		

Table 4-14: GHG emissions from fuel combustion for blasting purposes for the life of the project

Emission Source	Scenario	GHG Emissions (t CO_2-e)			
		CO_2	CH_4	N_2O	Total
Blasting – explosives usage	Annual	668	1	2	**671**
	Total	5,011	7	14	**5,032**
Emissions rounded to the nearest tonne of CO_2-e.					

4.3 Scope 2 Emissions – Purchased Electricity Consumption

Scope 2 emissions of CO_2-e associated with purchased electricity were estimated using Method 1 (*Division 7.2, Method 1 – purchase of electricity from main electricity grid in a State or Territory of the 2020 NGER Determination*) using the below equation.

$$Y = Q \times \frac{EF_{S2}}{1000}$$

where:

Y	=	Scope 2 GHG emissions	(t CO_2-e/yr)
Q	=	Quantity of electricity purchased during the year and consumed from the operation of the facility	(kWh/yr)
EF_{S2}	=	Default Scope 2 emission factor	(kg CO_2-e/kWh)

The default Scope 2 emission factor for the NT from Part 6 of Schedule 1 of the *2020 NGER Determination* was used for this assessment, as presented in Table 4-15.

Forecast total annual power requirement was provided by Core Lithium and this was used to estimate the electricity consumption, as shown in Table 4-16 and Table 4-17. The estimated annual average and total emissions for the two phases are presented in Table 4-18 and Table 4-19.

Table 4-15: Emission factor associated with electricity consumption from the grid

Description	Value	Units
Default Scope 2 emission factor for the NT	0.62	kg CO_2-e/ kWh
Reference: Part 6 of Schedule 1 of the 2020 NGER Determination.		

Table 4-16: Annual electricity consumption from the grid during the start-up/construction phase

Description	Value	Units
Annual electricity consumption as purchased from the grid [a]	22,671,000	kWh/year
Phase length [b]	1.25	years

a. The annual electricity consumption during the construction phase was taken as the consumption in year one of the Project (as provided in the assumptions tab in Core Lithium's responses to the RFI).
b. Reference: Core GHG RFI: 210520_Finniss GHG Project Emissions Calculations UPDATED INFO.xlsx.

Table 4-17: Annual electricity consumption from the grid during the commercial production phase

Description	Value	Units
Annual electricity consumption as purchased from the grid	42,171,000	kWh/year
Phase length	6.25	years

Reference: Core GHG RFI: 210520_Finniss GHG Project Emissions Calculations UPDATED INFO.xlsx.

Table 4-18: GHG emissions from electricity consumed from the grid during the start-up/construction phase

Description	Scenario	Scope 2 Emissions (t CO_2-e)
Electricity consumption from the grid	Annual	14,056
	Total	17,570

Table 4-19: GHG emissions from electricity consumed from the grid during the commercial production phase

Description	Scenario	Scope 2 Emissions (t CO_2-e)
Electricity consumption from the grid	Annual	26,146
	Total	163,413

4.4 Scope 3 Emissions

4.4.1 Employee Commute to Site

Emissions associated with the commute of employees to the site (note that this doesn't include any corporate activity) have been estimated using the 'Distance-based' method from the '*Greenhouse Gas Protocol - Technical Guidance for Calculating Scope 3 Emissions'* (World Resources Institute, 2013), which uses the total distance travelled and an appropriate emission factor for the mode of transport used. Emission factors for cars and buses from the UK Government's '*Greenhouse gas reporting: conversion factors 2020'* (UK Government, 2020) were used to estimate the emissions and are shown in Table 4-20.

Table 4-21 shows the commute activity data provided by Core Lithium. The commute emissions were estimated by multiplying the one-way trip distances by 2 in order to represent the return journey. For those employees travelling by car, it was assumed that there was an even split between medium-sized and large-sized cars commuting to the site (7 medium and 8 large cars). The GHG emissions associated with the employee commute are presented in Table 4-22. Emission factors for employee commute vehicles

Table 4-20: Emission factors for employee commute vehicles

Description	Value	Units
Medium-sized car - Petrol	0.19	kg CO_2-e /km
Large-sized car - Petrol	0.28	kg CO_2-e /km
Bus	0.10	kg CO_2-e /passenger km

Source: (UK Government, 2020) – 'Business travel- land' tab of 'Greenhouse gas reporting: conversion factors 2020'.

Table 4-21: Activity data for employee commute

Description	Value	Units
Number of employees on site [a]	138	Employees/day
Approximate commute distance (one-way) [a]	50	km
Number of cars travelling to site [a]	15	cars/day
Number of buses travelling to site [a]	4	buses/day
Number of passengers per bus [b]	31	passengers/bus
Total km travelled by cars [c]	547,500	km/year
Total km travelled by bus passengers [d]	4,526,000	passenger km/year

a. Reference: Core GHG RFI: 210412_Finniss GHG Project Emissions Calculations (ID 195408).xlsx.
b. Estimated by ERM using the number of employees on site per day (it was assumed that all employees travelled by bus except for 15 that travelled by car).
c. Estimated by ERM using the number of cars travelling to site and the commute distance.
d. Estimated by ERM using the total number of bus passengers travelling to site and the commute distance.

Table 4-22: GHG Emissions for the employee commute

Emission Source	Scenario	GHG Emissions (t CO_2-e)
Car commute	Annual	129
	Life of Project	967
Bus commute	Annual	467
	Life of Project	3,500
Total commute	Annual	596
	Life of Project	4,467

Emissions rounded to the nearest tonne of CO_2-e.

4.4.2 Air Travel

Emissions associated with air travel to site (note that this doesn't include any corporate activity) have been estimated using the 'Distance-based' method from the '*Greenhouse Gas Protocol - Technical Guidance for Calculating Scope 3 Emissions'* (World Resources Institute, 2013), which uses the total distance travelled and an appropriate emission factor for the mode of transport used. Emission factors for short haul flights from the UK Government's '*Greenhouse gas reporting: conversion factors 2020'* (UK Government, 2020) were used to estimate the emissions and are shown in Table 4-23.

An estimate of the total kilometres travelled for air travel was provided by Core Lithium (see Table 4-24). The GHG emissions associated with air travel are presented in Table 4-25.

Table 4-23: Emission factors for air travel

Description	Value	Units
Short haul business flight emission factor - Economy class	0.15	kg CO_2-e /passenger km

Source: (UK Government, 2020) – 'Business travel- air' tab of 'Greenhouse gas reporting: conversion factors 2020. Note that short haut haul flights are defined as flights between 785 and 3,700 km.

Table 4-24: Activity data for air travel

Description	Value	Units
Total distance travelled for air travel [a]	5,460,000	passenger km/year

Reference: Core GHG RFI: 210412_Finniss GHG Project Emissions Calculations (ID 195408).xlsx.

Table 4-25: GHG Emissions for air travel

Emission Source	Scenario	GHG Emissions (t CO_2-e)
Air travel	Annual	835
	Life of Project	6,265

Emissions rounded to the nearest tonne of CO_2-e.

4.4.3 Consumables and Material Transport

Emissions associated with the transportation of materials and consumables to site and waste and SC6 from the site have been estimated using the 'Distance-based' method from the '*Greenhouse Gas Protocol - Technical Guidance for Calculating Scope 3 Emissions'* (World Resources Institute, 2013), which uses the mass of cargo transported, the distance travelled in the transport leg and an appropriate mass-distance emission factor for the mode of transport used. Emission factors for truck and ship freight transport from the UK Government's '*Greenhouse gas reporting: conversion factors 2020'* (UK Government, 2020) were used to estimate the emissions and are shown in Table 4-26.

Table 4-27 shows the freight transport activity data provided by Core Lithium. Due to uncertainty about the vehicles return journey (i.e. the route taken, whether there is cargo on board, etc.), the return trips of the vehicles as they go back to their point of origin have not been included in the emissions estimation. The GHG emissions associated with the transportation of materials and consumables to site and waste and SC6 from the site are presented in Table 4-28. Note that Core Lithium has a contract to send a portion of the SC6 product to China for refinement. It has not yet been determined where the remaining SC6 will be transported, however, for the purposes of this assessment it has been assumed that all SC6 product will be shipped to China for refinement.

Table 4-26: Emission factors for freight transport

Description	Value	Units
Truck freight	0.183 [a]	kg CO_2-e /tonne.km
Ship freight	0.00354 [b]	kg CO_2-e /tonne.km

a. It is assumed that the trucks are rigid trucks with a capacity of greater than 17 tonnes and that they are carrying an average load.
b. It is assumed that the ships are average bulk carriers
Source: (UK Government, 2020) – 'Freighting goods' tab of 'Greenhouse gas reporting: conversion factors 2020.

Table 4-27: Activity data for freight transport

Description	Value	Units
Consumables (including explosives) transported to site [a]	4,800	tonnes/year
Maintenance materials transported to site [b]	3,600	tonnes/year
Fuel transported to site [c]	6,048	tonnes/year
Waste transported from site [a]	1,300	tonnes/year
SC6 transported from site [d]	167,015	tonnes/year
Distance between Darwin and site [a]	90	km
Distance between site and landfill [a]	60	km
Distance between Port of Darwin and Port of Shanghai [e]	5,650	km

a. Reference: Core GHG RFI: 210412_Finniss GHG Project Emissions Calculations (ID 195408).xlsx.
b. Estimated by ERM using information from Core Lithium's responses to the GHG RFI (i.e. 4 trucks per month and 75 tonnes per truck).
c. Estimated by ERM using the density for diesel (0.84 kg/L) and information contained in Core Lithium's responses to the GHG RFI (i.e. 8 trucks per month and 75,000 l per truck).
d. Estimated by ERM as the average of the forecasted annual SC6 production data for the commercial production phase.
e. Estimated by ERM using http://ports.com/sea-route/. Note that it has been assumed that all SC6 product will be shipped to China for refinement.

