

VICKERY EXTENSION PROJECT (SSD 7480)

Submission to the
Independent Planning
Commission on the
consideration of greenhouse
gas emissions and climate
change

16 June 2020



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GLOSSARY

Abbreviation/Acronym	Meaning
2006 IPCC Guidelines	2006 IPCC Guidelines for National Greenhouse Gas Inventories
2019 IPCC Refinement	2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
ACA	Australian Coal Alliance
ACARP	Australian Coal Association Research Program
ACCUs	Australian carbon credit units
Amendment Report	Vickery Extension Project Amendment Report dated August 2019
Applicant	Vickery Coal Pty Ltd
Approved Project	Vickery Coal Project approved on 19 September 2014 under Part 4 of the EP&A Act (application no. SSD-5000)
Assessment Report	State Significant Development Assessment (SSD 7480): Vickery Extension Project published by the NSW Department of Planning, Industry and Environment in May 2020
A-USC	Advanced ultra-supercritical
BAU	Business-as-usual
Buckley Submission	Submission of Tim Buckley of the Institute for Energy Economic and Financial Analysis to the IPC dated February 2019
CCUS	Carbon capture, use and storage
CER	Clean Energy Regulator
CFI Act	<i>Carbon Credits (Carbon Farming) Act 2011</i> (Cth)
CHPP	Coal handling and preparation plant
COP	Conference of the Parties
CO ₂ -e	Carbon dioxide equivalent
CSR	Coke strength after reduction
CTSCo	Carbon Transport Storage Company
DPIE	NSW Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW)

Abbreviation/Acronym	Meaning
ERF	Emissions Reduction Fund
ESD	Ecologically sustainable development
ETS	Emissions trading scheme
Export Countries	The most likely countries to which the Extension Project's coal will be exported: Japan, South Korea and Taiwan
Extension Project	Vickery Extension Project (application no. SSD 7480)
FoE	Friends of the Earth
GHG	Greenhouse gas
GHG Assessment	Air Quality and Greenhouse Gas Assessment by Ramboll Australia Pty Ltd dated June 2018, which is Appendix E to the EIS for the Extension Project
HCC	Hard coking coal (metallurgical coal)
HEL	Hunter Environment Lobby
HELE	High-efficiency, low-emissions
IEA	International Energy Agency
IEEFA Report	The Institute for Energy Economic and Financial Analysis' report titled "New South Wales Thermal Coal Exports Face Permanent Decline: Grim Outlook Prompts the Need for Transition" dated November 2018
INDC	Intended Nationally Determined Contribution
IPC	Independent Planning Commission
IPCC	Intergovernmental Panel on Climate Change
JCM	Japan's Joint Crediting Mechanism
LGA	Local government area
LULUCF	Land use, land-use change and forestry
Mining SEPP	<i>State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007</i>
Mt	Million tonnes
Mtce	Million tonnes of coal equivalent
MW	Megawatts
NDC	Nationally Determined Contribution
Net Zero Plan Stage 1	NSW Department of Planning, Industry and Environment's <i>Net</i>

Abbreviation/Acronym	Meaning
	<i>Zero Plan Stage 1: 2020–2030</i> (March 2020)
NGER Act	<i>National Greenhouse and Energy Reporting Act 2007</i> (Cth)
NSW	New South Wales
PAC	Planning Assessment Commission
Roadmap	South Korea's revised roadmap for achieving the 2030 National Greenhouse Gas Reduction Goal in July 2018
Rocky Hill	<i>Gloucester Resources Limited v Minister for Planning</i> (2009) 234 LGERA 257
ROM	Run-of-mine
SC	Supercritical
SEARs	Secretary's Environmental Assessment Requirements
SSCC	Semi-soft coking coal (metallurgical coal)
Steffen Report	Expert report produced by Emeritus Professor Will Steffen dated 9 February 2018
t	Tonnes
Territorial Limits Bill	<i>The Environmental Planning and Assessment Amendment (Territorial Limits) Bill 2019</i> (NSW)
Transparency Framework	Transparency Framework adopted under the Katowice Climate Package
UNFCCC	<i>United Nations Framework Convention on Climate Change</i>
USC	Ultra-supercritical
<i>Wallerah 2</i>	<i>Australian Coal Alliance Inc v Wyong Coal Pty Ltd</i> [2019] NSWLEC 31
WEO	World Energy Outlook
WEO 2019	World Energy Outlook 2019
Whitehaven	Whitehaven Coal Limited, the parent company of the Applicant
<i>Xstrata</i>	<i>Xstrata Coal Queensland Pty Ltd v Friends of the Earth</i> [2012] QLC 13

SUBMISSION TO THE INDEPENDENT PLANNING COMMISSION

1. INTRODUCTION

- 1.1 Vickery Coal Pty Ltd (the **Applicant**), a subsidiary of Whitehaven Coal Limited (**Whitehaven**), seeks consent to extend open cut mining operations at the site of the approved, but yet to be constructed, Vickery Coal Project (the **Approved Project**). The proposed extension is known as the Vickery Extension Project (the **Extension Project** or the **Project**). The Applicant has applied for consent to the Extension Project under the State significant development provisions of the *Environmental Planning and Assessment Act 1979* (NSW) (**EP&A Act**).
- 1.2 The Approved Project was approved on 19 September 2014 under Part 4 of the EP&A Act (application no. SSD-5000). That development consent authorises the extraction of up to 4.5 million tonnes (**Mt**) of run-of-mine (**ROM**) coal annually, totalling 135 Mt of ROM coal over 30 years.
- 1.3 The Approved Project has been "physically commenced" under the EP&A Act, and as a consequence, the development consent for the Approved Project has not lapsed. It follows, that if the IPC refuses to grant consent for the Extension Project, the Applicant will still be entitled to proceed with construction and operation of the Approved Project.
- 1.4 The Extension Project will expand the area of approved mining and increase the approved rate of extraction to authorise the extraction of up to 10 Mt of ROM coal per year, with an estimated total extraction of 168 Mt of ROM coal over 25 years.
- 1.5 The Extension Project will be carried out partly on land that has been disturbed by previous mining operations at the former Vickery Coal Mine and Canyon Coal Mine. Extraction from the former Vickery Coal Mine and Canyon Coal Mine ceased in 1998 and 2009 respectively. Those mines were rehabilitated to form five final voids.
- 1.6 The Applicant commissioned an Air Quality and Greenhouse Gas Assessment by Ramboll Australia Pty Ltd dated June 2018 (**GHG Assessment**), which is Appendix E to the Environmental Impact Statement (**EIS**) for the Extension Project.
- 1.7 The Applicant also commissioned an Economic Assessment by AnalytEcon Pty Ltd dated August 2018 (**Economic Assessment**), which is Appendix J to the EIS.
- 1.8 The initial stage of the public hearing on the Extension Project was held by the Independent Planning Commission (**IPC**) on 4 and 5 February 2019.
- 1.9 A number of written submissions opposing the Extension Project have been made to the IPC regarding the IPC's consideration of greenhouse gas (**GHG**) emissions and climate change.
- 1.10 In May 2020, the NSW Department of Planning, Industry and Environment (**DPIE**) published the State Significant Development Assessment (SSD 7480): Vickery Extension Project (the **Assessment Report**). The Assessment Report has been given to the IPC for its consideration. The development application for the Extension Project has been referred to the IPC for a further public hearing and determination.
- 1.11 This submission is the Applicant's response on GHG emissions and climate change issues which are relevant to the IPC's assessment and determination of the development application for the Extension Project.

2. **STRUCTURE OF THIS SUBMISSION**

2.1 This submission contains the following five parts:

- (a) **Part A:** the law regarding the consideration of GHG emissions and climate change in determining development applications under the EP&A Act
- (b) **Part B:** international, national and State climate change law and policy that the IPC may consider when determining the development application for the Extension Project
- (c) **Part C:** the future demand for coal (including under future climate change policy scenarios), the characteristics of the Extension Project's coal, and the consequences of coal market substitution
- (d) **Part D:** response to submissions made in respect of GHG emissions and climate change at, and following, the initial stage of the public hearing into the Extension Project
- (e) **Part E:** weighing the benefits of the Extension Project against the consideration of GHG emissions and climate change

3. **EXECUTIVE SUMMARY**

The law regarding the consideration of GHG emissions and climate change in determining the development application under the EP&A Act

3.1 The following key points are made in **Part A** of this submission:

- (a) pursuant to s 4.5(1) of the EP&A Act, the IPC must consider, among other things:
 - (i) the provisions of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (**Mining SEPP**), including the aims of the Mining SEPP and cl 14;
 - (ii) the likely impacts of the Extension Project, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality; and
 - (iii) the public interest;
- (b) the aims of the Mining SEPP include to facilitate the orderly and economic use and development of land containing mineral resources, and to promote the development of significant mineral resources;
- (c) clause 14(2) of the Mining SEPP requires a consideration of an assessment of the GHG emissions (including downstream emissions);
- (d) the NSW Land and Environment Court has said that the obligation to consider the public interest includes the principles of ESD in cases where issues relevant to those principles arise. The principle of intergenerational equity and the precautionary principle can, in turn, involve the consideration of GHG emissions;
- (e) the IPC may take into account the *Paris Agreement*, Australia's Nationally Determined Contribution (**NDC**) under the *Paris Agreement*, and the NSW Government's Climate Change Policy Framework and its *Net Zero Plan Stage 1: 2020–2030* (March 2020) (**Net Zero Plan Stage 1**);

- (f) however, GHG emissions and climate change are not the only considerations that inform the public interest. The public interest is broad and captures not only environmental considerations, but also the social and economic benefits associated with the Extension Project for the wider community and the State;
- (g) as recognised by the NSW Court of Appeal, ESD is just one of many objects of the EP&A Act, including:
 - (i) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources, and
 - (ii) to promote the orderly and economic use of land;¹
- (h) the IPC must consider and determine the development application for the Extension Project on its own merits, taking into account both the positive and negative impacts of the Extension Project and all of the relevant considerations under the EP&A Act;
- (i) the IPC is not obliged to consider or follow any part of *Gloucester Resources Limited v Minister for Planning* (2019) 234 LGERA 257 (**Rocky Hill**), in which the NSW Land and Environment Court, exercising administrative power in Class 1 of its jurisdiction, found that the significant and unacceptable planning, visual and social impacts of the proposed project were sufficient reasons alone for refusing consent at [556]; and
- (j) there are legal and policy reasons why the IPC should not impose conditions of consent that require the Applicant to offset GHG emissions, or that would restrict the export of the Extension Project's product coal. The Territorial Limits Bill, if enacted, would codify this position.

International, national and State climate change law and policy

3.2 The following key points are made in **Part B** of this submission:

- (a) almost all of the Extension Project's Scope 3 emissions will be counted under the *Paris Agreement* as the Scope 1 GHG emissions of the Export Countries in which the coal is combusted. Any mitigation in relation to the use of coal in electricity generation or steelmaking within those countries will count towards those countries' Nationally Determined Contributions (**NDCs**) under the *Paris Agreement*;
- (b) the Export Countries are parties to the *Paris Agreement* (save for Taiwan which is not a member of the United Nations) and have announced or adopted domestic laws and policies to achieve their targets to reduce their GHG emissions as set out in their NDCs or Taiwan's INDC;²
- (c) Australia does not require monitoring or reporting of Scope 3 GHG emissions under the NGER Act and does not count Scope 3 GHG emissions in its national inventory of GHG emissions, as this would constitute double counting contrary to the Transparency Framework under the *Paris Agreement*. Consequently, refusing development consent to the Extension Project will not help to achieve Australia's NDC;

¹ EP&A Act, s 1.3(a) and (c); *Minister of Planning v Walker* (2008) 161 LGERA 423 at [52].

² It should be noted, of course, that there may well be other countries to which the Project's coal is exported from time-to-time during the Project's life of mine. Nevertheless, the *Paris Agreement* has been adopted almost universally having been ratified by 187 countries, 184 of which have submitted NDCs.

- (d) the carbon budget approach is not endorsed by the *Paris Agreement* as a method by which allocation or sharing of global mitigation efforts among countries can occur, indeed:
 - (i) it is inconsistent with the approach that has been adopted by the *Paris Agreement* for achieving the goal set under that agreement, namely NDCs;
 - (ii) its application to Scope 3 GHG emissions results in double counting, which is an outcome that the *Paris Agreement* seeks to avoid;
- (e) neither the Australian Government nor the NSW Government have advocated the "carbon budget" approach, or indicated that the development of new coal mines, or expansion of existing coal mines, is to be prohibited or restricted in any way for the purpose of achieving Australia's NDC;
- (f) the Extension Project's Scope 1 GHG emissions will be regulated under the Safeguard Mechanism of the Australian Government's *National Greenhouse and Energy Reporting Act 2007 (NGER Act)*. Once direct GHG emissions exceed 100,000 tCO₂-e/year, the Clean Energy Regulator will set an emissions baseline based on benchmark emissions intensities (that is, the best, least emissions intensive standard for production),³ and the Applicant will be required to offset any emissions above its baseline in accordance with the NGER Act; and
- (g) it is the NSW Government's policy:
 - (i) as embodied in the *Mining Act 1992* (NSW) and the Mining SEPP, that mineral resources in NSW continue to be developed in recognition of the significant social and economic benefits to NSW that result from the efficient development of mineral resources. The IPC is required by s 4.15 of the EP&A Act to take into consideration the aims of the Mining SEPP; and
 - (ii) as stated in the Department of Planning, Industry and Environment's *Net Zero Plan Stage 1: 2020–2030* (March 2020) (**Net Zero Plan Stage 1**) (at 22):

New South Wales' \$36 billion mining sector is one of our biggest economic contributors, supplying both domestic and export markets with high quality, competitive resources. Mining will continue to be an important part of the economy into the future and it is important that the State's action on climate change does not undermine those businesses and the jobs and communities they support.

Future demand for coal, the characteristics of the Extension Project's coal, and the consequences of coal market substitution

3.3 The following key points are made in **Part C** of this submission:

- (a) the International Energy Agency's (**IEA**) *World Energy Outlook 2019 (WEO 2019)* presents three policy scenarios for projecting global energy demand and energy supply:
 - (i) the Current Policies Scenario is the business-as-usual scenario and assumes that governments do not implement recently announced climate change or GHG mitigation policies and that no new policies are introduced in the future;

³ *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015* (Cth), cl 38(3); <http://www.cleanenergyregulator.gov.au/NGER/The-safeguard-mechanism/Baselines>

- (ii) the Stated Policies Scenario, the WEO 2019's central scenario, incorporates policies and measures that have been announced by governments but where the precise implementation measures have not yet been fully defined; and
 - (iii) the Sustainable Development Scenario, which incorporates a variety of hypothetical government policies compatible with achieving universal access to electricity while achieving the aim of the *Paris Agreement*;
- (b) the Extension Project will produce approximately 150 Mt of saleable coal, comprising thermal coal and semi-soft coking coal (**SSCC**) at an indicative life of mine ratio of 40:60. Thermal coal is primarily used in electricity generation. SSCC is a type of metallurgical coal used in steelmaking;
- (c) the IEA projects that, in the Stated Policies Scenario, primary energy demand grows by approximately 24% from 2018 to 2040, driven by structural trends of population growth, urbanisation and economic growth in developing economies, particularly in the Asia Pacific region;
- (d) in relation to coal, the IEA projects that demand for coal in the Stated Policies Scenario will essentially remain flat and drop by 60 Mtce between 2018 and 2040, ending up in 2040 at around 5400 Mtce. Coal-fired electricity generation plateaus and its share of electricity generation declines from 38% in 2018 to 25% in 2040. However, this varies drastically by region. In advanced economies coal-fired electricity generation will more than halve over the period to 2040 while coal consumption will increase in Southeast Asia, where 40% of the projected rise in the region's electricity demand will be met by coal, and coal plants are currently around 12 years old on average (more than 20 years younger than those in advanced economies);
- (e) under all three policy scenarios presented by the IEA (including the Sustainable Development Scenario), there will continue to be a global demand for coal. Absent new mines or brownfield expansions, the global production of coal would be approximately 600 Mtce in 2040. Under the Sustainable Development Scenario, global demand for coal would be 2,101 Mtce in 2040 of which 858 Mtce would be for electricity and 1,206 Mtce would be for industrial use, principally steelmaking.
- (f) metallurgical coals, including hard coking coal (**HCC**) and SSCC are essential inputs for the current production of approximately 70% of all steel globally produced using blast furnace-basic oxygen furnace technology. HCC and SSCC are used together to produce coke, which is the primary source of carbon in steelmaking. The proportion of each coal used in the coking process is determined by various factors, including pricing differentials, blast furnace requirements and specific characteristics and qualities of the coals;
- (g) the IEA projects that coal use in steelmaking declines in the Stated Policy Scenario by around 30 Mtce by 2040, reflecting efficiency gains and the gradual rise in the use of electricity-based routes for steel production. However, in both the Stated Policies Scenario and the Sustainable Development Scenario, coal remains the backbone of steel manufacturing, as the scope to shift away from coal by making greater use of scrap-based or direct reduction of iron (DRI)-based electric arc furnaces is limited by the availability and cost of scrap steel and the cost of electricity;

- (h) the Applicant engaged CRU International Limited (**CRU**) to undertake a study of global coal demand and supply to 2040, the characteristics of the Extension Project's coal compared to the coal produced by other coal exporting countries, and the likely GHG consequences of coal market substitution if the Extension Project does not go ahead. CRU's forecasts for global coal demand to 2040 are similar to the IEA's projections for the Stated Policies Scenario. The relevant findings in the CRU study are:
- (i) global demand for thermal coal will decline only slightly from 2018 to 2040, and coal will remain an important pillar of electricity generation in many regions, including in Southeast Asia, as well as in China and India in 2040;
 - (ii) high quality thermal coal from Australia (such as that produced by the Extension Project) is, and will continue to be, in high demand to meet the electricity generation needs in these regions;
 - (iii) as the ability of existing mines to meet the global demand for coal declines over time, it will be necessary for the demand to be met by expansions of approved coal mines or the development of new coal mines;
 - (iv) the Extension Project's thermal coal is higher quality (in terms of calorific value) than the country weighted averages of all other thermal coal exporters, including Australia;
 - (v) more GHGs are emitted when lower quality coal is used because more lower quality coal is needed to achieve an equivalent energy output than what would be produced from the combustion of higher quality coal;
 - (vi) demand for metallurgical coal is driven by demand for steel. Blast-furnace technology, which is dependent on HCC and SSCC, will still dominate the steelmaking industry to 2040;
 - (vii) HCC has superior coke strength after reduction (**CSR**) compared to SSCC. However, blast furnaces cannot run using only HCC. There is evidence that a coke blend containing approximately 15 to 20% SSCC is the likely technical, minimum level of SSCC that can be used in highly efficient blast furnaces. This means that SSCC's vital role in steel production will continue into the future;
 - (viii) the ash content of the Extension Project's SSCC is lower than the average ash content of Australian SSCC and all other major seaborne SSCC suppliers, save for Canada. The sulphur content of the Extension Project's SSCC at 0.4% is also near the bottom end globally and lower than the average sulphur content of Australian SSCC. The phosphorus content of the Extension Project's SSCC at 0.003% is lower than the average of Australia and all other major seaborne SSCC suppliers. These qualities make the Extension Project's SSCC one of the most marketable SSCC products globally;
 - (ix) ash and CSR are the two attributes of HCC and SSCC that have the greatest impact on blast-furnace productivity and, consequently, the GHG emissions intensity of steelmaking. Given the Extension Project's SSCC's low ash levels compared to other exporters, CO₂ emissions could be reduced by 13 kg per tonne of hot metal produced (compared to the emissions intensity based on average ash content of SSCC globally) if the Extension Project's coal were used as the only SSCC within the coke blend. CSR has not been measured for the Extension Project's SSCC at this stage because SSCC is generally selected for use in coking coal blends based on attributes other than CSR; and

- (x) given its high energy content, SSCC can be used as premium quality thermal coal. At times during the life of mine, the prevailing pricing differential between SSCC and thermal coal may drive SSCC into the premium quality thermal coal market for power generation.
- (i) coal investment and supply conditions in Australia have a limited impact on global market conditions, which means that failure to approve the Extension Project will not affect global demand for coal;
- (j) the environmental impacts of substituting the shortfall in supply from the Extension Project with alternative sources of thermal coal would be adverse, because the Extension Project's thermal coal is high quality (including compared to the weighted average of Australian mines) in calorific terms and low in negative attributes such as ash and sulphur;
- (k) this means that substitution by other coal sources is likely to result in more coal being mined and combusted to meet the same power needs, resulting in higher Scope 3 GHG emissions and higher concentrations of ash and sulphur;
- (l) moreover, the direct emissions (Scope 1 and 2 emissions) of these alternative supply sources are also likely to be higher, due to favourable geology and efficient production processes and technologies used by the Australian mining industry;
- (m) CRU modelled three hypothetical scenarios. They are:
 - (i) if neither the Extension Project nor the Approved Project go ahead (**Scenario 1**), the absence of coal supply from the Extension Project and the Approved Project is estimated to result in the release of an additional 14 to 120.4 million tonnes of CO₂-e into the atmosphere over the life of mine as the result of substituted inferior coal;
 - (ii) if the Extension Project is not approved, but the Approved Project does go ahead (**Scenario 2**), then the absence of the additional supply of coal from the Extension Project is estimated to result in the release of an additional 5.7 to 49.7 million tonnes of CO₂-e into the atmosphere over the life of mine as the result of substituted inferior coal; and
 - (iii) if no new Australian projects enter production and currently operating Australian mines naturally deplete during the period 2019-2030 (**Scenario 3**), then the non-Australian alternative supply is estimated to result in the release of an additional 68.6 to 124.1 million tonnes of CO₂-e into the atmosphere in that period to 2030;
- (n) therefore, the failure to approve the Extension Project would likely result in a net increase in GHG emissions globally due to market substitution of the Extension Project's high quality coal with inferior quality coal.

Response to submissions made in respect of GHG emissions and climate change

3.4 In **Part D** of this submission we have:

- (a) identified the key submissions made by opponents of the Extension Project that are based on GHG emissions and climate change; and
- (b) identified and critically reviewed six common themes relied by on opponents of the Extension Project which are related to GHG emissions and climate change. Those six themes which are critically reviewed are:

- (i) Theme 1 – anthropogenic climate change is a real phenomenon that is occurring and coal is one of the major sources of human-induced GHG emissions;
- (ii) Theme 2 – in order for the "well below 2°C" goal of the Paris Agreement to be realised, no new fossil fuel developments should be approved, and those existing, already approved fossil fuel developments should be rapidly phased out;
- (iii) Theme 3 – coal market substitution is speculative and should not be considered by the IPC;
- (iv) Theme 4 – the approval of the Extension Project would be inconsistent with existing climate change laws and policies, particularly Australia's NDC and the NSW Climate Change Policy Framework;
- (v) Theme 5 – approval of the Extension Project creates a financial risk for the Applicant, existing coal mines in NSW, Australia and the local community; and
- (vi) Theme 6 – the IPC should follow *Rocky Hill* and refuse development consent for the Extension Project.

Weighing the benefits of the Extension Project against the consideration of GHG emissions and climate change

3.5 The following key points are made in **Part E** of this submission:

- (a) the Extension Project will more efficiently extract ROM coal reserves and thereby maximise recovery of the valuable coal resource, enabling extraction of approximately 33 million tonnes of additional ROM coal compared to the Approved Project but over a shorter life of mine;
- (b) the Extension Project would remove the need to transport coal on public roads to Whitehaven's Coal Handling and Preparation Plant (**CHPP**) located 5 km northwest of Gunnedah. The Extension Project will also reduce the GHG emissions intensity of the Tarrawonga Coal Mine as a result of reduced haulage distances to the Project CHPP instead of the Whitehaven CHPP;
- (c) mitigation measures will be implemented to limit the impacts associated with the Extension Project, including Scope 1 and Scope 2 GHG emissions that are generated by the Extension Project;
- (d) the Extension Project will improve the compatibility of the final landform with the surrounding landscape by reducing the number of final voids compared to both the Approved Project and the current landscape, better integrating the western emplacement with the surrounding landscape, and removing the need for the approved eastern emplacement;
- (e) the Extension Project will generate significant social and economic benefits at a local, regional and State level for current and future generations, in the form of job creation and a total net economic benefit for the NSW community of approximately \$1.16 billion (in net present value terms). The sensitivity analysis included in the Economic Assessment means that a significant net benefit will accrue to NSW even if coal prices are affected by climate change policies in the future;

- (f) if the Extension Project is not approved, Whitehaven would still be entitled to carry out the Approved Project with a number of consequences, including that approximately 200 additional operational employment opportunities would be foregone, the operational efficiency improvements of the Extension Project (including its CHPP) would not be realised, the additional economic benefits to the State would be foregone, coal would be extracted over a longer timeframe which would extend past 2050, and three final voids would remain in the landscape as opposed to two following completion of the Extension Project;
- (g) the failure to approve the Extension Project would likely result in a net increase in GHG emissions globally due to market substitution of the Extension Project's high quality coal with inferior quality coal; and
- (h) based on the information provided by the Applicant to the IPC, the Applicant considers that there is more than sufficient information before the IPC to comfortably reach a conclusion that the benefits of the Extension Project outweigh its impacts.

4. **PART A: THE LAW REGARDING CONSIDERATION OF CLIMATE CHANGE AND GHG EMISSIONS IN DETERMINING A DEVELOPMENT APPLICATION UNDER THE EP&A ACT**
- 4.1 In Part A of the submission, the following is addressed:
 - (a) the law regarding the consideration of climate change and GHG emissions (particularly Scope 3 emissions) in determining a development application under the EP&A Act;
 - (b) the type and nature of conditions of consent that may be imposed by the IPC in relation to GHG emissions and climate change; and
 - (c) relevance of the Territorial Limits Bill to the IPC's assessment and determination of the development application for the Extension Project.
- 4.2 Each of these will be addressed in turn below.

The law regarding the consideration of climate change and GHG emissions in determining a development application under the EP&A Act
- 4.3 As a starting point, the exercise of the IPC's discretion under the EP&A Act is governed by the scope and subject matter of the EP&A Act.
- 4.4 The objects of the EP&A Act relevantly include:
 - (a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources (s 1.3(a));
 - (b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment (s 1.3(b));
 - (c) to promote the orderly and economic use and development of land (s 1.3(c)); and
 - (d) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State (s 1.3(i)).
- 4.5 In determining a development application, s 4.15 of the EP&A Act requires the consent authority to take into consideration certain matters as are of relevance to the development, including:
 - (a) the provisions of any relevant environmental planning instrument (s 4.15(1)(a)(i));
 - (b) "the likely impacts of the development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality" (s 4.15(1)(b)); and
 - (c) the public interest (s 4.15(1)(e)).
- 4.6 The main environmental planning instrument of relevance to the Extension Project is the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP)*. The aims of the Mining SEPP "in recognition of the importance to New South Wales of mining, petroleum production and extractive industries" include:

- (a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State (cl 2(a));
- (b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources (cl 2(b));
- (c) to promote the development of significant mineral resources (cl 2(b1)); and
- (d) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources (cl 2(c)).

4.7 Clause 14 of the Mining SEPP relevantly states:

14 Natural resource management and environmental management

- (1) Before granting consent for development for the purposes of mining... the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure the following—

...

- (c) that greenhouse gas emissions are minimised to the greatest extent practicable.

- (2) Without limiting subclause (1), in determining a development application for development for the purposes of mining... the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable State or national policies, programs or guidelines concerning greenhouse gas emissions.