Table 4-28: GHG Emissions for freight transport

Emission Source	Scenario	GHG Emissions ($t\ CO_2$-e)
Consumables and materials transported to site	Annual	238
	Life of Project	1,785
Waste transported from site	Annual	14
	Life of Project	107
SC6 transported to refining facilities	Annual	7,620
	Life of Project	47,624

4.4.4 Refining Emissions

The SC6 product is typically shipped to plants in China for conversion and refining into Lithium Carbonate Equivalent (LCE). The refinement process is typically the most emission intensive stage of the lithium production process (Roskill, 2020). An average emission factor of 8.06 t CO_2-e/t LCE was estimated for LCE refinery facilities in China using information from the Roskill (2020) white paper. The emissions associated with refining the SC6 produced by the Project into LCE were then estimated using this emission factor and an estimate of the amount of LCE produced from the expected SC6 production (167,015 tpa). A literature search suggested that the mass of LCE produced is typically approximately 1/8 of the mass of the SC6 feedstock, resulting in an estimated LCE production for the Project of 23,750 tonnes per year.

The GHG emissions associated with the refining are presented in Table 4-29.

Table 4-29: GHG Emissions for refining

Emission Source	Scenario	GHG Emissions ($t\ CO_2$-e)
Refining	Annual	168,351
	Life of Project	1,052,195
Emissions rounded to the nearest tonne of CO_2-e.		

4.4.5 Landfill

Waste generated throughout the life of the project is anticipated to be sent to an offsite landfill. Emissions of CH_4 from landfill were estimated using Method 1 (Division 5.2.2, *Method 1 - emissions of methane released from landfills)* of the *NGER Determination* using the below equation. It has been assumed that the methane emissions from the landfill will be released and not combusted, flared or transferred.

$$E_j = CH_4^* \times (1 - OF)$$

where:

E_j	=	Estimated emissions of methane from landfill	($t\ CO_2$-e/yr)
CH_4^*	=	Estimated quantity of methane in landfill gas	($t\ CO_2$-e/yr)
OF	=	Oxidation factor	(-)

The CH_4 in landfill gas is estimated using estimates of the decomposable degradable organic carbon decomposed during the reporting year from both the landfill deposited in the reporting year (C_{at}) and the landfill deposited in the previous year (C_{ost}). In order to estimate the C_{at} and C_{ost} values, default values for the organic carbon fraction (DOC), the fraction of degradable organic carbon which decomposes (DOC_f), the methane generation rate (k) and the fraction of CH_4 in generated landfill gas were taken from Chapter 5 of the *NGER Determination*. It was also assumed that the waste stream had the properties of food waste.

Default equation inputs and activity data provided by Core Lithium were used to estimate the emissions of CH_4 from landfill as presented in Table 4-30. The estimated life of Project emissions are presented in Table 4-31.

Table 4-30: Equation factors associated with estimating CH_4 landfill emissions

Description of Data Source	Value	units
Quantity of solid waste sent to landfill [a]	1,300	tonnes/year
Degradable organic carbon fraction (DOC) of wet waste [b]	0.15	N/A
Fraction of degradable organic carbon which decomposes (DOC_f) [c]	0.84	N/A
Methane generation rate (k) [d]	0.40	N/A
Molecular weight ratio CH_4/C	1.33	N/A
Fraction of CH_4, by volume, in generated landfill gas [e]	0.50	N/A
Oxidation factor [f]	0.10	N/A
Conversion factor cubic metres of methane to tonnes of CO_2-e [f]	0.00068	N/A

a. Core GHG RFI: 210412_Finniss GHG Project Emissions Calculations (ID 195408).xlsx
b. Reference: Section 5.12 of 2020 NGER Determination.
c. Reference: Section 5.14A of 2020 NGER Determination.
d. Reference: Section 5.14 of 2020 NGER Determination, value for Northern Territory was selected.
e. Reference: Section 5.14C of 2020 NGER Determination.
f. Reference: Section 5.4 of 2020 NGER Determination.

Table 4-31: GHG emissions from landfill

Emission Source	Scenario	GHG Emissions (t CO_2-e)			
		CO_2	CH_4	N_2O	Total
Landfill	Life of Project	-	14,008	-	**14,008**

Emissions rounded to the nearest tonne of CO_2-e.

4.5 Summary of Emissions

4.5.1 Scope 1 and 2

A summary of the estimated annual average emissions during the start-up/construction phase and commercial production phase is shown in Table 4-32, a summary of the total life of Project emissions (i.e. sum of emissions during the start-up/construction and commercial production phases) is also provided. A breakdown of the emission sources during the construction phase, production phase, and life of the Project are presented in Figure 4-1, Figure 4-2 and Figure 4-3 respectively. Due to the annual variability in soil carbon stocks, the emissions associated with land clearing have been included exclusively in the life of the Project summary. It is also worth noting that land clearing emissions are not typically included as part of the annual reporting to NGER as there is currently no method for estimating these emissions in the NGER (Measurement) Determination 2008. However, it is important to capture these emissions when considering the overall carbon footprint of the Project.

As shown in Figure 4-1, the majority of the annual GHG emissions during the construction phase operations are associated with the stationary combustion of diesel (i.e. Scope 1 emissions) in the mining equipment. Once commercial operations begin there is a drop in the diesel combustion due to the switch from onsite diesel generators to electricity purchased from the grid and a reduction in the amount of diesel combusted in mining equipment. As a result, Scope 2 emissions were the major source of GHG emissions during the operations phase. Stationary combustion of diesel and the use of electricity purchased from the grid are also the two largest sources of total GHG emissions for the life of the Project, however, the contribution from vegetation clearing was also substantial, increasing the overall emissions by an anticipated 27%.

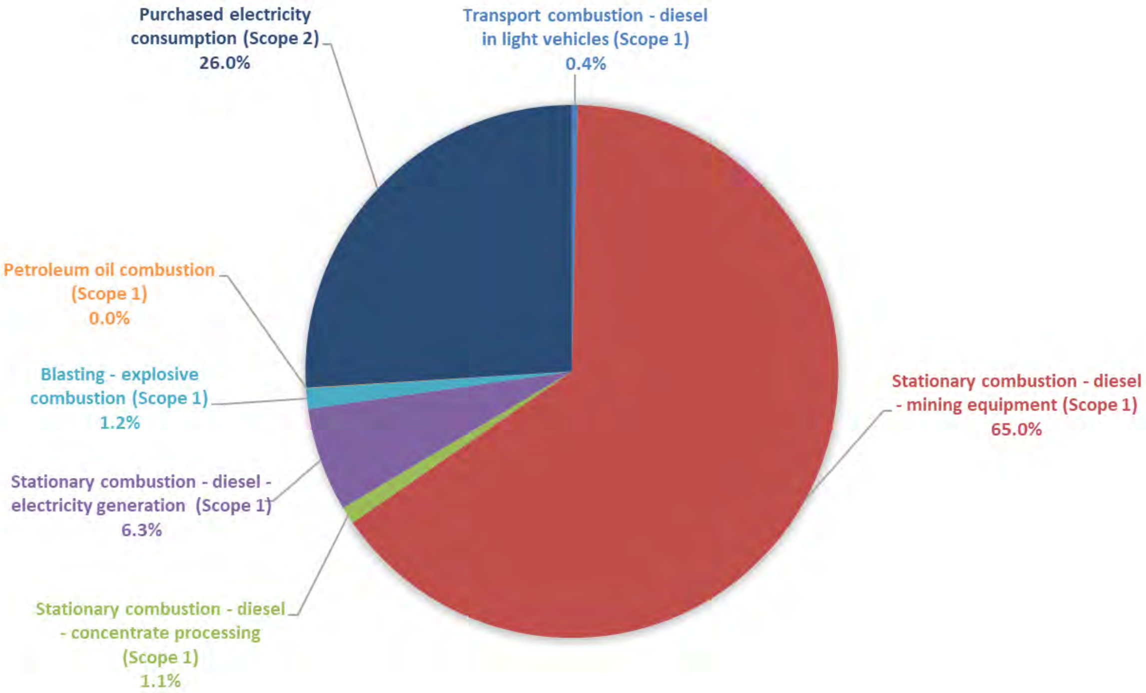

Figure 4-1: Breakdown in annual Scope 1 and 2 GHG emissions for the start-up/construction phase