4.8 The following things should be noted about s 4.15 of the EP&A Act and cl 14(2) of the Mining SEPP:

- (a) statutes are always read as being prima facie restricted in their operation within territorial limits.⁴ This principle of interpretation is reflected in s 12(1) of the *Interpretation Act 1987* (NSW) which states that in any Act or instrument "a reference to a locality jurisdiction or other matter or thing is a reference to such a locality, jurisdiction or other matter or thing in and of New South Wales." This applies unless a contrary intention appears in the Act or instrument concerned;⁵
- (b) the starting point to interpreting s 4.15 of the EP&A Act is that the impacts of the development (both direct and indirect) that are to be considered are impacts of the development in and of NSW;
- (c) in relation to the provisions of any relevant environmental planning instrument, clause 14(2) of the Mining SEPP requires a consideration of an assessment of the GHG emissions (including downstream emissions), being prima facie GHG emissions in and of NSW;⁶

⁴ *Jumbunna Coal Mine NL v Victorian Coal Miners' Association* (1908) 6 CLR 309, 363 (O'Connor J).

⁵ *Interpretation Act 1987* (NSW), s 5(2).

⁶ This is supported by the *Guidelines for the economic assessment of mining and coal seam gas proposals* (dated December 2015), in which it appears to be suggested that the assessment of the economic aspects of a given project are to be considered at local, regional and State scale, but not at a higher scale.

- (d) the expression "public interest", when used in a statute like the EP&A Act, imports a discretionary value judgment to be made by reference to undefined factual matters and is unconfined except by the scope and subject matter of the EP&A Act;⁷
 - (e) the public interest is, as a result, broad and captures not only environmental considerations associated with the Extension Project, but also the social and economic benefits associated with the Extension Project for the wider community and the State;
 - (f) the NSW Land and Environment Court has said that the obligation to consider the public interest under s 4.15(1)(e) of the EP&A Act obliges the consent authority to have regard to the principles of ESD in cases where issues relevant to those principles arise;⁸
 - (g) as acknowledged by the NSW Court of Appeal, ESD is just one of many objects of the EP&A Act, including:
 - (i) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources, and
 - (ii) to promote the orderly and economic use of land;⁹ and
 - (h) there is authority that consideration of the public interest and principles of ESD can involve consideration of Scope 3 GHG emissions.¹⁰
- 4.9 The Applicant accepts that the IPC may take into account the Paris Agreement, Australia's NDC under the Paris Agreement, the NSW Government's Climate Change Policy Framework and its Net Zero Plan Stage 1.
- 4.10 The Applicant accepts that the IPC can consider, as part of the public interest, the GHG emissions of the Extension Project (including Scope 3 emissions), and the Extension Project's contribution to climate change insofar as that contribution is likely to impact NSW. However, the Applicant submits that:
- (a) climate change and GHG emissions are not the only considerations that inform the public interest and, certainly, are not to be solely determinative of the Extension Project;¹¹
 - (b) it is for the IPC to determine how much weight is to be attributed to the relevant social, economic and environmental factors associated with the Extension Project (including the climate change impacts and GHG emissions of the Extension Project); and

⁷ *The Pilbara Infrastructure Pty Ltd v Australian Competition Tribunal* (2012) 246 CLR 379 at [42] per French CJ, Gummow, Hayne, Crennan, Kiefel and Bell JJ.

⁸ *Telstra Corporation Ltd v Hornsby Shire Council* (2006) 67 NSWLR 256 at [121]-[124], cited with agreement in *Minister of Planning v Walker* (2008) 161 LGERA 423 per Hodgson J at [42]-[43]. However, the NSW Court of Appeal has been more circumspect at least in respect of decisions under Part 3A of the EP&A Act, stating that the principles of ESD "are likely to come to be seen as so plainly an element of the public interest, in relation to most if not all decisions, that failure to consider them will become strong evidence of failure to consider the public interest": *Minister of Planning v Walker* (2008) 161 LGERA 423 per Hodgson J at [56].

⁹ EP&A Act, s 1.3(a) and (c); *Minister of Planning v Walker* (2008) 161 LGERA 423 at [52].

¹⁰ See, e.g., *Gray v Minister for Planning* (2006) 152 LGERA 258 at [126], [135].

¹¹ This proposition also gains support generally from Justice Moore's recent decision in *Australian Coal Alliance Incorporated v Wyong Coal Pty Ltd* [2019] NSWLEC 31 at [96] to [105] and from the NSW Court of Appeal's decision in *Minister of Planning v Walker* (2008) 161 LGERA 423.

- (c) the IPC's approach to considering and weighting the relevant factors is not prescribed, dictated or restricted by the decision in *Gloucester Resources Limited v Minister for Planning* [2019] NSWLEC 7 (**Rocky Hill**).
- 4.11 The Applicant's position on the relevance of *Rocky Hill* is set out in detail in **Appendix 1** and is summarised as follows:
- (a) the Court's decision in *Rocky Hill* was the determination of a "merit appeal" whereby the Court "stands in the shoes" of the consent authority and determines the merits of a development application. The Court's decision is, therefore, not a legal precedent that the IPC is obliged to follow;
 - (b) in contrast, *Australian Coal Alliance Inc v Wyong Coal Pty Ltd* [2019] NSWLEC 31 (**Wallarah 2**), which was decided after *Rocky Hill*, was the determination of judicial review proceedings, with the consequence that this case is a legal precedent and is, in the Applicant's submission, both binding on and instructive to the IPC as to how the issue of climate change and GHG emissions may be addressed by the IPC in determining the development application for the Extension Project;
 - (c) in *Wallarah 2*, the Court found that there was no legal error in a consent authority approving a new coal mine in circumstances where:
 - (i) the combustion of the project's coal was predicted to generate Scope 3 emissions significantly greater (by a factor of 7) than those of the Rocky Hill Coal Project;
 - (ii) there was no proposal to offset those emissions;
 - (iii) the consent authority considered and accepted the concept of coal market substitution; and
 - (iv) the consent authority considered that Scope 3 emissions should be dealt with at the location where those emissions are generated or at higher policy levels.
 - (d) *Rocky Hill* was concerned with the specific facts and circumstances of that proposed mining project, particularly being in the Gloucester Valley, close to the town of Gloucester;
 - (e) in *Rocky Hill*, climate change impacts and GHG emissions were not the essential reasons for the refusal of the Rocky Hill Coal Project, as the Court made clear at [556] that the significant and unacceptable planning, visual and social impacts of the proposed project were sufficient reasons alone for refusing the development application for the Rocky Hill Coal Project;
 - (f) the IPC is obliged to consider and determine the development application for the Extension Project on its own, individual merits, having regard to the environmental assessment material and information that is before it;
 - (g) the IPC, in determining the development application for the Extension Project, is not obliged to consider, adopt, distinguish or follow any aspect of the Court's decision in *Rocky Hill*, as the Court's decision in *Wallarah 2* (which is a binding, legal precedent) confirms;

- (h) the IPC is required to assess all of the impacts of the Extension Project (both positive and negative) and all of the relevant considerations under the EP&A Act, which involves an "intuitive synthesis of the relevant factors";¹²
- (i) as is evident from the judgment in *Wallarah 2*, the fact that a project generates GHG emissions does not mean that the starting position for consideration of a development application is that the Extension Project should be refused, and that fact is also not singularly determinative for the purposes of considering a development application made under the EP&A Act for any type of development, coal mining being only one of many types of development which generate GHG emissions;
- (j) there is no government policy or legal principle that dictates the extent to which GHG emissions generated by the Extension Project, or the combustion of the Extension Project's coal by other developments, are to be considered and weighted in determining a development application under the EP&A Act, and there is no prescribed quantitative criteria against which the Extension Project's GHG emissions are to be assessed;
- (k) it is for the IPC to determine how much weight it will accord to the climate change impacts and GHG emissions generated by the Extension Project or the combustion of the Extension Project's coal by other developments, compared to all the other relevant considerations under the EP&A Act; and
- (l) for the reasons given in Parts C, D and E of this submission, it is submitted that the climate change impacts and GHG emissions generated by the Extension Project or the combustion of the Extension Project's coal by other developments do not outweigh the significant social and economic benefits that the Extension Project will deliver at a local, regional and State level (which are summarised in Part E of this submission and are addressed in other documents already before the IPC, such as the Environmental Impact Statement).

The type and nature of conditions of consent that may be imposed in relation to GHG emissions and climate change

4.12 DPIE has recommended conditions of consent for the Extension Project that:

- (a) all reasonable steps are taken to improve energy efficiency and reduce Scope 1 and 2 GHG emissions of the Extension Project; and
- (b) that an Air Quality and Greenhouse Gas Management Plan is prepared describing the measures to be implemented to ensure that best management practice is employed to minimise the Extension Project's Scope 1 and 2 GHG emissions and to improve the Extension Project's energy efficiency.

4.13 The Applicant welcomes these recommended conditions of consent and submits that the IPC should not impose any further conditions of consent relating to GHG emissions for the reasons set out below.

4.14 The case of *Hunter Environment Lobby Inc v Minister for Planning* [2011] NSWLEC 221 is relevant to the type and nature of conditions of consent that may be imposed. Whilst that decision was also in a merit appeal like in *Rocky Hill* (and thus, has no precedent value), the Applicant considers that certain aspects of that decision are worth bringing to the IPC's attention.

¹² *Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure* (2013) 194 LGERA 347 at [41]–[42].

- 4.15 That case was a merit appeal brought in respect of the consolidation and expansion of the Ulan coal mine. At [32] of the judgment, Justice Pain noted that "some of the conditions that [Hunter Environment Lobby] seek to impose are novel, particularly in relation to measures to offset GHG emissions".
- 4.16 Hunter Environment Lobby (**HEL**) sought conditions of consent that would require an offset for Scope 1 and 2 emissions, but not for Scope 3 emissions.
- 4.17 Mr Kitto of the then Department of Planning and Environment (**DP&E**) gave evidence in the proceedings. His evidence was that the imposition of conditions on a planning approval requiring offset of GHG emissions would be "inconsistent with the government's policy of not using the development assessment process in the EP&A Act to impose obligations on proponents to offset the GHG emissions of their projects and contrary to the DP&E's practice of at least 5 years of applying this policy to the assessment and regulation of all major projects in NSW" (at [59]).
- 4.18 Mr Kitto summarised the DP&E's position as being that development approval conditions are unsuitable for implementing a regulatory regime to require proponents to offset some or all of the GHG emissions of their projects. Key reasons given for this position were (at [60]):
- (a) such a regime would be inefficient, ineffective and inequitable because conditions could only be imposed on new projects, not existing ones;
 - (b) no existing mines in NSW are required to offset their GHG emissions (we believe that statement remains true today, to the extent that no existing mine is required by a condition of consent to offset its GHG emissions. Some mines will be subject to the Federal government's Safeguard Mechanism and will need to offset GHGs that are emitted above a certain baseline, as discussed in paragraphs 5.38 to 5.45 below);
 - (c) imposing a regulatory regime through conditions would make the coal supply from a few mines more expensive and would not drive change across the industry;
 - (d) in the absence of a national or international scheme for offsetting GHG emissions, the regulatory regime imposed by the conditions would need to rely on a collection of largely voluntary schemes to achieve offsets;
 - (e) the regime would be inflexible as consents could only be modified at the request of the proponent; and
 - (f) the regime would be complex to administer as it would not be uniform for all proponents.
- 4.19 Justice Pain held that it was within power to impose a condition on a planning approval requiring the offset of Scope 1 emissions generated by a project, finding that the fact that "the impact is felt within and also beyond NSW does not suggest that legally a condition should not be imposed under state legislation which seeks to ameliorate one contributor to that impact" (at [93]).
- 4.20 At [94], her Honour declined to determine whether it would be lawful to impose conditions requiring the offset of Scope 2 emissions, but clearly expressed doubts on the validity of such a condition:

Scope 2 emissions are different to scope 1 emissions. By contrast scope 2 emissions result from diesel and electricity use at the project and are not emissions which Ulan can control entirely ... [W]hile Ulan can minimise electricity and diesel use at the mine it cannot influence how an electricity generator and supplier chooses to generate the electricity Ulan uses ... A condition framed to require offsetting of scope 2 emissions would be open to criticism that to the extent that those emissions are under the control of others, the requirement would not fairly relate to the development [one of the three criteria to be satisfied under the *Newbury* test for a valid condition of development consent]. It was not clear from the evidence how identifiable those parts of the scope 2 emissions are which Ulan has the ability to minimise or of any other form of control. The incentive for the electricity generator to reduce the production of GHG will also be removed if Ulan has to offset these, a poor policy outcome as identified in the Respondent's submissions.

- 4.21 It stands to reason that, if Justice Pain's logic in [94] is accepted (which it should be), it would be invalid to impose conditions of development consent on the SSD consent for the Extension Project which requires offset of Scope 2 or of Scope 3 GHG emissions, which may be even further beyond the control of the Applicant than Scope 2 GHG emissions.
- 4.22 At [100] et seq, her Honour resolved to impose a condition requiring offset of Scope 1 GHG emissions.
- 4.23 However, in a later judgment – *Hunter Environment Lobby Inc v Minister for Planning (No 2)* [2012] NSWLEC 40 – Justice Pain departed from the position of imposing a condition requiring offset of Scope 1 GHG emissions generated by the project following the passage of the *Clean Energy Act 2011* (Cth). It appears that the main reason why her Honour did not impose a condition requiring the proponent to offset the project's Scope 1 GHG emissions was that she was satisfied that the Commonwealth scheme as represented by the *Clean Energy Act 2011* (Cth) and related legislation, met "at a practical level the purpose of imposing a condition requiring the offset of Scope 1 GHG emissions" (at [16]).
- 4.24 In light of Justice Pain's observations in these cases, as well as the information contained in this submission, the Applicant submits that:
 - (a) the IPC should not impose a condition of consent requiring Scope 1 GHG emissions of the Extension Project to be offset because the Commonwealth Government's Safeguard Mechanism will apply to the Extension Project as described in Part B;
 - (b) it would be unlawful for a condition of consent to be imposed for the Extension Project requiring offset of Scope 2 and Scope 3 GHG emissions, because it would breach the *Newbury* tests for a valid condition of development consent;
 - (c) the position in paragraph 4.24(b) above will be codified by the Territorial Limits Bill, which will prohibit conditions of consent imposed for the purpose of achieving objectives relating to the impacts occurring outside Australia as a result of the development, or the impacts occurring in NSW as a result of development carried out outside Australia. The Minister for Planning in his second reading speech for the Bill said that the Bill is "consistent with the well-defined *Newbury* test for conditions of consent and the development of case law in line with the *Newbury* Principles";
 - (d) even if it was lawful to impose a condition of consent requiring the offset of Scope 2 and Scope 3 GHG emissions, there are strong policy reasons why it would be inappropriate for such a condition of development consent to be imposed (see paragraphs 4.17 and 4.18 above); and
 - (e) there are also strong policy reasons why it would be inappropriate for a condition of development consent to be imposed requiring offset of Scope 1 emissions, in that there are existing Commonwealth laws regulating GHG emissions (as set out in Part B of the submission) which will apply to the Extension Project.

4.25 Although the IPC imposed a condition of consent for the United Wambo Open Cut Coal Mine Project (SSD 7142) that requires the proponent to use all reasonable and feasible measures to ensure that coal is only exported to countries that are signatories to the *Paris Agreement*, the Applicant submits that:

- (a) it would be unlawful for an export control condition to be imposed for the Extension Project, including because:
 - (i) it would breach one or more of the *Newbury* tests for a valid condition of development consent, including for the same reasons as set out in *Hunter Environment Lobby Inc v Minister for Planning* [2011] NSWLEC 221 at [94]. That is, the condition which would be aimed at minimising Scope 3 GHG emissions would not reasonably and fairly relate to the development the subject of the application;¹³ and
 - (ii) the Commonwealth Government has comprehensively regulated the topic of foreign exports and the countries to which certain goods may lawfully be exported by reference to international treaty obligations. This is reflected in the detailed regime of the *Customs Act 1901* (Cth) and other legislation. Therefore, by reason of s 109 of the *Commonwealth Constitution*, s 4.38(1) of the EP&A Act does not authorise the imposition of conditions of consent regulating export permissibility;
- (b) the position in paragraph 4.25(a) above will also be codified by the Territorial Limits Bill. The Minister for Planning in his second reading speech for the Bill said that:

Whilst the United Wambo development consent related to overseas downstream greenhouse gas emissions, conditions like this one highlight a technical and jurisdictional issue with the Environmental Planning and Assessment Act 1979, which does not deal expressly with the extraterritorial impacts of development—that is, impacts of development outside the territorial limits of Australia and therefore outside the territorial capacity of the New South Wales planning system to effectively be involved with the enforcement of such conditions. When the United Wambo conditions were initially proposed, the Government expressed concern that consideration of downstream, or scope 3, greenhouse gas emissions did not automatically mean that those emissions should be controlled by the conditions of a development consent.

...

... As the secretary of the planning department correctly highlighted in his letter to the Independent Planning Commission in relation to the United Wambo proposal, it is not the Government's policy to regulate—either directly or indirectly—matters of international trade. They are matters for the Commonwealth Government... It is therefore important that we clarify the limitations of the New South Wales planning system to control the impacts of development that occurs overseas.

- (c) as noted in DPIE's Assessment Report (at [706]), the Territorial Limits Bill "aligns with the intent that development consent conditions... are not an appropriate mechanism to control the impacts resulting from the activities of third parties in other countries";
- (d) even if it were lawful to impose an export control condition, there are strong practical and policy reasons why it would be inappropriate for such a condition of development consent to be imposed:

¹³ See *Western Australian Planning Commission v Temwood Holdings Pty Ltd* (2004) 21 CLR 20 per McHugh J at [57].

- (i) it would be inefficient and inequitable to impose export control conditions only on new projects, not existing ones (existing consents could only be modified at the request of the proponent); and
- (ii) it is not compatible with the reality of the global coal trade where coal sales are not always made directly to end users, but also to traders, other producers, third parties and customers who operate in multiple jurisdictions, which means that the destination country is not always known to the mine operator and the mine operator does not have control over the on-selling and distribution of coal once it is exported. Coal might be on-sold and blended multiple times before it reaches its final destination.

Relevance of the Territorial Limits Bill to the IPC's assessment and determination of the development application for the Extension Project

4.26 The Territorial Limits Bill was introduced to NSW Parliament on 24 October 2019 following the IPC's decision to grant consent to the United Wambo Open Cut Coal Mine. That consent was granted subject to conditions that require the applicant to use all reasonable and feasible measures to ensure that any coal that is to be exported is only exported to countries that are parties to the *Paris Agreement*.

4.27 The Territorial Limits Bill, if enacted, will amend the EP&A Act and the Mining SEPP by:

- (a) inserting a new condition 4.17A into the EP&A Act:

4.17A Prohibited conditions

- (1) A condition of a development consent described in this section has no effect despite anything to the contrary in this Act,
- (2) A condition imposed for the purpose of achieving outcomes or objectives relating to—
 - (a) the impacts occurring outside Australia or an external Territory as a result of the development, or
 - (b) the impacts occurring in the State as a result of any development carried out outside Australia or an external Territory.
- (b) Omitting the words "(including downstream emissions)" from clause 14(2) of the Mining SEPP, which is relevantly extracted in paragraph 4.7 above, so that clause 14(2) as amended will require the IPC to consider only an assessment of the greenhouse gas emissions of the development.

4.28 The Territorial Limits Bill, if enacted and in force, will:

- (a) render ineffective an export control condition as imposed by the IPC on the United Wambo Open Cut SSD consent, if such is purported to be imposed on a new development consent, and
- (b) mean that the IPC is no longer required by the Mining SEPP to consider downstream GHG emissions. However, the IPC may still take into account the Scope 3 GHG emissions of the Extension Project and the Extension Project's impact on the climate as part of its consideration of the public interest under s 4.15 of the EP&A Act as discussed above.

5. **PART B: INTERNATIONAL, NATIONAL AND STATE CLIMATE CHANGE LAW AND POLICY**

5.1 There are a range of climate change laws and policies that may inform, where applicable, the IPC's consideration of climate change and GHG emissions as one of the many matters of relevance to the IPC's decision.

5.2 In Part B of this submission, the Applicant provides commentary on:

- (a) the international climate change framework, focussing on the *Paris Agreement*;
- (b) the issue of double counting of GHG emissions and how that is addressed in the international and Australian climate change frameworks;
- (c) the carbon budget approach and its limited role as a tool in the international and Australian climate change frameworks;
- (d) Australia's NDC under the *Paris Agreement*, and the national laws and policies that Australia has adopted to achieve its NDC;
- (e) the domestic climate change laws, policies, NDCs and objectives of the countries that are most likely to be the export destinations for the Extension Project's coal; and
- (f) the NSW Climate Change Policy Framework and the Net Zero Plan Stage 1.

The international climate change framework

5.3 The international framework that addresses GHG emissions, and more broadly the global response to climate change, comprises:

- (a) the *United Nations Framework Convention on Climate Change (UNFCCC)*;
- (b) the *Kyoto Protocol*;
- (c) the *Paris Agreement*; and
- (d) associated decisions by the Conference of the Parties serving each of the above instruments.

5.4 The UNFCCC was adopted in 1992 and represented the first step by countries to address the issue of climate change. It set an overarching objective of stabilising GHG concentrations in the atmosphere at a level that would prevent "dangerous anthropogenic interference with the climate system". The *Kyoto Protocol* was adopted in 1997 and imposed limits on GHG emissions to be met by developed countries, both individually and collectively, during the first commitment period from 2008 to 2012. The second commitment period of the *Kyoto Protocol* runs from 1 January 2013 to 31 December 2020, but the amendment to the *Kyoto Protocol* that would introduce that second commitment period has not entered into force.

5.5 The *Paris Agreement* builds upon the UNFCCC and, for the first time, requires *all* parties (not just developed countries) to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. The *Paris Agreement* aims to strengthen the global response to climate change by holding the increase in global average temperatures to "well below 2°C" and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels. To achieve this goal, countries aim to peak and then reduce emissions "as soon as possible" to "achieve a balance between anthropogenic emissions by sources and removals by sinks" in the second half of the century.

- 5.6 In contrast to the approach of the *Kyoto Protocol*, which imposed limitation or reduction commitments on certain parties, one of the key features of the *Paris Agreement* is the use of NDCs. NDCs are high-level policy plans setting out what approach each country will take to reduce emissions and contribute to the global "well below 2°C" goal. Parties' first NDCs were submitted in 2015 with new or updated NDCs to be submitted every five years. 186 parties to the *Paris Agreement* have submitted their first NDC (or INDC in the case of Taiwan), including Australia and the countries that are most likely to be the export destinations for the vast majority of the Extension Project's coal, being Japan, South Korea, Taiwan (**Export Countries**).¹⁴ Eight countries, including Japan, have submitted a second or updated NDC in 2020. The NDCs of Australia and the Export Countries are addressed under separate sub-headings below in this Part B of the submission. Parties' updated or second NDCs are due to be submitted to the UNFCCC in 2020.
- 5.7 At the Conference of the Parties (**COP**) 24 in Katowice in December 2018, the Katowice Climate Change Package was adopted. That package contains, among other things, guidance on the features of NDCs, the information each country should provide to facilitate clarity, transparency and understanding of NDCs and accounting for NDCs. In general terms, they establish a common set of elements that each Party will apply, as appropriate, based on the type of its NDC. Importantly, the guidance ensures the avoidance of "double counting" of emissions. The issue of "double counting" is discussed below.

The issue of double counting GHG emissions and how that is addressed in the international and Australian climate change frameworks

- 5.8 For the purposes of the commentary which follows, it is useful to provide a high level overview of the three scopes of GHG emissions.
- 5.9 The three scopes of GHG emissions may be defined or described as follows:
- (a) **Scope 1:** direct emissions occurring from sources that are owned or controlled by the proponent of the Extension Project (e.g. fuel use of on-site plant and equipment, fugitive emissions). These emissions are emissions over which the Extension Project has a high level of control.
 - (b) **Scope 2:** indirect emissions from the generation of purchased electricity consumed by the Extension Project.
 - (c) **Scope 3:** indirect emissions that are a consequence of the activities of the Extension Project, but occur at sources owned or controlled by other entities (e.g. outsourced services). Scope 3 emissions can include emissions generated upstream of the Extension Project by providers of energy, materials and transport. Scope 3 emissions can also include emissions generated downstream of the Extension Project by transport providers and product use (e.g. burning product coal).
- 5.10 A useful figure that highlights the degree of control the proponent of a mining project has over GHG emissions is produced at **Appendix 2** of this submission.
- 5.11 Double counting of GHG emissions occurs where the Scope 3 emissions generated by the burning of a mine's coal by other developments, are counted twice in the context of calculating a country's GHG emissions for the purpose of tracking progress towards achievement of its NDC. This can occur in two main circumstances:

¹⁴ It should be noted, of course, that there may well be other countries to which the Project's coal is exported from time-to-time during the Project's life of mine. However, given the broad adoption of NDCs, those countries (which may include China and South East Asian countries) are highly likely to have also submitted NDCs and be in the process of adopting and implementing laws and policies to achieve their NDCs.

- (a) the Scope 3 emissions of a particular development or activity carried out in Country A, are actually generated in Country B as Scope 1 emissions associated with development or activities conducted in Country B, and both Countries A and B count the same GHG emissions towards their NDC; or
 - (b) the Scope 3 emissions of a particular development or activity carried out in Country A, are actually generated by another development or activity in Country A as Scope 1 emissions generated by that other development or activity, and Country A counts the same GHG emissions towards its NDC.
- 5.12 The issue of double counting, as arising in the context of the first main circumstance described in paragraph 5.11(a) above, can be illustrated by the example of the Extension Project.
- 5.13 Almost all of the Extension Project's Scope 3 emissions are generated by the burning or combustion of coal by the end-user of the coal. As the coal from the Extension Project is planned to be exported, the generation of Scope 3 emissions will occur outside of Australia. In this regard, the Scope 3 emissions of the Extension Project would count as Scope 1 emissions in the relevant Export Countries and, if Australia were to count the Scope 3 emissions from the Extension Project in calculating its GHG emissions, this would result in an unacceptable double counting of GHG emissions.
- 5.14 In relation to the second main circumstance described in paragraph 5.11(b) above, another example can be used to illustrate how double counting can occur in this context. If a coal mine was proposed to be constructed somewhere in Australia, and it was to supply coal to a power station which was also located in Australia and the coal was combusted by that power station, then:
 - (a) the Scope 1 emissions of the coal mine would need to be accounted for and reported; and
 - (b) the Scope 1 emissions of the power station would need to be accounted for and reported.
- 5.15 However, it would be double counting if the Scope 3 emissions of the coal mine were also accounted for and reported because those emissions are the same as the Scope 1 emissions of the power station.
- 5.16 The importance of avoiding double counting of GHG emissions generally, including in the context of calculating a country's GHG emissions for the purpose of tracking progress towards achievement of its NDC, is well-recognised under the *Paris Agreement* and the NGER Act.
- 5.17 At an international level:
 - (a) in respect of overarching obligations, article 4(13) of the *Paris Agreement* requires parties to ensure the avoidance of double counting consistent with the guidance adopted by the COP;
 - (b) in respect of the use of internationally transferred mitigation outcomes towards NDCs:
 - (i) article 6(2) of the *Paris Agreement* requires Parties to apply robust accounting to avoid double counting consistent with the guidance adopted by the COP;

- (ii) the modalities, procedures and guidelines for the Transparency Framework adopted under the Katowice Climate Package (**Transparency Framework**), requires that each participating Party provide information on how their cooperative approach applies robust accounting to ensure the avoidance of double counting;
 - (c) in respect of accounting for Parties' NDCs, the guidance adopted by the Parties under the Katowice Climate Package requires that Parties avoid double counting when accounting for anthropogenic emissions and removals corresponding to their NDCs; and
 - (d) the guiding principles of the Transparency Framework also provide that double counting be avoided.
- 5.18 The clear intent of the *Paris Agreement* is to ensure a robust approach is taken to accounting of GHG emissions and it would undermine the integrity of that agreement for an approach to be taken to accounting of emissions which involved double counting.
- 5.19 At the domestic level, the NGER Act in Australia also precludes double counting by imposing reporting obligations upon companies only in respect of Scope 1 and Scope 2 emissions. There is no requirement or obligation imposed on companies under Australian law to report on Scope 3 emissions. The exclusion of Scope 3 emissions from the reporting requirements under Australian law effectively avoids double counting of Scope 3 emissions since the end-user who is responsible for a project's Scope 3 emissions will ultimately account for them as Scope 1 emissions.
- 5.20 Indeed, the letter from the Hon. Angus Taylor, Minister for Energy and Emissions Reduction to the Hon. Rob Stokes, Minister for Planning and Public Spaces dated 20 November 2019 being Appendix G2-3 to the Assessment Report states that:
- Emissions resulting from overseas actions are already managed through legislative frameworks by the countries where those actions are occurring. Any requirement to consider scope three emissions within a sub-national or state jurisdiction is inconsistent with long-accepted international carbon accounting principles and Australia's international commitments.
- ...
- Any requirement for Australian businesses to report or manage scope three emissions would duplicate existing obligations on third parties, would be impractical to implement and would impose a high regulatory burden for indeterminate benefits.