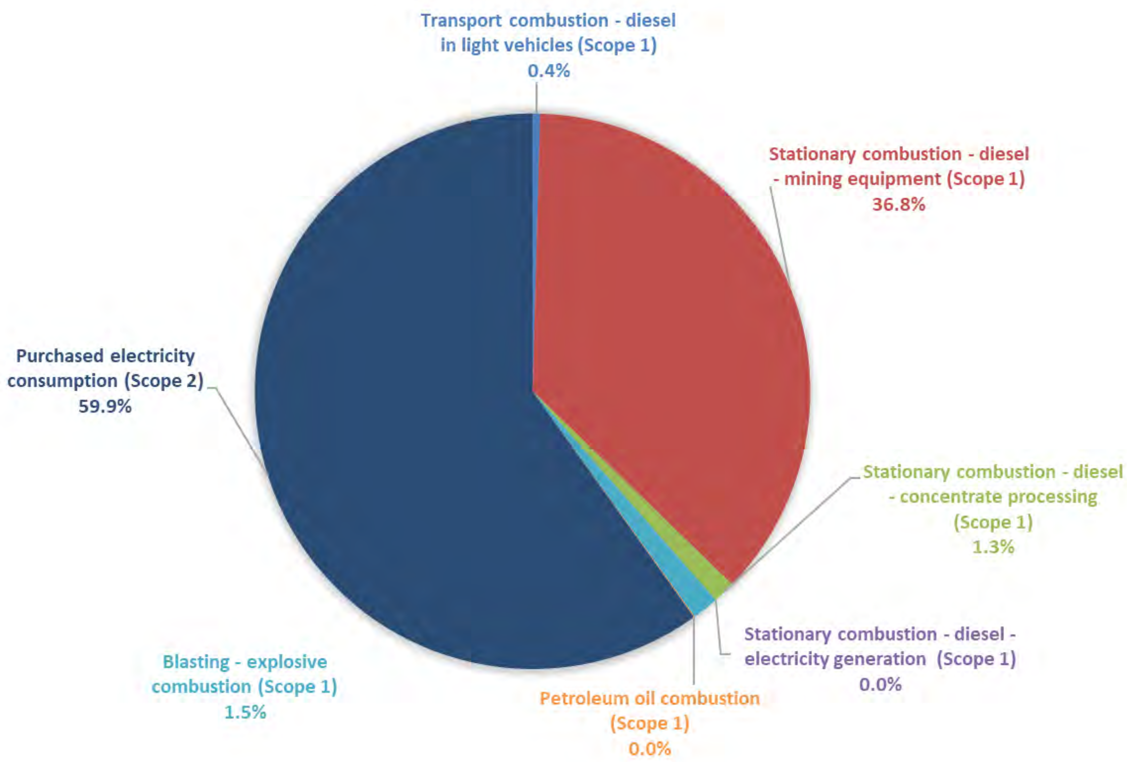

Figure 4-2: Breakdown in annual Scope 1 and 2 GHG emissions for the commercial production phase

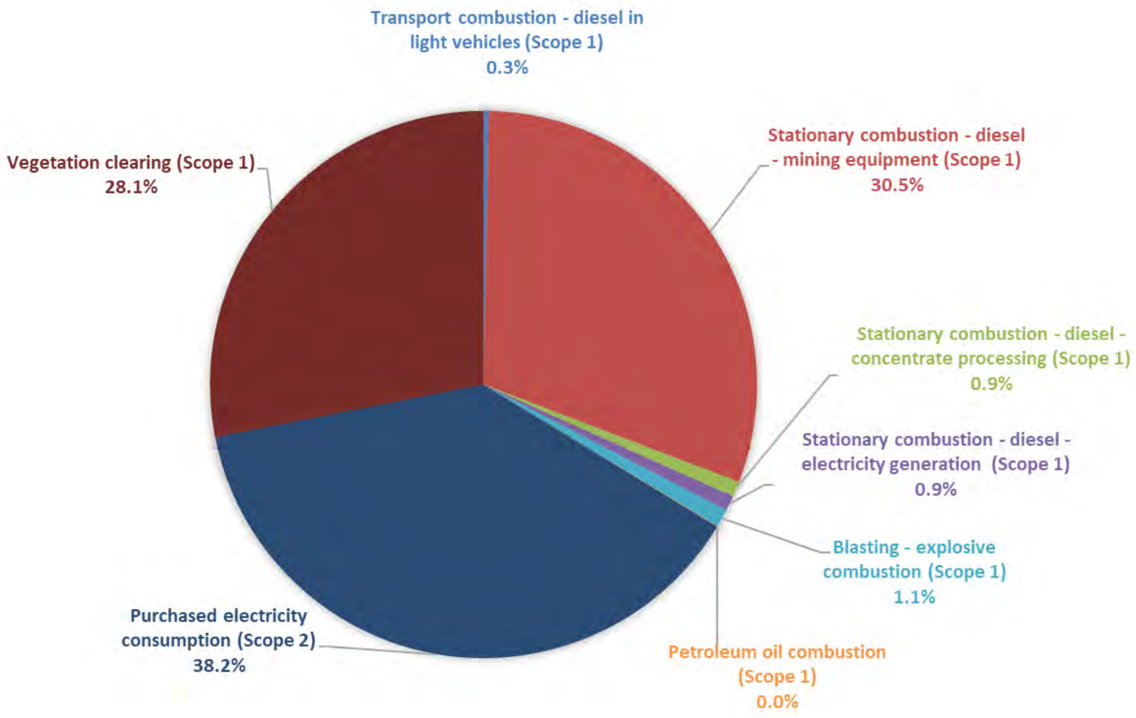

Figure 4-3: Breakdown in life of project Scope 1 and 2 GHG emissions

Table 4-32: Estimated total GHG emissions

Project scenario	Description	Emissions (t CO_2-e)			
		CO_2	CH_4	N_2O	Total
Annual Emissions: Start-up / Construction Phase	Transport combustion - diesel in light vehicles (Scope 1)	189	0	1	190
	Stationary combustion - diesel - mining equipment (Scope 1)	35,049	50	100	35,199
	Stationary combustion - diesel - concentrate processing (Scope 1)	567	1	2	569
	Stationary combustion - diesel - electricity generation (Scope 1)	3,400	5	10	3,414
	Blasting - explosive combustion (Scope 1)	688	1	2	671
	Petroleum oil combustion (Scope 1)	22	0	0	22
	Purchased electricity consumption (Scope 2)	14,056	0	0	14,056
	Total Scope 1 Emissions	**39,894**	**57**	**115**	**40,066**
	Total Scope 2 Emissions	**14,056**	**0**	**0**	**14,056**
	Total Scope 1 and Scope 2 Emissions	**53,950**	**57**	**115**	**54,122**
Annual Emissions: Commercial Production Phase	Transport combustion - diesel in light vehicles (Scope 1)	189	0	1	190
	Stationary combustion - diesel - mining equipment (Scope 1)	16,000	23	46	16,069
	Stationary combustion - diesel - concentrate processing (Scope 1)	567	1	2	569
	Stationary combustion - diesel - electricity generation (Scope 1)	0	0	0	0
	Blasting - explosive combustion (Scope 1)	668	1	2	671
	Petroleum oil combustion (Scope 1)	22	0	0	22
	Purchased electricity consumption (Scope 2)	26,146	0	0	26,146
	Total Scope 1 Emissions	**17,445**	**25**	**51**	**17,521**
	Total Scope 2 Emissions	**26,146**	**0**	**0**	**26,146**
	Total Scope 1 and Scope 2 Emissions	**43,591**	**25**	**51**	**43,667**
Total Emissions: Life of the Project	Transport combustion - diesel in light vehicles (Scope 1)	1,417	0	10	1,427
	Stationary combustion - diesel - mining equipment (Scope 1)	143,811	206	411	144,428
	Stationary combustion - diesel - concentrate processing (Scope 1)	4,250	6	12	4,268
	Stationary combustion - diesel - electricity generation (Scope 1)	4,250	0	0	4,250
	Blasting - explosive combustion (Scope 1)	5,011	7	14	5,032
	Petroleum oil combustion (Scope 1)	163	0	0	163
	Purchased electricity consumption (Scope 2)	180,983	0	0	180,983
	Vegetation clearing (Scope 1)	132,987	0	0	132,987
	Total Scope 1 Emissions	**291,888**	**219**	**448**	**292,555**
	Total Scope 2 Emissions	**180,983**	**0**	**0**	**180,983**
	Total Scope 1 and Scope 2 Emissions	**472,871**	**219**	**448**	**473,538**

4.5.2 Annual Scope 1 and 2 Emissions

Scope 1 and 2 emissions were also estimated on a year by year basis using forecasted annual activity data provided by Core Lithium. Estimated annual emissions during the life of the project, including the start-up/construction phase and commercial production phase, are shown in Figure 4-4.

The highest annual GHG emissions (> 50,000 tonnes $CO_{2\text{-e}}$/year) were found during the construction phase in year 1 and in year 7 during the commercial production phase. Where the company plans to commence open pit mining of the Hang Gong prospect, the emissions range between 30,000 and 50,000 tonnes $CO_{2\text{-e}}$/year. The lowest emissions are expected in the final year of the Project.

Annual emission intensities (i.e. total emissions per tonne of SC6 produced) were also estimated and are shown in Figure 4-5. Year 1 is predicted to have a much higher emissions intensity than other years due to the limited production during the construction/start-up phase and this intensity is not comparable to the emission intensities in other years. Therefore, Figure 4-6 shows the emission intensities during the commercial production phase only. The intensities in the commercial production phase ranged from 0.19 to 0.39. Figure 4-6 shows an increasing trend in the annual emissions intensities during the commercial production phase based on the current mine plan, including the overlap of starting up development of additional prospects as the project progresses.