The carbon budget approach and its limited role as a tool in international and domestic climate change frameworks

- 5.21 The "carbon budget" approach has been used by some members of the scientific community and non-governmental organisations to estimate the maximum cumulative amount of CO₂ (i.e. the budget of CO₂) that could be released into the atmosphere from human sources globally while limiting global average temperature increases to a desired level above pre-industrialised levels. Once the CO₂ concentration in the atmosphere reaches the estimated maximum amount (i.e. the budget is spent), global emissions of CO₂ must be "net zero" (i.e. the magnitude of emissions to the atmosphere is matched by the magnitude of removals of emissions from the atmosphere).
- 5.22 While the "carbon budget" approach is sometimes used by scientists and advocates to illustrate generally the global mitigation pathways that may achieve the goals of the *Paris Agreement*, it is not an approach that is required by the *Paris Agreement*, or Australian domestic laws (i.e. federal and NSW legislation) in the context of implementing, or measuring progress towards achievement, of Australia's NDC.

- 5.23 It would be inappropriate for the IPC to apply the "carbon budget" approach in determining the development application for the Extension Project. The Applicant makes this submission for the following reasons:
- (a) the "carbon budget" is a highly-generalised analysis to inform broad, economy-wide or global policy-making. It does not qualitatively assess the impact of a particular project on the environment in terms of its GHG emissions. The "carbon budget" approach does not provide the IPC with any practical assistance in discharging the function it is required to perform (i.e. to determine the development application for the Extension Project), and is a matter that is best left to State, national and international policy makers;
 - (b) the "carbon budget" approach is inconsistent with the approach that has been adopted by the *Paris Agreement* for achieving the goal set under that agreement, in that:
 - (i) each country has made a commitment (in the form of a NDC) as to how it will contribute to achieving the goal set by the *Paris Agreement*;
 - (ii) the *Paris Agreement* does not prescribe the measures or mechanisms by which a particular country is to implement actions to facilitate the achievement of its NDC. Indeed, the *Paris Agreement* enshrines the principle of common but differentiated responsibility, allowing each party to determine its own contributions taking into account national circumstances; and
 - (iii) the application of the carbon budget approach results in double counting of GHG emissions, which is an outcome that the *Paris Agreement* seeks to avoid.
 - (c) the approach suffers from numerous deficiencies, including:
 - (i) **Uncertainty:** the approach suffers from uncertainties, such as:
 - (A) the evaluation of an appropriate historic baseline, which is affected by uncertainties in both historical emissions, and in deriving the estimate of globally averaged human-induced warming;¹⁵ and
 - (B) accounting for non-CO₂ gases (i.e. if non-CO₂ gases are not reduced or reduced more slowly than CO₂, the budget is reduced accordingly). There is also uncertainty in the magnitude and geographical variation of radiative forcing of non-CO₂ climate forcers and the predicted temperature response.¹⁶
 - (ii) **Technology:** the approach can be susceptible to ignoring the role that technological advancements can play in reducing CO₂ levels globally (e.g. low emission coal technologies including carbon capture and storage, and HELE projects). Any failure of the carbon budget approach to account for such technological advancements would result in the CO₂ levels being recorded at levels higher than they actually are.

¹⁵ IPCC, Chapter 2: Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development in *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* (2018) at 96, 107.

¹⁶ Ibid at 96, 101–103 (2.2.1.1), 106 (2.2.2.2).

- (iii) **Allocation:** the approach has not been accepted by the international community as a means of sharing global mitigation efforts among countries. The question of the contribution of individual countries in line with an overall carbon budget is rather complex. This is because the transition to a lower-carbon future must be equitably shared so as not to disproportionately damage the economies of countries or undermine the right to sustainable development. For this reason, and as explained above, the approach to allocation adopted under the *Paris Agreement* has been for each country to adopt a NDC and determine, for itself, the measures or mechanisms that will be implemented to achieve that NDC.

- 5.24 The Court in *Rocky Hill* did not adopt or apply the carbon budget approach. In considering Professor Steffen's opinion about the carbon budget approach, the Court stated that the carbon budget approach "admits that some fossil fuel reserves can be exploited and burned" (at [551]) and that the carbon budget approach (at [552]–[553]):

assume[s] that all existing and approved fossil fuel developments will continue and there will be no reduction in GHG emissions from these sources. It gives priority to existing and approved fossil fuel developments, along the lines of "first in, best dressed". It also frames the decision as a policy decision that no fossil fuel development should ever be approved.

I consider the better approach is to evaluate the merits of the particular fossil fuel development that is the subject of the development application to be determined. Should this fossil fuel development be approved or refused? Answering this question involves consideration of the GHG emissions of the development and their likely contribution to climate change and its consequences, as well as the other impacts of the development. The consideration can be in absolute terms or relative terms.

- 5.25 An alternative to adopting the carbon budget approach would be to consider the International Energy Agency's (IEA) Stated Policies Scenario and its Sustainable Development Scenario in the World Energy Outlook 2019. As discussed in detail in Part C of this submission, under both those scenarios, there would be continued demand for high-quality coal to 2040, not all of which would be satisfied by existing mines.

Australia's NDC and national climate change laws and policies

- 5.26 As a starting point, neither the *Paris Agreement* nor Australia's NDC are part of the law of Australia except to the extent that legislation has been passed to give effect to those documents within Australia.

Australia's NDC

- 5.27 Australia signed the *Paris Agreement* on 22 April 2016, and ratified it on 6 November 2016.
- 5.28 It is not bound under international law to achieve the emission reduction target in its NDC, although it is to be observed that countries are likely to face international pressure if they fail to meet NDC targets.
- 5.29 Australia has obligations under the *Paris Agreement* to:
- (a) prepare, communicate and maintain an NDC that it intends to achieve (Article 4(2));
 - (b) pursue domestic mitigation measures, with the aim of achieving the objectives of its NDC (Article 4(2));
 - (c) communicate an NDC every 5 years (Article 4(3), (9)); and
 - (d) account for its NDC and, in the process, ensure the avoidance of double counting in accordance with the methodologies and common metrics assessed by the IPCC and adopted by the Katowice Climate Package (Article 4(13)).

- 5.30 With respect to the specifics of Australia's NDC, it is to be noted that Australia's NDC communicates an unconditional economy-wide target to reduce GHG emissions by 26-28% below 2005 levels by 2030. Australia's emissions reduction target represents a 50-52% reduction in emissions per capita and a 64-65% reduction in the emissions intensity of the economy between 2005 and 2030. Australia's NDC is summarised in the following table.

Summary of Australia's NDC	
Emissions reduction target	Economy-wide target to reduce greenhouse gas emissions by 26 to 28 per cent below 2005 levels by 2030
Coverage	Economy-wide
Scope	<ul style="list-style-type: none"> - Energy - Industrial processes and product use - Agriculture - Land-use, land-use change and forestry - Waste
Gases	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ , NF ₃

Mechanisms by which Australia's NDC is to be achieved

- 5.31 The policy document supporting Australia's NDC communicates that Australia will achieve its 2030 target through the Direct Action policy suite. The key component of the Direct Action policy suite is the Emissions Reduction Fund (**ERF**), which is complemented by the Safeguard Mechanism, the Renewable Energy Target (which requires 33,000 Gwh of electricity generation (or approximately 23.5% of total generation) to be produced from renewable resources by 2020), improvements in energy efficiency under the National Energy Productivity Plan, phasing out of synthetic GHGs and direct support for investment in low emissions technologies and practices.
- 5.32 Importantly, the Australian Government has not – in any climate change policy or law – indicated that the development of new coal mines, or expansions of existing coal mines, is to be prohibited or restricted in any way for the purpose of achieving Australia's NDC. As a corollary, it must follow that the Australian Government considers that Australia's NDC can still be achieved in circumstances where new coal mines, or expansions of existing coal mines, are approved.
- 5.33 It is also to be noted that the Federal climate change policy of the Australian Labor Party does not contain any measures that could constitute a prohibition on new coal mines or coal mining. Indeed, Labor leader Anthony Albanese recently stated that demand for coal around the world would not change if Australia stopped its exports, which meant that a ban on new coal mines would have no impact on emissions and that:

We've got to consider what the actual outcome is from any proposal, and the proposal that we immediately stop exporting coal would damage our economy and would not have any environmental benefit.¹⁷

¹⁷ David Crowe, 'Albanese says Australia should continue to export coal' *Sydney Morning Herald* 9 December 2019, available at: <https://www.smh.com.au/politics/federal/albanese-says-australia-should-continue-to-export-coal-20191208-p53hyp.html>

- 5.35 For present purposes, the most relevant mechanisms in the suite of existing law and policy are:
- (a) the ERF; and
 - (b) the Safeguard Mechanism.
- 5.36 First, the ERF is a \$2.55bn fund which purchases least cost emission reductions and abatement through a Commonwealth government procurement process, which includes reverse auctions. It is underpinned by the *Carbon Credits (Carbon Farming) Act 2011 (CFI Act)* which creates a legislative framework for the development of offset projects and the creation of Australian carbon credit units (**ACCUs**). The CFI Act was initially enacted to support activities in the land sector but has been amended to now support a wider range of projects related to energy, transport and industry.
- 5.37 Separate from, but related to the ERF, it should be acknowledged that the Australian Government recently announced the Climate Solutions Package, which is a \$3.5 billion plan to deliver Australia's 2030 emissions reduction target. As part of the package, a Climate Solutions Fund has been established to continue the work of the ERF with an additional \$2 billion investment over 10 years. Approximately \$200 million per year over ten years is expected to be allocated to abatement purchases through the ERF. The Climate Solutions Fund is also designed to be a fund that will partner with businesses, local communities and farmers in emissions reduction programs. The Package, and the ERF specifically, has been promoted as a key policy to contribute to the national 26% emissions reduction target by 2030.
- 5.38 Secondly, the Safeguard Mechanism, established under Part 3H of the *National Greenhouse and Energy Reporting Act 2007 (NGER Act)*, aims to ensure that emission reductions purchased by the Government through the ERF are not undermined by increases in emissions in other areas of the economy.
- 5.39 The Safeguard Mechanism sets a baseline on emissions for facilities that emit over 100,000 tonnes CO₂-e per year. When the Safeguard Mechanism was implemented, baselines were set for existing facilities using data reported under the NGER Act. For most facilities, baselines were the highest level of reported emissions for a facility over the historical period 2009-10 to 2013-14. These baselines could be adjusted to accommodate economic growth, natural resource variability and other circumstances where historical baselines will not represent future business-as-usual emissions. Baselines for new facilities are based on an audited emissions forecast provided by the facility operator, with a reconciliation of the estimate against the actual performance of the facility at the end of the forecast period.
- 5.40 In 2019, the *National Greenhouse and Energy Reporting (Safeguard Mechanism Rule 2015 (Cth))* was amended so that, for new facilities completed after 1 July 2020 (or existing facilities with new investments), baselines would be set to encourage facilities to achieve and maintain best practice in emissions intensity (known as benchmark baselines).¹⁸ Baselines for existing facilities would also be brought up-to-date by transitioning all facilities to calculated baselines over 2018-19 and 2019-20. The amendments also allow baselines to be updated annually for annual production (known as a production-adjusted baseline), but facilities transitioning from a benchmark baseline must use the same emissions intensity that was used in the benchmark baseline.¹⁹

¹⁸ Australian Government (2018) Consultation on amendments to the National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2017, available at: <https://publications.industry.gov.au/publications/climate-change/climate-change/government/emissions-reduction-fund/consultation/safeguard-mechanism-legislative-amendments-2018.html>

¹⁹ See: <http://www.cleanenergyregulator.gov.au/NGER/The-safeguard-mechanism/Baselines/Production-adjusted-baseline>

- 5.41 Due to Covid-19, the introduction of benchmark baselines for new facilities has been delayed to 1 July 2021, and the complete transition of existing facilities to calculated baselines will be delayed by a year to 1 July 2021.
- 5.42 If a facility exceeds its baseline, it is required to surrender a number of ACCUs equivalent to the exceedance to the Clean Energy Regulator (**CER**). It is also noted that there are other mechanisms by which a facility can manage baseline exceedance, including applying for multi-year monitoring periods and exemption for exceptional circumstances (i.e. natural disasters or criminal activity unrelated to the liable entity).
- 5.43 For example, if a facility has a FY2016/17 baseline of 1,000,000 tonnes CO₂-e and reported emissions of 1,500,000, the company with operational control of that facility would have to surrender 500,000 ACCUs, or be liable to the penalty under section 22XF of the NGER Act.
- 5.44 In its first year of operation (FY2016/17), 203 facilities were covered by the Safeguard Mechanism with combined emissions of 131.3 million tonnes of CO₂-e. Sixteen facilities exceeded their emissions limits and purchased and retired a total of 448,097 ACCUs to clear their liabilities.
- 5.45 The Air Quality and Greenhouse Gas Assessment for the Extension Project dated June 2018 estimates that the total Scope 1 emissions of the Extension Project will exceed 100,000 tCO₂-e in its fifth year. As the Extension Project's first year of emitting more than 100,000 tCO₂-e will likely be after 1 July 2021, the baseline emissions number for the Extension Project to be set by the Clean Energy Regulator under the Safeguard Mechanism will not be based on reported emissions or on an audited emissions forecast, but will be based on benchmark emissions intensities (that is, the best, least emissions intensive standard for production).²⁰ The Applicant will be required to offset any emissions above its baseline, or otherwise manage compliance, in accordance with the NGER Act.