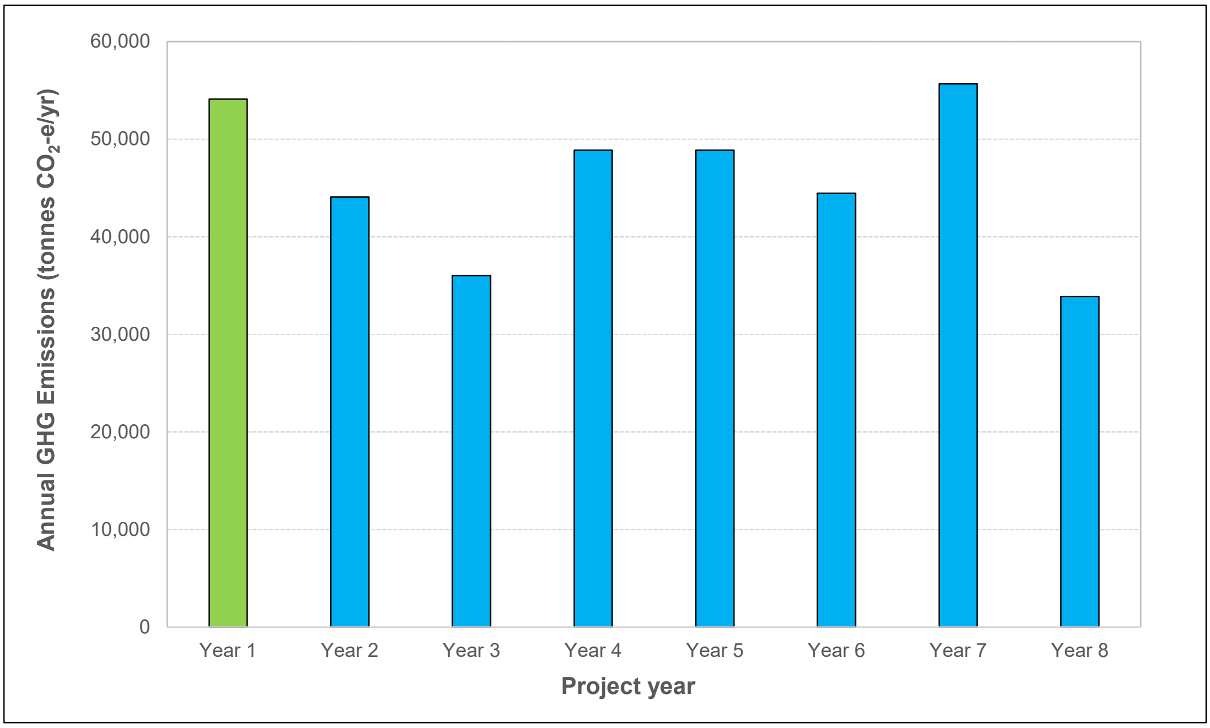

Figure 4-4: Projected Annual GHG Emissions (tonnes CO_2-e/year). Construction/ Startup emissions are in Green).

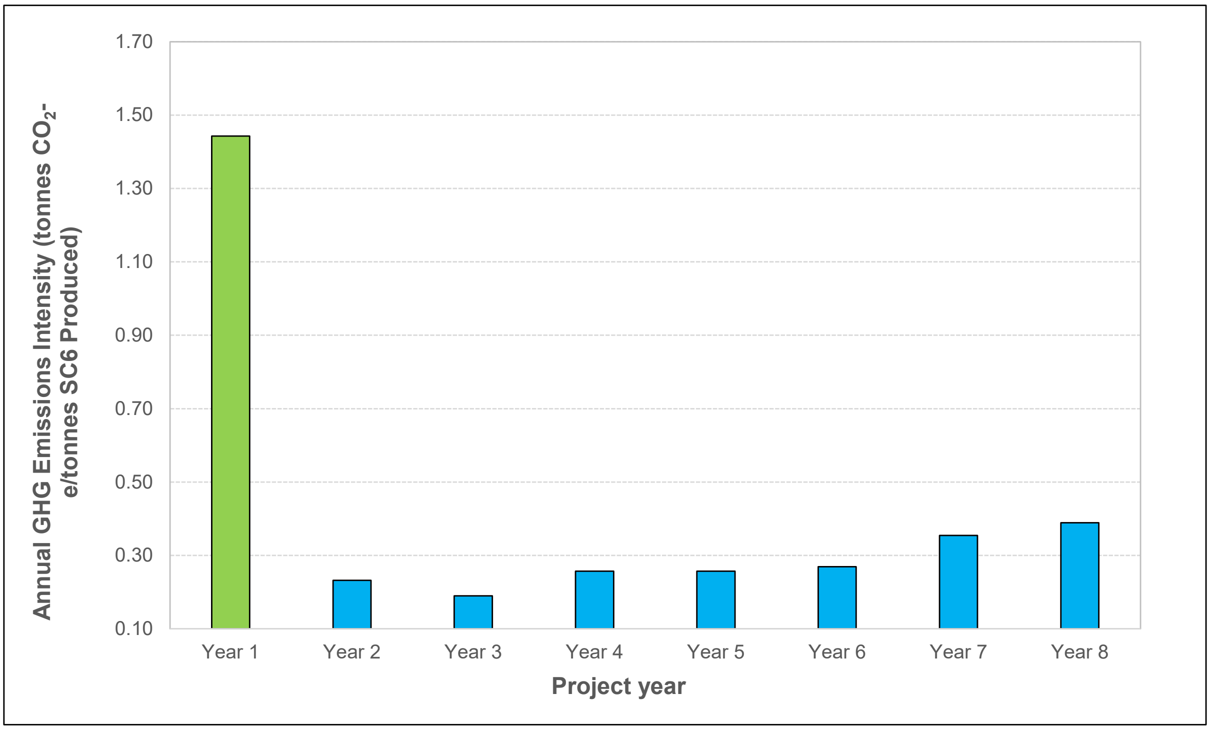

Figure 4-5: Projected Annual GHG Emissions Intensity (tonnes CO_2-e/tonnes SC6 Produced). The Construction/Startup emission intensity is in Green

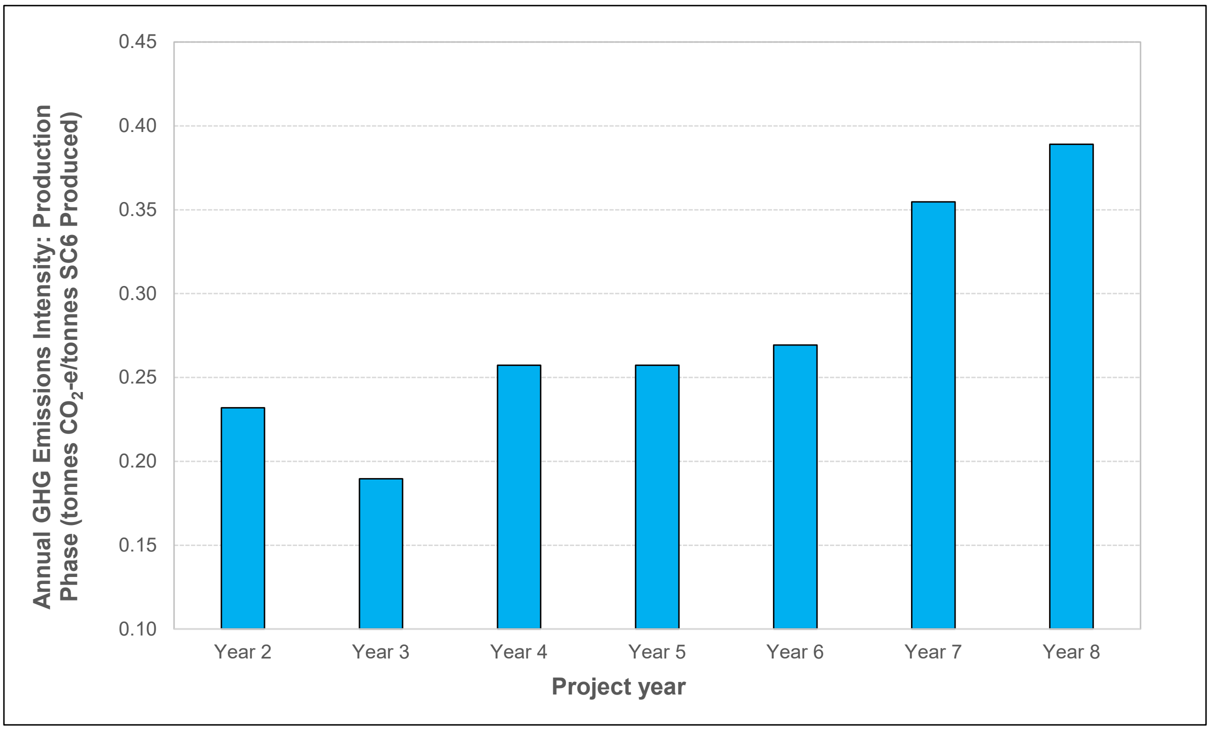

Figure 4-6: Projected Annual GHG Emissions Intensity: Commercial Production Phase (tonnes CO_2-e/tonnes SC6 Produced)

4.5.3 Scope 3

A summary of the estimated annual average and total Scope 3 GHG emissions for the life of the Project is provided in Table 4-33. A breakdown of the annual and Life of Project Scope 3 emission sources are presented in Figure 4-7 and Figure 4-8, respectively.

Figure 4-7 and Figure 4-8 show that by far the greatest expected source of Scope 3 GHG emissions is associated with the refining of SC6 into LCE. A breakdown of the annual and Life of Project emissions into the different scope categories is presented in Figure 4-9 and Figure 4-10. Scope 3 emissions are predicted to be the largest contributor to total lithium production emissions due to the high contribution from the SC6 refining.

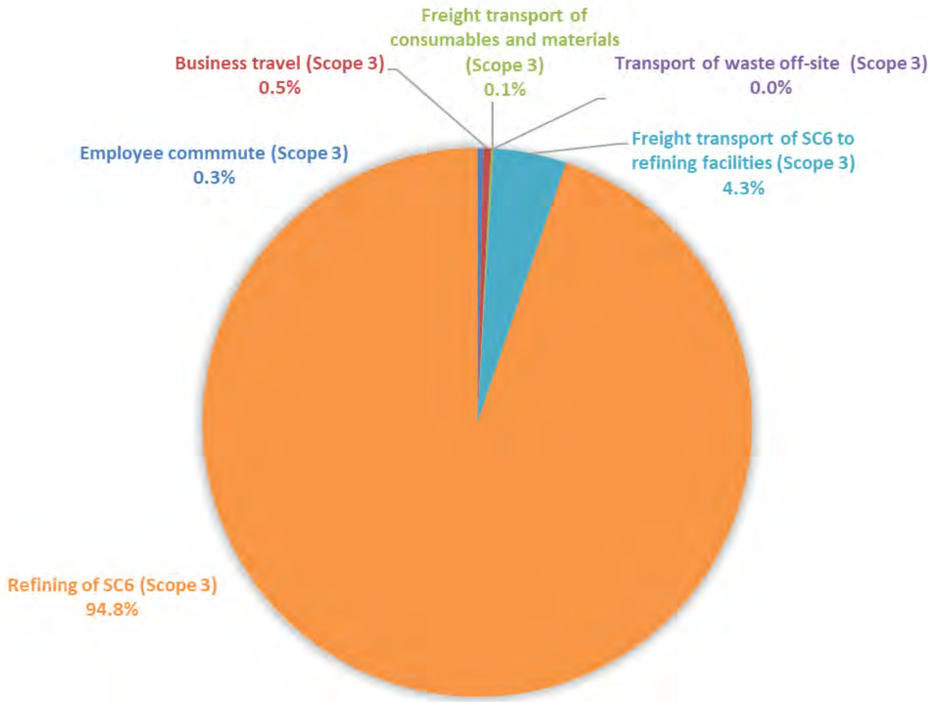

Figure 4-7: Breakdown in annual Scope 3 GHG emissions

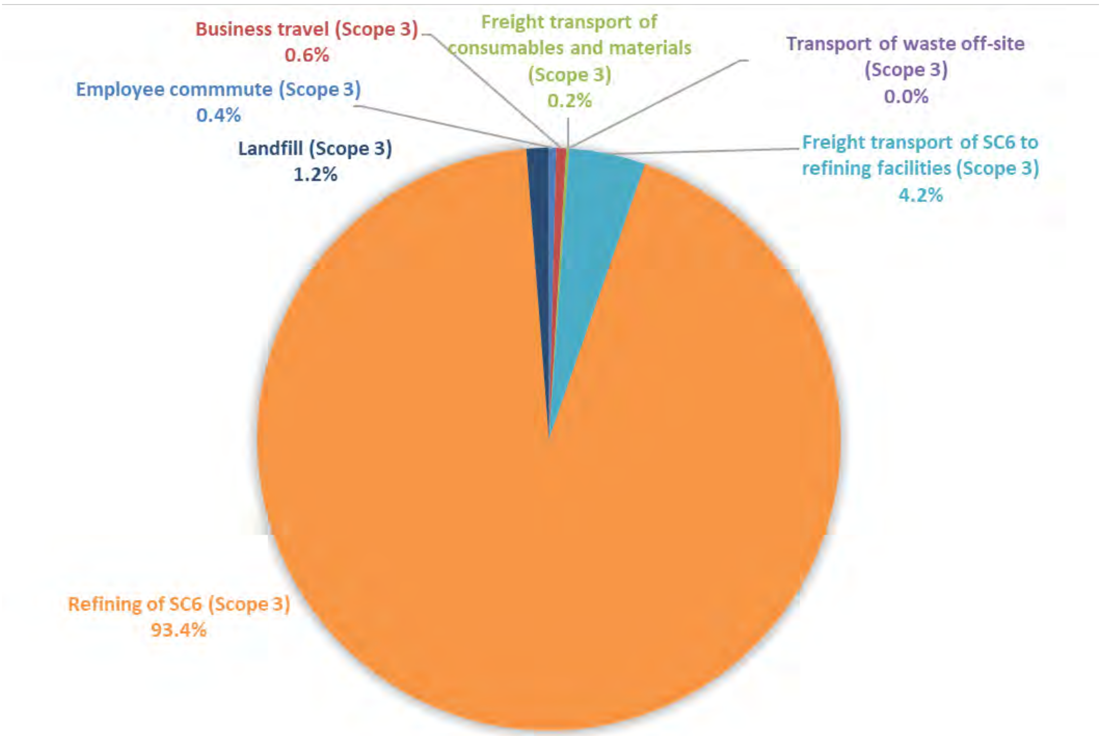

Figure 4-8: Breakdown in Project operations Scope 3 GHG emissions

Table 4-33: Estimated total Scope 3 GHG emissions

Project scenario	Description	Emissions (t CO_2-e) Total
Annual	Employee commute (Scope 3)	596
	Air travel (Scope 3)	835
	Freight transport of consumables and materials to site (Scope 3)	238
	Transport of waste off-site (Scope 3)	14
	Freight transport of SC6 to refining facilities (Scope 3)	7,620
	Refining of SC6 (Scope 3)	168,351
	Total Scope 3 Emissions	**177,654**
	Total Emissions	**221,321**
Life of the Project (excluding construction/start-up)	Employee commute (Scope 3)	4,467
	Air travel (Scope 3)	6,265
	Freight transport of consumables and materials to site (Scope 3)	1,785
	Transport of waste off-site (Scope 3)	107
	Freight transport of SC6 to refining facilities (Scope 3)	47,624
	Refining of SC6 (Scope 3)	1,052,195
	Landfill (Scope 3)	14,008
	Total Scope 3 Emissions	**1,126,451**
	Total Emissions	**1,565,105**