NGER Act

- 5.46 The NGER Act is a national system for reporting GHG emissions, energy production and consumption by corporations. The data gathered under the NGER Act assists with compiling Australia's national GHG inventory in order to meet Australia's reporting obligations under the UNFCCC.
- 5.47 Corporations that have operational control of facilities that emit more than a specified amount must report on the type of the source of their emissions, the methods used to estimate emissions and the amount of GHG emitted (in CO₂-e). The reporting requirements under the NGER Act apply to:
- (a) an individual facility that emits 25kt or more of CO₂-e or produces or consumes 100tJ or more of energy; or
 - (b) an individual facility and other facilities under the operational control of the same corporate group that together emit 50kt or more of CO₂-e or produce or consume 200tJ or more of energy.
- 5.48 Failure to comply with these reporting obligations is a breach of the legislation and can result in the imposition of civil penalties on companies and executive officers.
- 5.49 The NGER Act covers each of the six classes of Kyoto Protocol gases:
- CO₂;

²⁰ National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015 (Cth), cl 38(3); See also, <http://www.cleanenergyregulator.gov.au/NGER/The-safeguard-mechanism/Baselines>

- CH₄;
 - N₂O;
 - SF₆;
 - certain specified HFCs; and
 - certain specified PFCs.
- 5.50 Reporting requirements cover both Scope 1 and Scope 2 emissions. The NGER Act does not cover Scope 3 emissions.
- 5.51 The parent company of the Applicant, Whitehaven, submits annual NGERs reports for the facilities over which it or a member of its corporate group has operational control. Typically these reports will include Scope 1 emissions related to fugitive emissions of CO₂ and CH₄, emissions from the combustion of diesel, LPG and other gaseous fuels for stationary and transport uses, and Scope 2 emissions related to electricity consumption.
- 5.52 Australia's GHG Inventory is prepared centrally by the Department of the Environment using the Australian Greenhouse Emissions Information System, including data reported under the NGER Act. Australia's National Greenhouse Accounts conform to the UNFCCC Reporting Guidelines on Annual Inventories and the supplementary reporting requirements under the Kyoto Protocol to prepare its national inventories. These guidelines establish standardised reporting formats and require detailed information on all aspects of each party's national inventory system, including measurement systems, data collection systems, estimation methodologies, reporting and data management.
- 5.53 Currently, emission estimates are compiled in accordance with the IPCC 2006 Guidelines for National Greenhouse Gas Inventories (**2006 IPCC Guidelines**), the 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol, and now the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (**2019 IPCC Refinement**). Parties may also use country-specific methodologies where these are consistent with the IPCC guidelines and improve the accuracy of emissions estimates. Australia predominantly uses country-specific methodologies and emissions factors, described in detail in its National Inventory Report.
- 5.54 The National Greenhouse Gas Inventory is reviewed annually by a team of international experts through the UNFCCC review process.
- 5.55 Notably, neither the 2006 IPCC Guidelines, the Revised Supplementary Methods, nor the 2019 IPCC Refinement require emissions data to be collected and reported or estimates to be made for Scope 3 emissions.
- 5.56 The NGER Act also does not provide any methodology for accounting for and reporting on Scope 3 emissions.

The NDCs and climate change laws and policies of the Export Countries

- 5.57 It is to be noted that of the most likely countries that the coal from the Extension Project will be exported to, both Japan and South Korea are parties to the *Paris Agreement* and either have or are in the process of adopting domestic laws, policies, and measures to implement and achieve their NDC targets. Taiwan is not recognised as an independent sovereign nation and therefore is not a member of the United Nations and consequently cannot be a party to the Paris Agreement. Nonetheless, it has put forward an INDC. Each Export Country's domestic efforts to achieve their NDC (or INDC) targets are summarised in the table below and set out in detail in **Appendix 3** to this submission. Specific details as to the uptake of HELE, CCUS and other low emission coal technologies are also addressed in Part C of this submission.

Country	Summary of the domestic climate change framework in the likely export customer countries for the Extension Project
Japan	<ul style="list-style-type: none"> has highlighted carbon pricing and the use of CCUS technologies as key to achieving its emissions reductions NDC of 26% below 2013 levels by 2030. Japan's second/updated NDC submitted to the UNFCCC on 31 March 2020 states that Japan "will strive to achieve a 'decarbonized society' as close as possible to 2050 with disruptive innovations, such as artificial photosynthesis and other CCUS technologies"; made significant progress with several CCUS projects (see Part C); has imposed import taxes for coal and LNG; aims to pursue high efficiency in thermal power generation using high-efficiency technologies such as ultra-supercritical and advanced ultra-supercritical; and is on track to halve its emissions by 2050 according to the IEA (WEO 2019, p 97).
South Korea	<ul style="list-style-type: none"> is looking to increase the share of renewable energy to 20% by 2030 and natural gas while decreasing the share of coal as a key measure for achieving its NDC of 37% below business-as-usual (BAU) levels by 2030; and has imposed import taxes for coal and LNG which act as a carbon tax and seeks to encourage a transition away from coal to renewables and LNG
Taiwan	<ul style="list-style-type: none"> has legislated toward reducing reliance on both domestic and imported sources of coal, with plans to increase reliance on renewable energy and impose tax mechanisms on imported fossil fuels as a part of its plan to achieving emissions reductions of 50% below BAU levels by 2030 per its INDC.

5.58 For the purposes of the Extension Project, the key points for the IPC to appreciate in relation to the material produced in this submission on climate change laws and policies in the Export Countries are:

- (a) the likely countries where the Extension Project's coal will ultimately be burned or combusted have numerous domestic laws and policies in place for how each respective country intends to achieve its NDC (or INDC in the case of Taiwan); and
- (b) it is both appropriate, and consistent with the overarching international climate change framework, for the Extension Project's Scope 3 emissions to be accounted for, regulated and reported by the respective Export Countries as Scope 1 emissions generated in those countries.

The NSW Climate Change Policy Framework and Net Zero Plan Stage 1

5.59 The NSW Climate Change Policy Framework (October 2016) seeks to provide aspirational goals and broad policy directions to attain NSW's objective of achieving net-zero emissions by 2050 and ensuring that NSW is more resilient and responsive to climate change. Its other aspirational objectives include the implementation of policies consistent with the Commonwealth's plan for long-term emissions savings, to reduce emissions in government operations, and to advocate for Commonwealth, COAG and international action consistent with the *Paris Agreement*.

5.60 Under the NSW Climate Change Policy Framework, NSW has committed to both follow the *Paris Agreement* and to work to complement national action. The key policy directions under the NSW Climate Change Policy Framework and their rationales are summarised in the table below:

Policy Direction	Rationale/Goals
Creating an investment environment that manages the emissions reduction transition	Energy will be transformed and investment/job opportunities will be created in emerging industries of advanced energy, transport and carbon farming and environmental services
Boost energy productivity and put downward pressure on energy bills	Boosting energy and resource productivity will help reduce prices and the cost of transitions to net-zero emissions
Grow new industries and capitalise on competitive advantages	Capitalising on the competitive advantage and growth of industries in professional services, advanced energy technology, property management and financial services
Reduce risks and damage to public and private assets arising from climate change	Embed climate change considerations into asset and risk management as well as support the private sector by providing information and supportive regulatory frameworks for adaptation
Reduce climate change impacts on health and wellbeing	Recognise the increased demand for health and emergency services due to climate change and identify ways to better support more vulnerable communities to health impacts
Manage impacts on natural resources and communities	Coordinate efforts to increase resilience of primary industries and rural communities as climate change impacts water availability, water quality, habitats, weeds and air pollution

5.61 The Policy Framework is being delivered through:

- (a) the Climate Change Fund;
- (b) the development of a value for emissions savings that will be applied consistently in government economic appraisals;
- (c) embedding climate change mitigation and adaptation across government operations including service delivery, infrastructure, purchasing decisions and regulatory frameworks;
- (d) building on NSW's expansion of renewable energy; and
- (e) developing action plans and strategies, including on advanced energy, energy efficiency, climate change adaptation, energy productivity, fugitive emissions, primary industry emissions and adaptation and health and wellbeing.

5.62 In March 2020, the Department of Planning, Industry and Environment published the Net Zero Plan Stage 1, which sets out how the NSW Government will deliver on its objective of achieving net zero emissions by 2050 over the next decade to 2030. The Net Zero Plan sets out GHG emission mitigation measures in relation to electricity generation, transport, agriculture, stationary energy (excluding electricity generation), fugitive emissions from mining, industrial processes, waste, and land use.

5.63 Significantly, for the IPC's consideration of the Extension Project, the Net Zero Plan Stage 1 states (at 22) (underline added):

New South Wales' \$36 billion mining sector is one of our biggest economic contributors, supplying both domestic and export markets with high quality, competitive resources. Mining will continue to be an important part of the economy into the future and it is important that the State's action on climate change does not undermine those businesses and the jobs and communities they support.

5.64 The Assessment Report states (at [696]):

Importantly, the NSW or Commonwealth Government's current policy frameworks do not promote restricting private development as a means for Australia to meet its commitments under the Paris Agreement or the long-term aspirational objective of the [Climate Change Policy Framework] guidelines. Neither do they require any action to taken by the private sector in Australia to minimise or offset the GHG emissions of any parties outside of Australia, including the emissions that may be generated in transporting or using goods that are produced in Australia.

6. **PART C: FUTURE DEMAND FOR COAL, THE CHARACTERISTICS OF THE EXTENSION PROJECT'S COAL, AND THE CONSEQUENCES OF COAL MARKET SUBSTITUTION**

Overview

- 6.1 It is important to recognise that there is, and will remain for the foreseeable future, a demand for coal (both coking and thermal coal) as a reliable, affordable and efficient source of energy to meet the basic needs of human populations throughout the world. That demand for coal will remain irrespective of whether the IPC approves the Extension Project or not and, if the Extension Project is not approved, the demand will simply be met by coal sourced from elsewhere. In this regard, there is a real likelihood that the coal sourced from elsewhere will:
- (a) be of inferior quality (in terms of calorific value, and ash and sulphur content) than the coal that will be produced by the Extension Project; and
 - (b) result in a higher level of GHG emissions than if the Extension Project is approved.
- 6.2 In this Part C of the submission, the Applicant will provide evidence for the points made in the paragraph immediately above and will:
- (a) demonstrate that under all three policy scenarios presented by the IEA in WEO 2019 (including the Sustainable Development Scenario), there will continue to be a global demand for coal that will need to be met by expansions of approved coal mines (such as the Extension Project) or the development of new coal mines;
 - (b) provide commentary on the:
 - (i) Extension's Project's coal and cost of operations, having regard to the Extension Project's coal's qualities and tonnage profile;
 - (ii) relative importance of Australian coal exports in terms of meeting projected demand for thermal and coking coal;
 - (iii) likelihood of market substitution if:
 - (A) the Extension Project is not approved and neither the Approved Project nor the Extension Project go ahead;
 - (B) the Extension Project is not approved and does not go ahead, but the Approved Project does go ahead; or
 - (C) no new coal mines are approved in Australia, and Australia's existing coal mines naturally deplete;
 - (iv) consequences that would likely follow from substitution of the Extension Project's coal with product coal from alternative sources, particularly in respect of GHG emissions;
 - (v) energy policies, plans and initiatives of the Export Countries, including discussion of the uptake of HELE, CCUS and other low emission coal technologies in Asia and the impact that such technology is likely to have on global GHG emissions.

- 6.3 Ashurst, on behalf of the Applicant, retained CRU to undertake an independent study of global coal demand and supply and the coal market to 2040, in the context of the Extension Project. For reasons relating to confidentiality and intellectual property, the Applicant only has CRU's permission to publicly disclose a letter summarising the main findings of CRU's report. However, CRU has advised that it is prepared to give permission for its study to be disclosed to the IPC, if the IPC makes a direction under clause 5 of Schedule 2 to the EP&A Act that the study be treated as a confidential document that is not to be published.
- 6.4 A copy of the summary letter is produced at **Appendix 4** of this submission.

Global demand for coal to 2040

- 6.5 The global demand for coal to 2040 is addressed in detail by the IEA, an entity related to the Organisation for Economic Co-operation and Development (**OECD**), in its annually published reports known as the WEO. The IEA does analysis work for both the Intergovernmental Panel on Climate Change (**IPCC**) and under the UNFCCC.
- 6.6 At the time of preparing this submission, the most recent report published by the IEA is the WEO 2019, which was published in November 2019.
- 6.7 The purpose of the WEO is to provide a framework for thinking about the future of global energy. It does not make predictions about or forecast the future. Instead, it sets out what the future could look like on the basis of different scenarios or pathways, with the aim of providing insights to inform decision makers as they design new policies or consider new investments.²¹
- 6.8 The WEO 2019 presents three policy scenarios for assessing global energy demand and energy sources. Those three policy scenarios are described in the WEO 2019 (at pp 29 and 30) as follows (footnotes omitted):

The aim of the **Stated Policies Scenario** (STEPS), which occupies a central position in the WEO analysis, is to hold up a mirror to the actions and intentions of today's policy makers, and to provide a candid assessment of their implications for energy markets, energy security and emissions. The scenario reflects:

- The impact of energy-related policies that governments have already implemented.
- An assessment of the likely effects of announced policies, as expressed in official targets and plans.
- A dynamic evolution of the cost of energy technologies, reflecting gains from deployment and learning-by-doing.