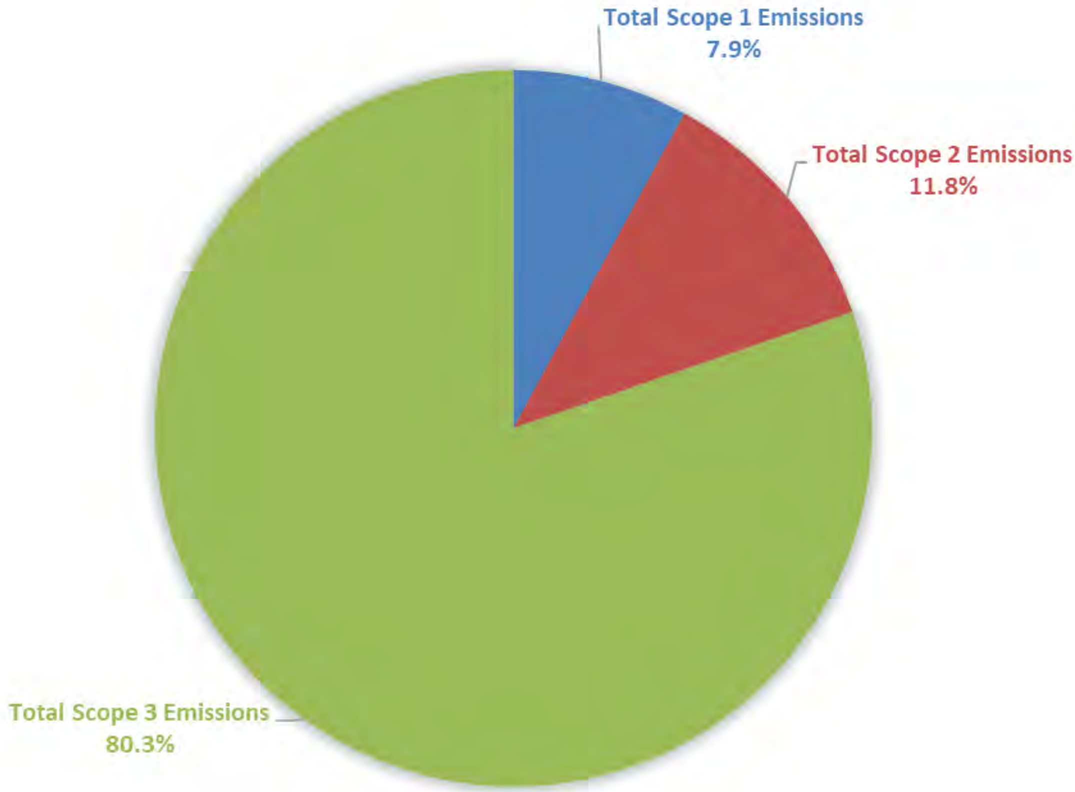

Figure 4-9: Breakdown in annual GHG emissions by scope

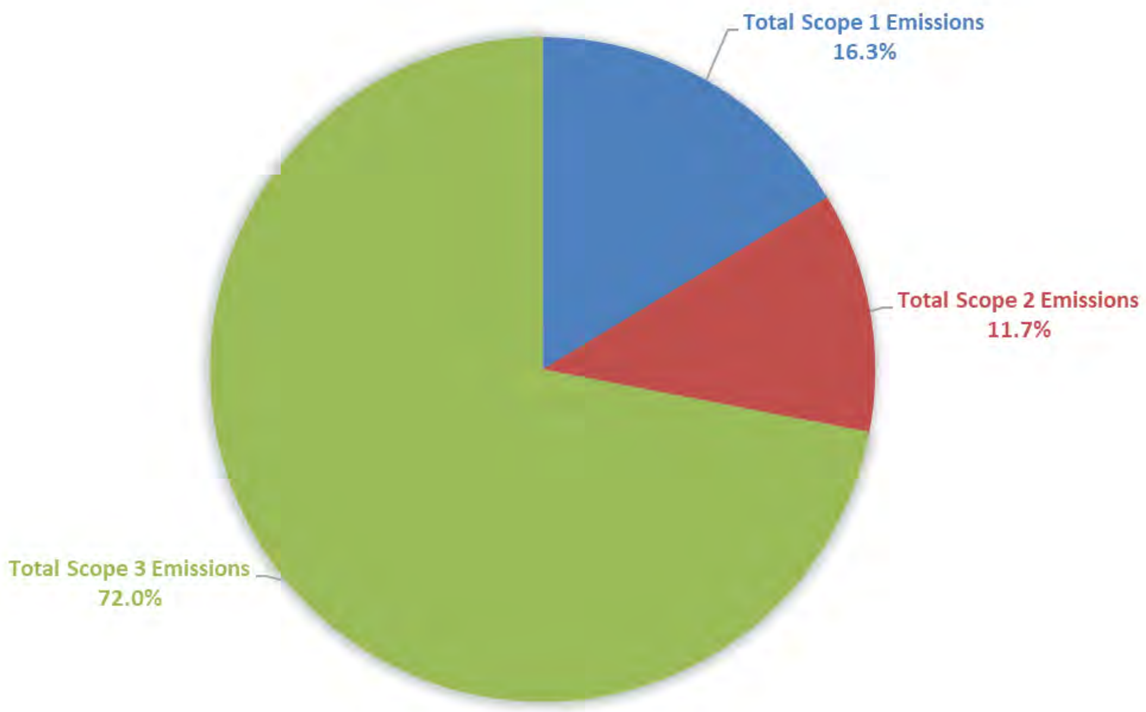

Figure 4-10: Breakdown in Project operations GHG emissions by scope

5. BENCHMARKING, MITIGATION AND MANAGEMENT

5.1 Benchmarking Against Similar Facilities

To contextualise the Project's estimated GHG emissions, the Project's emission intensity (i.e. total emissions per tonne of product produced) for SC6 was compared to published emission intensities for other SC6 production facilities.

Published data relating to GHG emissions associated with lithium mining is scarce due the low number of mines globally. Lithium extraction is typically carried out from two broad deposit types, mineral and brine. Most mineral mining occurs in Western Australia, where SC6 is produced and then typically shipped to plants in China for conversion and refining into Lithium Carbonate Equivalent (LCE). Lithium brine production is mainly located in the high Andes in Chile, Argentina and Bolivia in areas with high amounts of solar radiation and limited rainfall. Unlike with mineral mines, for brine operations, the extraction of the lithium at the brine ponds and the LCE refining typically occur within the same country (often the two facilities are in close proximity to one another (Roskill, 2020)).

Emission intensities for several Australian lithium mines producing SC6 were found in annual and environmental reports published by the operating companies. The intensities were calculated by dividing the facilities total Scope 1 and Scope 2 GHG emissions (as downloaded from the Clean Energy Regulator's website) by the total SC6 produced at the facility and are shown in Table 5-1 and Figure 5-1. The Project's emission intensity was estimated by dividing the expected annual Scope 1 and Scope 2 GHG emissions during the commercial production phase (43,667 t CO_2-e/year) by the expected average SC6 production (i.e. 167,015 tpa) during the commercial production phase. The Project's annual average emission intensity (i.e. **0.26 t CO_2-e/t SC6**) is aligned with the intensity at each of the other facilities, being lower than Pilgangoora and higher than Greenbushes and Mt Cattlin mines. No publically available data was accessible for Altura Mining Limited's carbon emissions, which is likely due to it being below the NGERs reporting threshold of 50,000 t CO_2-e/year for 2019. Note that the **0.26 t CO_2-e/t SC6** emissions intensity is only the emissions intensity for the commercial production phase of the Project and is presented here to allow comparison with the intensities from other facilities that have also been estimated on an annual average basis for the years noted in Table 5-1. However, in order to estimate the overall emission intensity of the lithium product footprint as a whole, the total emissions from the Life of Project (including construction and land clearing emissions) should be divided by the total Life of Project production.

Table 5-1: Project's SC6 emissions intensity: benchmarking against Lithium mines in Australia and overseas

Description	Location	Year	Emission Intensity ($t\ CO_2$-e/ t SC6)
Finniss Lithium Project	Australia	NA	0.26 [a]
Greenbushes Lithium Mine – Current	Australia	FY18	0.11 [b]
Greenbushes Lithium Mine - Projected after expansion	Australia	FY29	0.18 [b]
Mt Cattlin Lithium Mine - 2020	Australia	2020	0.23 [c]
Pilgangoora Lithium and Tantalum Mine - NGER Emissions FY19	Australia	FY19	0.28 [d,f]
Pilgangoora Lithium and Tantalum Mine - Annual Report FY19	Australia	FY19	0.56 [e,f]
Pilgangoora Lithium and Tantalum Mine - Annual Report FY20	Australia	FY20	0.28 [f,g]

a. Source: (ERM, 2021)

b. Source: (GHD, 2018) - Greenbushes Lithium Mine Expansion: Environmental Referral - Additional Information

c. Source: (Galaxy Resources, 2021) - Sustainability Report for the Year Ended 31 December 2020

d. Source: (Pilbara Minerals, 2019) – Note that this emissions intensity was estimated using the FY19 production reported in the 2019 Pilbara Minerals Annual Report and the FY19 Scope 1 and 2 emissions for the Pilgangoora Lithium and Tantalum Mine downloaded from the NGER website.

e. Source: (Pilbara Minerals, 2019) - Note that this emissions intensity was estimated using the FY19 production and FY19 emissions reported in the 2019 Pilbara Minerals Annual Report. It is not clear why there is an inconsistency in the Scope 1 and 2 emissions reported in the Pilbara Minerals Annual Report and on the NGER website. However, both values are shown here for completion.

f. Note that while SC6 is the primary product of the Pilgangoora mine, there was also some minor tantalum production at the site. Therefore, it is likely that some of the emissions included in the emission intensity estimation are associated with the Tantalum production.

g. Source: (Pilbara Minerals, 2020) - 2020 Pilbara Minerals Annual Report

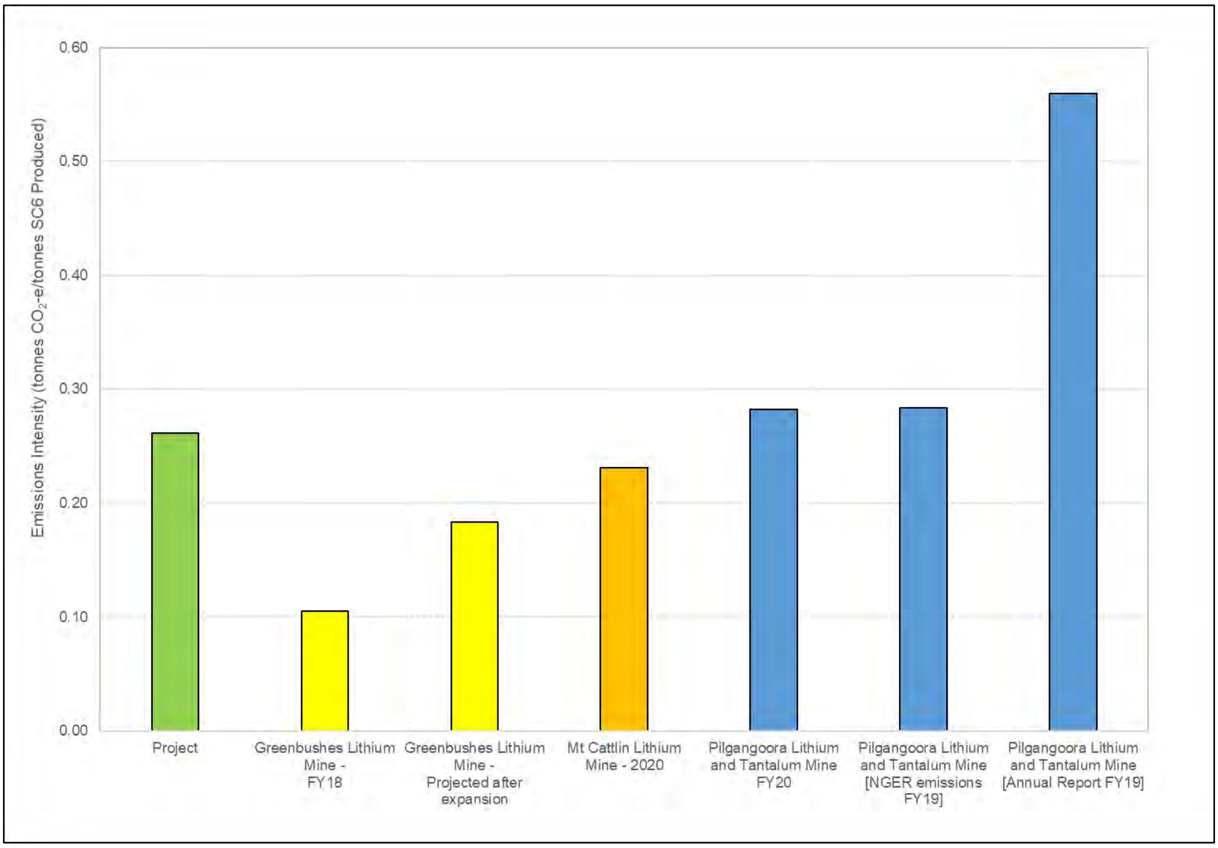

Figure 5-1: Project's SC6 Emissions Intensity (using Scope 1 and Scope 2 Emissions) and Comparison with Lithium Mines in Australia (Sources: GHD (2018), Pilbara Minerals (2019, 2020) and Galaxy Resources (2020))

5.2 Benchmarking against Similar Facilities for the Transport of SC6 from site to Refinery

The Project will involve transport of SC6 from the site to the Port of Darwin, where it has been assumed that the product will then be shipped to China (where the vast majority of refining facilities are located). The Port of Darwin is situated closer to refining facilities in China than the West-Australian ports where the other SC6 producers ship their product from (e.g. Port of Bunbury, Port of Esperance and Port Hedland). Therefore, it is appropriate to conduct a comparison of the Scope 3 emissions associated with the transport of the SC6 product from the Project site and other SC6 production facilities. The Scope 3 emissions associated with the transport of SC6 were calculated for each of the mines covered in the benchmarking section (Section 5.1) and for other known historical Australian SC6 production facilities (Mt Marion, Wodgina and Bald Hill). The Scope 3 emissions shown in Figure 5-2 were calculated for the transportation of 167,015 tpa from each mine (the same amount was used for each mine to focus purely on the difference in emissions associated with the different transport legs) and include both the trucking and shipping legs. The SC6 transport emissions are lower for the Project (7,620 t CO_2-e) than for all the other facilities, with the next lowest emissions (Wodinga = 9,101 t CO_2-e) being 20% more than the Project's and the highest emissions being more than twice those of the Project (Mt Marion = 19,176 t CO_2-e).

Figure 5-3 shows the emission intensities from Figure 5-1 after the inclusion of the Scope 3 emissions associated with the transport of the SC6 product from the sites to the refining facilities (note that the actual annual SC6 production for each facility has been used in the calculations of these emission intensities).

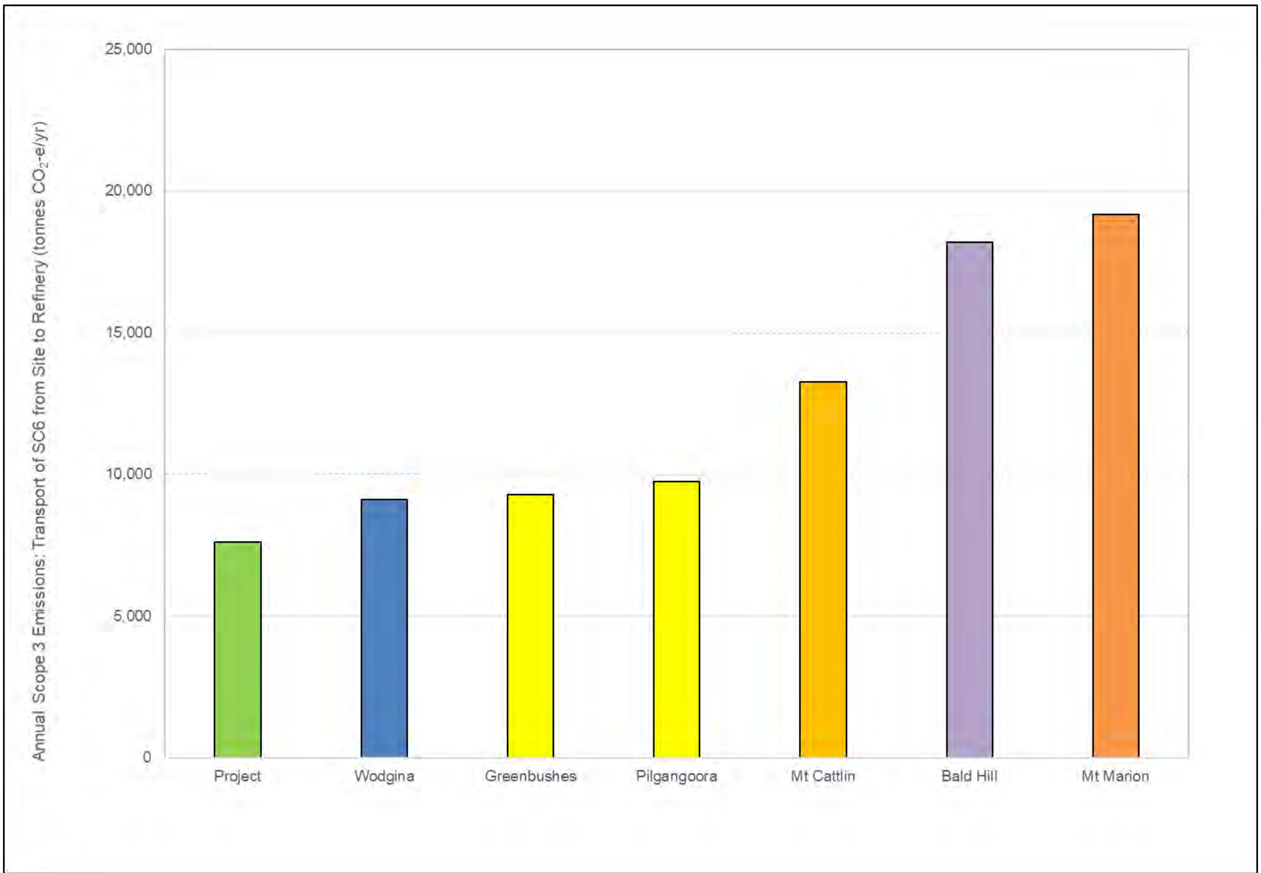

Figure 5-2: Annual Scope 3 emissions associated with the transport of the SC6 product from the site to the refining facilities for the Project and comparison with other Lithium Mines in Australia

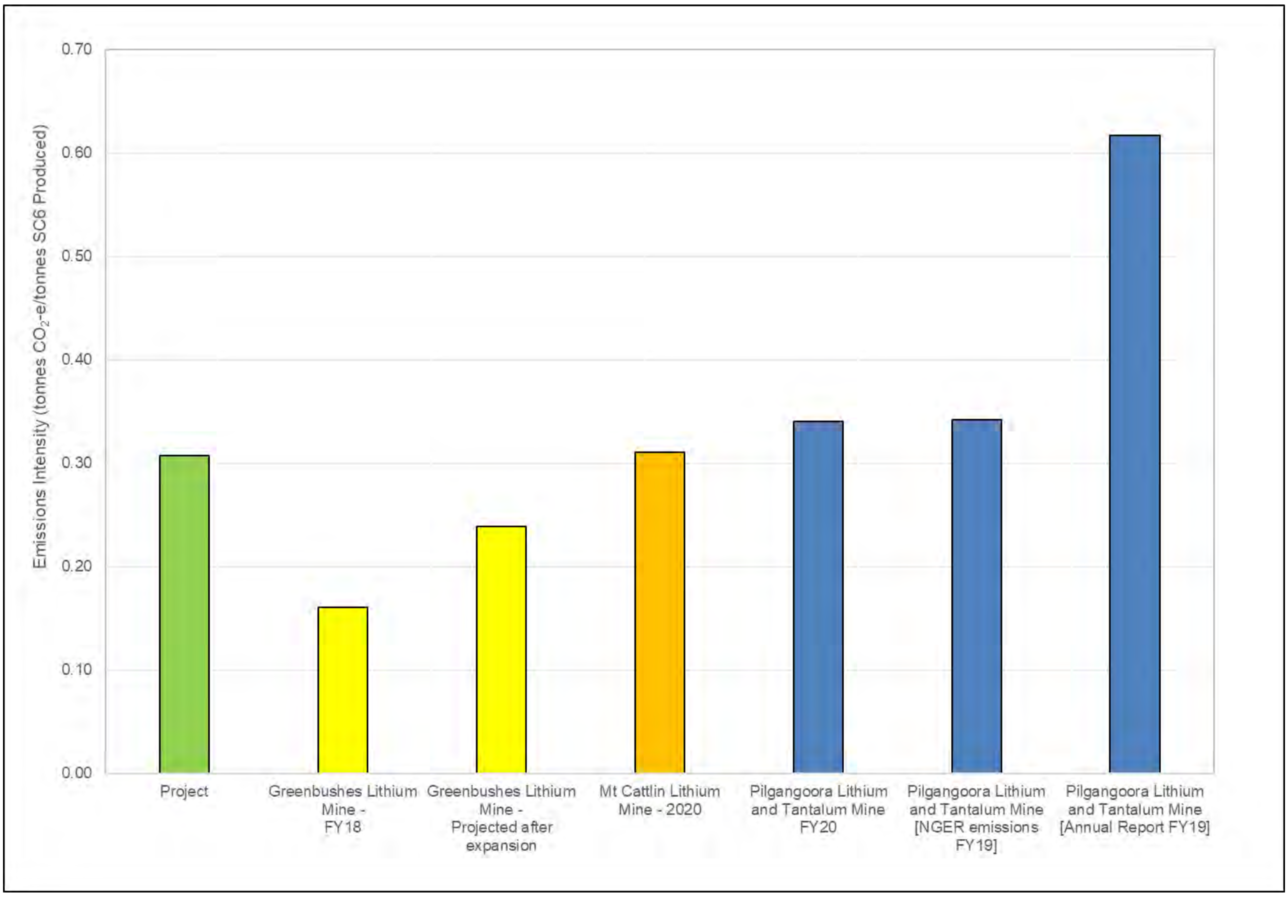

Figure 5-3: Project's SC6 Emissions Intensity (using Scope 1 emissions, Scope 2 emissions and Scope 3 emissions associated with the transport of the SC6 product from the site to the refining facilities) and Comparison with Lithium Mines in Australia (Sources: GHD (2018), Pilbara Minerals (2019,2020) and Galaxy Resources (2020))

5.3 Greenhouse Gas Mitigation and Management

The opportunity exists to continue to optimise energy consumption and reduce GHG emissions throughout the Project design and management.