The Stated Policies Scenario, previously called the New Policies Scenario, is not an IEA forecast. It takes into account policies that have already been announced ("stated"), but does not speculate on how these might evolve in the future. The new name of this scenario in WEO-2019 has been chosen with the aim of avoiding misunderstanding on this point.

Policies announced by governments include some far-reaching commitments, including aspirations to achieve full energy access in a few years, to reform pricing regimes and, more recently, to reach net zero emissions in some countries and sectors. These ambitions are not automatically incorporated into the scenario: full implementation cannot be taken for granted, so the prospects and timing for their realisation are based upon our assessment of the relevant regulatory, market, infrastructure and financial constraints. Nonetheless, these targets and plans move the projections away from a business-as-usual trajectory, as a comparison with the **Current Policies Scenario**, in which such announcements are not considered, makes clear.

²¹ WEO 2019 at 29.

The time horizon of the Stated Policies Scenario is to 2040. The design of this scenario, which relies on detailed bottom-up consideration of the impact of today's policies and plans, does not lend itself to very long-term horizons.

The **Sustainable Development Scenario** (SDS) is an essential counterpart to the Stated Policies Scenario. It sets out the major changes that would be required to reach the key energy-related goals of the United Nations Sustainable Development Agenda. These are:

- An early peak and rapid subsequent reductions in emissions, in line with the Paris Agreement (Sustainable Development Goal [SDG] 13).
- Universal access to modern energy by 2030, including electricity and clean cooking (SDG 7).
- A dramatic reduction in energy-related air pollution and the associated impacts on public health (SDG 3.9).

The trajectory for emissions in the Sustainable Development Scenario is consistent with reaching global "net zero" carbon dioxide (CO₂) emissions in 2070. If net emissions stay at zero after this point, this would mean a 66% chance of limiting the global average temperature rise to 1.8 degrees Celsius (°C) above pre-industrial levels (or a 50% chance of a 1.65°C stabilisation). In the light of the *Intergovernmental Panel on Climate Change Special Report on 1.5°C*, we also explore what even more ambitious pathways might look like for the energy sector, either via "net negative" emissions post-2070 or by reaching the "net zero" point even earlier.

6.9 It must be recognised that:

- (a) the WEO is not, and never has been, a forecast of what will happen;²²
- (b) the IEA does not endorse any particular scenario in WEO 2019; and
- (c) the Stated Policies Scenario is the central scenario in WEO 2019.²³

6.10 Coal is generally characterised into two types – thermal coal which is used in the production of electricity, and metallurgical coal which is used for industrial purposes, principally steelmaking.

6.11 The Extension Project will produce approximately 150 Mt of saleable coal comprising thermal coal and semi-soft coking coal (SSCC), which is a type of metallurgical coal. The indicative life of mine average proportion of thermal coal to SSCC will be 40:60. The Economic Assessment included pulverised coal for injection (**PCI**) in the product mix. However, Whitehaven has since updated these plans and the product mix now only includes thermal coal and SSCC. It should be noted that the Economic Assessment applied the same forecast price per tonne of SSCC and PCI. Therefore, the net benefits of the Extension Project to NSW are not affected by the change to the intended coal product mix.

6.12 As the Extension Project will produce both thermal and metallurgical coal, it is necessary to separately consider the predicted demand for each type of coal.

Projected global demand for thermal coal

6.13 The IEA projects the global demand for thermal coal under the three policy scenarios. Table 1.1 of the WEO 2019 (p 38), which is reproduced below, sets out the global demand for all energy sources under the three policy scenarios. The entries for "coal" in Table 1.1 are in respect of thermal coal.

²² WEO 2019 at 3, 23, 29 and 751.

²³ WEO 2019 at 29 to 30.

Table 1.1 ► World primary energy demand by fuel and scenario (Mtoe)

			Stated Policies		Sustainable Development		Current Policies	
	2000	2018	2030	2040	2030	2040	2030	2040
Coal	2 317	3 821	3 848	3 779	2 430	1 470	4 154	4 479
Oil	3 665	4 501	4 872	4 921	3 995	3 041	5 174	5 626
Natural gas	2 083	3 273	3 889	4 445	3 513	3 162	4 070	4 847
Nuclear	675	709	801	906	895	1 149	811	937
Renewables	659	1 391	2 287	3 127	2 776	4 381	2 138	2 741
Hydro	225	361	452	524	489	596	445	509
Modern bioenergy	374	737	1 058	1 282	1 179	1 554	1 013	1 190
Other	60	293	777	1 320	1 109	2 231	681	1 042
Solid biomass	638	620	613	546	140	75	613	546
Total	10 037	14 314	16 311	17 723	13 750	13 279	16 960	19 177
<i>Fossil fuel share</i>	<i>80%</i>	<i>81%</i>	<i>77%</i>	<i>74%</i>	<i>72%</i>	<i>58%</i>	<i>79%</i>	<i>78%</i>
CO₂ emissions (Gt)	23.1	33.2	34.9	35.6	25.2	15.8	37.4	41.3

Notes: Mtoe = million tonnes of oil equivalent; Gt = gigatonnes. Other includes wind, solar PV, geothermal, concentrating solar power and marine. Solid biomass includes its traditional use in three-stone fires and in improved cookstoves.

Source: WEO 2019

- 6.14 The relevant commentary on the data for the three policy scenarios, as outlined in Table 1.1 of the WEO 2019, is produced in part at pp 38–39 of the WEO 2019. The following relevant observations from that commentary are extracted below:

Global primary energy demand grew by 2.3% in 2018, its largest annual increase since 2010. China, the United States and India accounted for 70% of the total energy demand growth. Despite the fact that growth in renewables has outpaced growth in all other forms of energy since 2010, the share of fossil fuels in global primary energy demand remains above 80% (Table 1.1).

The energy debate is often focussed on the pace of change, but the forces of continuity in the energy sector should not be discounted. The **Current Policies Scenario** provides just such a "business as usual" picture, although 1.3% average annual growth in energy demand to 2040 is well below the rate seen in 2018. Growth in line with this scenario would mean greater consumption of all fuels and technologies, leading to a continuous rise in energy-related emissions and increasing strains on almost all aspects of energy security.

In the **Stated Policies Scenario**, primary energy demand grows by one-quarter to 2040; the 1% annual average growth represents a slowdown compared with the 2% average seen since 2000. The global economy and the demand for energy move on diverging pathways due to structural shifts towards less energy-intensive output, energy efficient gains and saturation effects, particularly in terms of vehicle use.

Low-carbon sources meet well over half of the increase in demand to 2040 in the Stated Policies Scenario, compared with 30% in 2017–2018. This is led by the power sector, where renewables dominate investment and capacity additions (Figure 1.2). However, demand for all sources of energy, except coal, continues to increase.

After rising strongly in the medium term, growth in oil demand slows markedly post-2025 in the Stated Policies Scenario before flattening in the 2030s. Oil use in passenger cars peaks in the late-2020s, despite the number of cars on the road increasing by 70% between 2018 and 2040. Coal demand in 2040 is slightly below today's level, and its share in the primary mix is overtaken by gas around 2030. Gas demand rises by 30%, with industrial use of gas increasing at more than twice the pace of gas in power generation.

In the **Sustainable Development Scenario**, a relentless focus on improving efficiency and a shift away from combustion for power generation (reduces losses from waste heat) means that the projected increase in the size of the global economy and population (the same in all scenarios) is accommodated without any rise in primary demand. With no overall increase in demand, the rise of low-carbon sources comes at the expense of coal and oil.

Global oil demand peaks within the next few years in the Sustainable Development Scenario. Much greater fuel efficiency and fuel switching, with almost half the global car fleet powered by near-zero carbon electricity, means that in 2040 oil use in transport is 40% lower than today; only the (non-combustion) use of oil, mostly as a feedstock for chemicals production, shows any increase. Natural gas use grows to 2030 and then falls back. Coal demand is hit hard in this scenario, declining at more than 4% per year.

- 6.15 It is important to understand the structural trends that determine the increased energy demand. They are primarily population growth, urbanisation and economic growth in developing economies, particularly those in the Asia Pacific region. This is illustrated by Table 6.2 from the WEO 2019, which is reproduced below.

Table 6.2 ► Electricity demand by region and scenario (TWh)

			Stated Policies		Sustainable Development		Change 2018-2040	
	2000	2018	2030	2040	2030	2040	STEPS	SDS
North America	4 260	4 786	5 160	5 626	4 966	5 602	840	816
United States	3 589	4 011	4 226	4 517	4 099	4 573	506	563
Central & South America	660	1 081	1 445	1 837	1 331	1 660	757	579
Brazil	327	517	675	845	619	745	328	228
Europe	3 114	3 631	3 975	4 346	3 926	4 724	715	1 093
European Union	2 604	2 884	3 045	3 243	3 050	3 645	359	761
Africa	380	703	1 086	1 653	1 073	1 696	950	993
South Africa	190	211	252	319	210	249	108	38
Middle East	361	954	1 309	1 817	1 189	1 621	863	667
Eurasia	809	1 084	1 302	1 474	1 132	1 220	390	137
Russia	677	893	1 043	1 149	916	971	256	77
Asia Pacific	3 569	10 792	15 662	19 699	14 474	18 038	8 907	7 246
China	1 174	6 330	9 127	10 912	8 415	10 052	4 582	3 723
India	376	1 243	2 417	3 718	2 254	3 263	2 475	2 020
Japan	962	994	980	989	926	942	-4	-52
Southeast Asia	323	935	1 510	2 091	1 346	1 888	1 156	953
World	13 152	23 031	29 939	36 453	28 090	34 562	13 422	11 531

Note: TWh=terawatt-hour; STEPS = Stated Policies Scenario; SDS = Sustainable Development Scenario.

Source: WEO 2019

- 6.16 The Sustainable Development Scenario for electricity demand at 2040 in the WEO 2019 is predicated on achieving universal access to both electricity and clean cooking facilities in circumstances of strong population growth, such that an additional 1 billion people would have access to electricity by 2030, and more than 2.5 billion people would move away from the traditional use of biomass for cooking by the same date (at 86).
- 6.17 **Table 5.1** of the WEO 2019 (p 222) sets out the global coal demand, production and trade by scenario for each of thermal coal (i.e. steam coal) and metallurgical coal (i.e. coking coal).

Table 5.1 ► Global coal demand, production and trade by scenario (Mtce)

			Stated Policies		Sustainable Development		Current Policies	
	2000	2018	2030	2040	2030	2040	2030	2040
Power	2 233	3 500	3 470	3 395	1 872	858	3 789	4 156
Industrial use	869	1 680	1 852	1 903	1 461	1 206	1 926	2 075
Other sectors	207	279	175	100	137	36	220	168
World coal demand	3 309	5 458	5 498	5 398	3 471	2 101	5 934	6 399
<i>Asia Pacific share</i>	<i>47%</i>	<i>75%</i>	<i>81%</i>	<i>83%</i>	<i>86%</i>	<i>84%</i>	<i>79%</i>	<i>81%</i>
Steam coal	2 504	4 342	4 393	4 394	2 672	1 515	4 753	5 266
Coking coal	449	955	857	790	676	497	885	854
Lignite and peat	302	270	247	214	123	89	297	280
World coal production	3 255	5 566	5 498	5 398	3 471	2 101	5 934	6 399
<i>Asia Pacific share</i>	<i>48%</i>	<i>73%</i>	<i>78%</i>	<i>79%</i>	<i>80%</i>	<i>83%</i>	<i>77%</i>	<i>78%</i>
Steam coal	310	859	733	726	381	197	888	964
Coking coal	175	319	314	371	258	247	332	404
World coal trade	471	1 169	1 039	1 087	633	413	1 206	1 355
<i>Trade as share of production</i>	<i>14%</i>	<i>21%</i>	<i>19%</i>	<i>20%</i>	<i>18%</i>	<i>20%</i>	<i>20%</i>	<i>21%</i>
Coastal China steam coal price (\$2018/tonne adjusted to 6 000 kcal/kg)	34	106	89	92	74	76	98	105

Notes: Mtce = million tonnes of coal equivalent; kcal/kg = kilocalories per kilogramme. Unless otherwise stated, industrial use in this chapter reflects volumes also consumed in own use and transformation in blast furnaces and coke ovens, petrochemical feedstocks, coal-to-liquids and coal-to-gas plants. Historical supply and demand volumes differ due to changes in stocks. World trade reflects volumes traded between regions modelled in the *WEO* and therefore does not include intra-regional trade. See Annex C for definitions.

Source: WEO 2019

- 6.18 The relevant commentary on the projections for the three policy scenarios, as outlined in Table 5.1 of the WEO 2019, is produced at pp 222-223 of the WEO 2019. The following relevant observations from that commentary are extracted below:

Coal demand is essentially flat in the **Stated Policies Scenario**, ending up in 2040 at around 5400 Mtce, some 60 Mtce below where it is today (Table 5.1). This represents a slight downward revision compared with the World Energy Outlook (WEO)-2018 (IEA, 2018). Flat demand in an expanding energy system means that the share of coal in the global energy mix declines from 27% in 2018 to 21% in 2040, falling behind natural gas in the process.

The strength of the economic and policy headwinds facing coal vary widely by scenario and, within each scenario, across different countries and sectors. The net effect in the Stated Policies Scenario is that global coal use in power generation decreases slightly, while its industrial use grows modestly. The **Current Policies Scenario**, in which energy demand is stronger and policy pressure on coal is weaker, sees coal use rise in both areas.

...