Management, monitoring and auditing provisions should be incorporated in the Environmental Management Plan (EMP) for the Project. Management shall include quantification and recording of:

- energy use
- GHGs
- transport activities
- other relevant GHG generating activities (such as land clearance)

Core Lithium is planning to re-vegetate the site once the Project has finished. The revegetation of sites can potentially offset the carbon losses caused by the clearing (although this will not occur for several years after the planting and is also dependent on the vegetation planted and management practices etc.).

Organisations can also offset emissions from a project by purchasing Australian Carbon Credit Units (ACCUs). Australian Carbon Credit Units (ACCUs) represent one tonne of carbon dioxide equivalent (t CO_2-e) stored or avoided by a project. The latest ACCU value is approximately $16.55/t CO_2-e. ACCU's are issued by the Clean Energy Regulator. For those project's looking to establish their own ACCU's (i.e. to be declared an 'eligible offsets project'), the project needs to be registered under the Clean Energy Regulator's Emissions Reduction Fund. When an Emissions Reduction Fund project has generated carbon abatement, they can apply for Australian carbon credit units (ACCUs) which can then be sold on the secondary market. To support application for ACCUs, project offset reports and an independent audit must be submitted.

Further measures to reduce emissions could involve some of the following measures:

- Procurement to consider the energy efficiency of all new mobile and fixed equipment.
- Use of less carbon intensive fossil fuels (i.e. less carbon containing fuel per unit of calorific value) or co-firing with carbon neutral fuels (i.e., biomass)
- Capture and storage of CO_2 or other currently experimental options.
- Generating on-site power from renewable energy sources such as solar.

Core Lithium is also investigating the option of installing Pumped Hydropower Energy Storage (PHES) for the purposes of electricity generation at the Grants open-pit. However, it is likely that any GHG emission reductions associated with the use of the PHES will be dependent on the fuel usage and/or electricity usage associated with operating the pumps (e.g. if pumps are powered using renewable electricity generation).

6. CONCLUSIONS

This GHG assessment investigated the sources of the GHG emissions associated with the operation of the Project, a lithium mine with SC6 processing facilities, located approximately 25 km south-west (as the crow flies) of Darwin.

The GHGs evaluated in this study were calculated based on a methodology consistent with the NGER legislation. Emissions were estimated over the life of the Project (approximately 7 years) and on an annual basis for both phases, start-up/construction and commercial production.

The total Scope 1 and Scope 2 GHG emissions associated with the Project are estimated to be **54,122 t CO_2-e/year** for the construction phase and an annual average of **43,667 t CO_2-e/year** for the commercial phase and **473,538 t CO_2-e/life of project**. The majority of the GHG emissions are associated with the stationary combustion of diesel in mining equipment, concentrate processing and electricity generation (i.e. Scope 1 emissions), and the use of electricity purchased from the grid (i.e. Scope 2 emissions). Inclusion of the Scope 3 emissions approximately tripled the total emissions of the Project due to the high contribution of emissions associated with SC6 refining. It is anticipated that Core Lithium will be required to submit a NGER report annually for the Project due to the Project emissions exceeding the NGER **25,000 CO_2-e/year** Scope 1 & 2 emissions threshold.

To contextualise the Project's current GHG emission estimates, the Project's emission intensity (i.e. total emissions per tonne of product produced) for SC6 production was compared to published emission intensities for other SC6 production facilities. Comparison of the Project's emission intensity with other available intensities, suggests that the Project's SC6 production will be aligned with the emissions of other existing facilities in Western Australia. It is expected that the Project will have lower Scope 3 emissions associated with the transport of the SC6 product from the site to the refining facilities than other SC6 producers in Western Australia.

7. REFERENCES

Altura Mining Ltd (2019), Annual Report 2019. Altura Mining Limited.

Australian Government (2017a), National Greenhouse and Energy Reporting (Audit) Determination 2009, Commonwealth of Australia, 3 July 2017.

Australian Government (2017b), National Greenhouse and Energy Reporting Measurement Technical Guidelines for the estimation of emissions by facilities in Australia, Commonwealth of Australia October 2017.

Australian Government. (2018). Australian Resource Reviews: Rare Earth Elements. Retrieved from Geoscience Australia: https://www.ga.gov.au/scientific-topics/minerals/mineral-resources-and-advice/australian-resource-reviews/rare-earth-elements

Australian Government (2019), National Greenhouse and Energy Reporting Act 2007, Commonwealth of Australia, 11 September 2019.

Australian Government (2020a), National Greenhouse and Energy Reporting Regulations 2008, Commonwealth of Australia, 1 July 2020.

Australian Government (2020b), National Greenhouse and Energy Reporting (Measurement) Determination 2008, Commonwealth of Australia, 1 July 2020.

Australian Government (2020c), National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015, Commonwealth of Australia, 3 October 2020.

Core Lithium (2021), Responses to ERM RFI, provided by Core Lithium Ltd via email received on 20/04/2021.

Galaxy Resources (2020). Sustainability Report Year Ended 31 December 2019. Galaxy Resources Limited.

Galaxy Resources (2021). Sustainability Report Year Ended 31 December 2020. Galaxy Resources Limited.

GHG Protocol (2018), Global Warming Potential Values. Retrieved from https://ghgprotocol.org/sites/default/files/Global-Warming-Potential-Values %28Feb 16 2016%29_1.pdf

GHD (2018), Greenbushes Lithium Mine Expansion: Environmental Referral Additional Information, prepared by GHD Pty Ltd (GHD) for Talison Lithium Australia Pty Ltd.

IPCC (1998), Principles Governing IPCC Work. Retrieved from https://archive.ipcc.ch/pdf/ipcc-principles/ipcc-principles.pdf

IPCC (2000), Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories. Retrieved from https://www.ipcc-nggip.iges.or.jp/public/gp/english/

IPCC (2006), 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Institute for Global Environmental Strategies (IGES) for the IPCC. Retrieved from https://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

IPCC (2014). Intergovernmental panel on Climate Change Climate Change 2014 Synthesis Report. Retrieved from https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full.pdf

IPCC (2017). IPCC Resource Mobilization. IPCC. Retrieved from https://www.ipcc.ch/pdf/brochure_resource_mobilization_en.pdf

Northern Territory Government (2020), Climate Change Response: Towards 2050, Northern Territory Government: Office of Climate Change, Department of Environment and Natural Resources

NPI (2016), National Pollutant Inventory Emission Estimation Technique Manual for Explosives Detonation and Firing Ranges Version 3.1, National Pollutant Inventory.

Pilbara Minerals (2019). 2019 Annual Report. Pilbara Minerals Limited.

Pilbara Minerals (2020). 2020 Annual Report. Pilbara Minerals Limited.

Roskill (2020), Lithium's Growing CO2 Footprint: An Analysis of Energy Consumption and Emissions Intensity from Global Lithium Supply. Roskill Information Services Ltd.

UK Government (2020). Greenhouse gas reporting: conversion factors 2020. Retrieved from https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020

USEPA (2017), Greenhouse Gas Emissions: Understanding Global Warming Potential, United States Environmental protection Agency. Retrieved from https://www.epa.gov/ghgemissions/understanding-global-warming-potentials

World Resources Institute (2004), 'The Greenhouse Gas Protocol - A Corporate Accounting and Reporting Standard', World Resources Institute, March 2004.

World Resources Institute (2013), ''Greenhouse Gas Protocol - Technical Guidance for Calculating Scope 3 Emissions', World Resources Institute, 2013. Retrieved from https://ghgprotocol.org/sites/default/files/standards/Scope3_Calculation_Guidance_0.pdf

WRI & WBCSD (2004). The Greenhouse Gas Protocol. World Resource Industry & World Business Council for Sustainable Development, March 2004. Retrieved 16 February 2018, from http://pdf.wri.org/ghg_protocol_2004.pdf

ERM has over 160 offices across the following countries and territories worldwide

Argentina
Australia
Belgium
Brazil
Canada
Chile
China
Colombia
France
Germany
Ghana
Guyana
Hong Kong
India
Indonesia
Ireland
Italy
Japan
Kazakhstan
Kenya
Malaysia
Mexico
Mozambique
Myanmar
The Netherlands
New Zealand
Norway
Panama
Peru
Poland
Portugal
Puerto Rico
Romania
Russia
Senegal
Singapore
South Africa
South Korea
Spain
Sweden
Switzerland
Taiwan
Tanzania
Thailand
UAE
UK
US
Vietnam

ERM's Perth Office

Level 2
3 Ord Street
West Perth WA 6005

T: +61 8 6467 1600
F: +61 8 9321 5262

www.erm.com

The business of sustainability

ERM