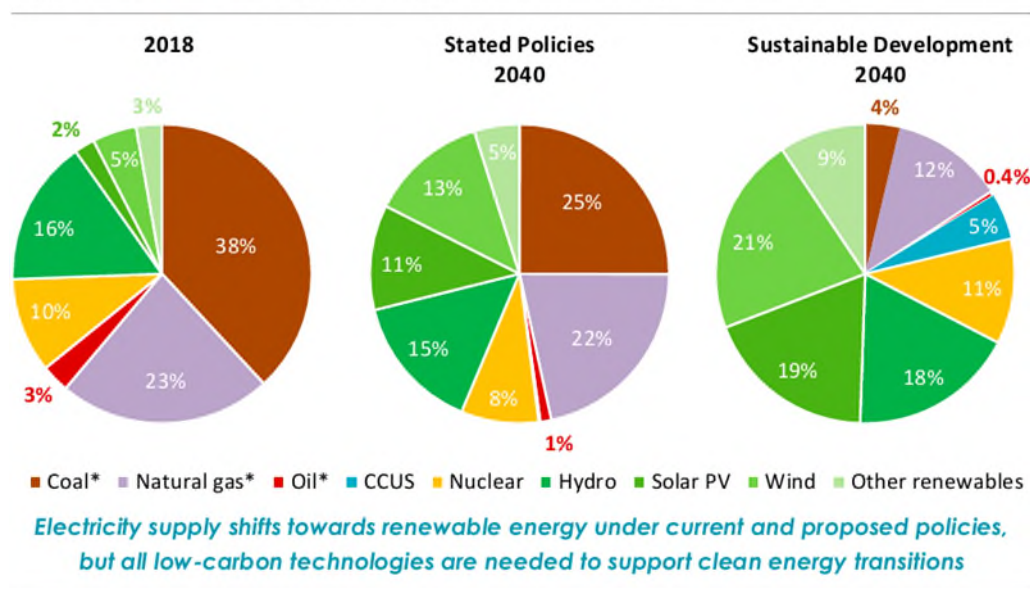
The outlook for coal is very different in the **Sustainable Development Scenario**. With a much more stringent focus on reducing emissions, coal use decreases steeply at an annual rate of 4.2%. By 2040, world coal use is 60% lower than in the Stated Policies Scenario and coal's share in the primary energy mix falls towards 10%.

Until the early 2010s, coal demand was aligned with economic growth. That is not the case in the future in either the Stated Policies or Sustainable Development scenarios (Figure 5.2). In advanced economies, e.g. European Union, United States, Japan, the trend in coal demand becomes detached from the overall economic outlook. By contrast, strong growth in incomes and energy needs in parts of developing Asia continues to go hand-in-hand with higher coal demand. China's position moves progressively closer to that of the advanced economy group, exerting a strong influence on the global decoupling of coal demand from economic growth.

With coal demand growth levelling off, CO₂ emissions from coal combustion flatten in the Stated Policies Scenario, but they do not reduce significantly. In the Sustainable Development Scenario, the deployment of CCUS and improvements in plant efficiencies result in coal-related CO₂ emissions falling faster than coal demand. By 2040, almost 160 gigawatts (GW) of coal-fired plants are equipped with CCUS, accounting for 40% of the electricity generated from coal, although today's policies fall far short of those which could stimulate needed investment in CCUS.

- 6.19 in the Stated Policies Scenario, coal-fired electricity generation plateaus and its share declines from 38% today to 25% in 2040 (as shown in **Figure 6.4** extracted below from p 265). However, this varies drastically by region. In advanced economies coal-fired electricity generation will more than halve over the period to 2040 while coal consumption will increase in Southeast Asia, where 40% of the projected rise in the region's electricity demand will be met by coal (WEO 2019, pp 225, 253, 256).

Figure 6.4 ▶ Global electricity generation mix by scenario



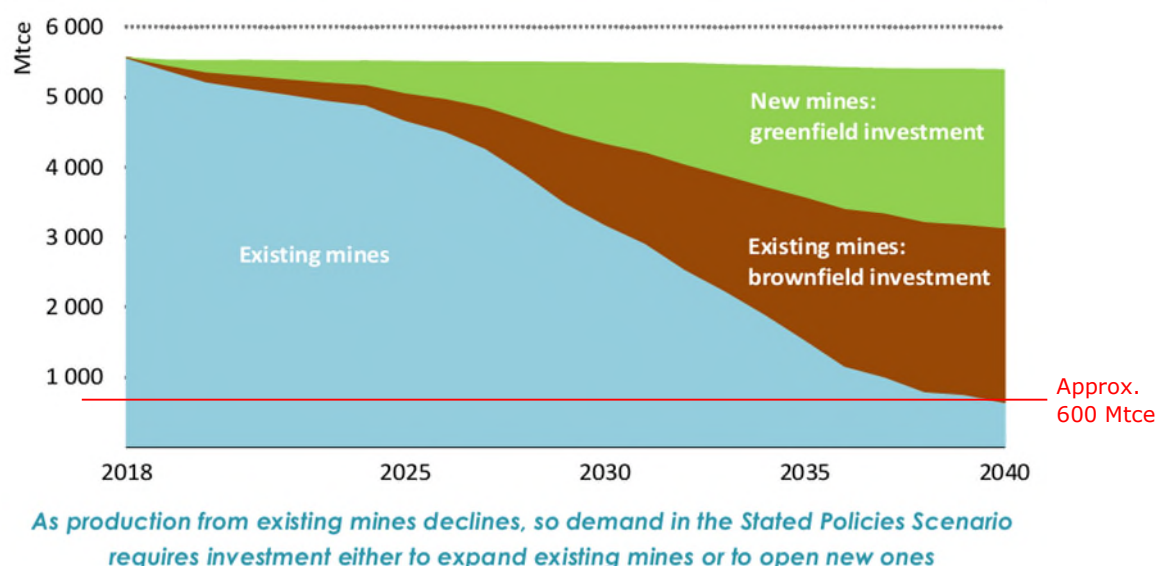
* Excludes capacity equipped with CCUS.

Source: WEO 2019

- 6.20 In 2018, around 70% of global coal power capacity and coal-based electricity generation was in Asia where electricity demand is rising fast and coal plants are around 12 years old on average, more than two decades younger than those in North America and Europe. In 2018, coal use rose for the second straight year in China, India and South East Asian countries. However, China would see a modest reduction in consumption of 0.4% per year on average from 2018 to 2040 due in large part to a strong policy push to improve air quality, but will remain the largest consumer of coal worldwide. China has a stock of more than 1000 GW of coal-fired capacity, much of it recently commissioned and highly efficient (WEO 2019, pp 220, 221, 224, 238).

- 6.21 It is evident that under all three policy scenarios presented by the IEA (including the Sustainable Development Scenario), there will continue to be a global demand for coal. Figure 5.13 (from WEO 2019, p 244) is reproduced below. Absent new mines or brownfield expansions, the global production of coal would be approximately 600 Mtce in 2040. We have drawn a red line on Figure 5.13 to illustrate that. Table 5.1 from the WEO 209 (p 222) reproduced above projects that even under the Sustainable Development Scenario, global demand for coal would be 2,101 Mtce in 2040 of which 858 Mtce would be for electricity and 1,206 Mtce would be for industrial use, including steelmaking.

Figure 5.13 ► Global coal production by type in the Stated Policies Scenario



Source: WEO 2019

- 6.22 The independent modelling undertaken by CRU (which aligns generally with IEA's Stated Policies Scenario) (see **Appendix 4**), forecasts that:
- coal will, in 2040, remain an important pillar of electricity generation in many of the world's regions, including in Southeast Asia, as well as in China and India;
 - high quality coal from Australia (such as that produced by the Extension Project) is, and will continue to be, in demand to meet the electricity generation needs in these regions in particular (as many of these countries, Japan, South Korea and Taiwan in particular, have little to no domestic supply), as well as global demand more generally; and
 - as the ability of existing mines to service global demand for coal declines (e.g. as a result of exhausting their environmentally recoverable reserves), it will be necessary for the coal demand to be met by expansions of approved coal mines or the development of new coal mines.

Projected global demand for metallurgical coal

- 6.23 SSCC is classified as metallurgical coal, along with hard coking coal (**HCC**).²⁴ Metallurgical coals are essential inputs for blast furnace-based steelmaking. HCC and SSCC are both used in the production of coke before entering the blast furnace. The proportion of each coal used in the coking process is determined by various factors, including pricing differentials, blast furnace requirements and specific characteristics and qualities of the coal.
- 6.24 As shown in Table 5.1 of the WEO 2019 extracted above, the IEA has projected that industrial coal use which today accounts for around one-third of coal consumption, increases by some 225 Mtce to 2040 in the Stated Policies Scenario, as coal remains the backbone of steel and cement manufacturing. In the Sustainable Development Scenario, overall use drops significantly, but coal remains important to several industrial processes, reflecting the difficulty and expense of finding substitutes for coal in these processes (WEO 2019, p 220, 225, 230).
- 6.25 The WEO 2019 states that 70% of global crude steel is produced through the blast furnace-basic oxygen furnace (BF-BOF) route which is heavily dependent on coking coal (SSCC and HCC) for the production of coke. The scope to shift away from coal by making greater use of scrap-based or direct reduction of iron (DRI)-based electric arc furnaces is limited by the availability and cost of scrap steel, as well as the cost competitiveness of electricity. Coal use in the iron and steel industry declines in the Stated Policy Scenario by around 30 Mtce by 2040, reflecting efficiency gains and the gradual rise in the use of electricity-based routes for steel production (WEO 2019, 231, 233).
- 6.26 As Table 5.1 from the WEO 2019 (reproduced above) shows, demand for coking coal in 2040 under the IEA's Stated Policies Scenario will be 790 Mtce.²⁵
- 6.27 The IEA's projections in relation to metallurgical coal aligns with the independent modelling undertaken by CRU, which forecast that:
- (a) steel will remain an important material for global development, particularly in South East Asia;
 - (b) global demand for carbon crude steel (crude steel, excluding stainless steel) is expected to grow steadily at a compound annual growth rate of approximately 1% from 2018 to 2040;
 - (c) despite the share of steel produced by blast furnace-basic oxygen furnace declining in the long term, as electric arc furnace steelmaking grows more quickly, there will continue to be a significant requirement for new iron units from coal (produced by blast furnace-basic oxygen furnaces as opposed to iron from recycled steel which is used in electric arc furnace steelmaking);
 - (d) given the relatively young age of the installed capacity of blast furnace-basic oxygen furnaces in Asia, much of the future demand for steel is forecast to be met by this existing capacity;
 - (e) by 2040, the blast furnace-basic oxygen furnace process will still account for approximately 57% of global steel production; and

²⁴ Pulverised coal for injection (PCI) is also used in steelmaking but, unlike HCC and SSCC, is injected directly into the blast furnace.

²⁵ Table 5.1 is titled "Global coal demand, production and trade by scenario". The projected world coal production in Table 5.1 is the same as world coal demand. However, as Figure 5.13 of WEO 2019 shows, global coal production will not meet demand. Therefore, it is clear that "world coal production" in Table 5.1 is to be interpreted as a breakdown of the projected demand for different types of coal under the IEA's three scenarios.

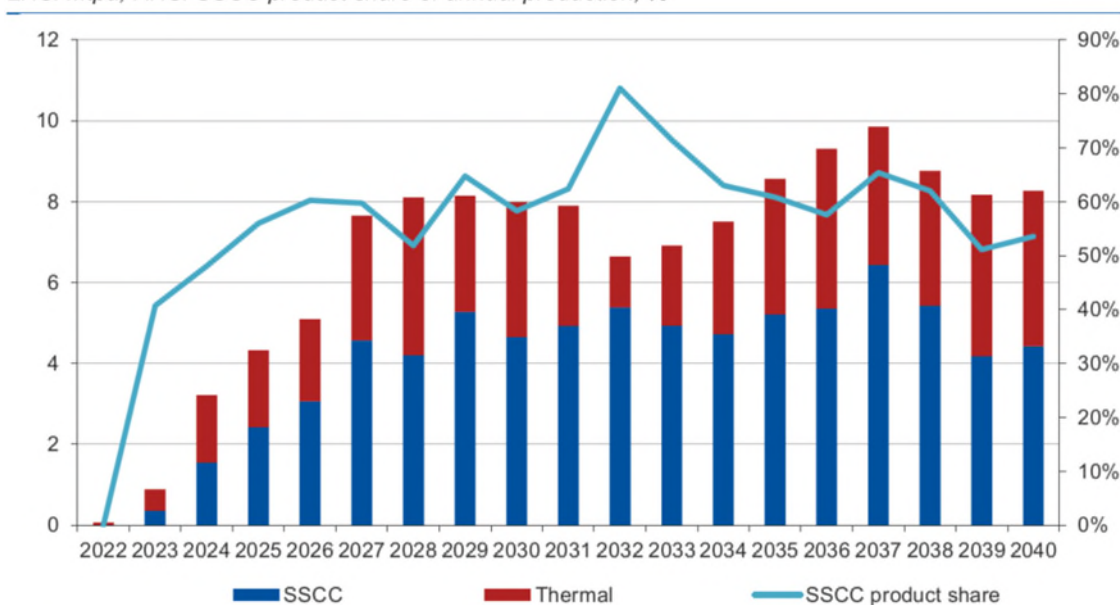
- (f) although the decline in total demand for steelmaking coal will be driven by a greater fall in demand for SSCC than HCC (as HCC has a higher CSR which is a key determinant of blast-furnace productivity), there is a limit to the amount of HCC that can be used in a coke blend. This means that the percentage of HCC used in a coke blend can only increase to a certain point and cannot entirely replace SSCC. A coke blend containing approximately 15 to 20% SSCC is the likely technical, minimum level of SSCC that can be used in highly efficient blast furnaces. This means that SSCC's important role in steelmaking will continue into the future.

Evaluating the Extension Project's coal and cost of operations: coal qualities, tonnage profile and duration of the Extension Project

- 6.28 The Extension Project will involve the extraction of an additional 33 million tonnes of ROM coal over a shorter life of mine (25 years) compared to the Approved Mine (168 Mt of ROM coal in total), with the total production of 150 Mt of saleable coal, all of which will be exported.
- 6.29 Coal produced by the Extension Project will be one of two coal categories:
- (a) thermal; and
 - (b) semi-soft coking coal (**SSCC**) (metallurgical coal).
- 6.30 On average, 60% of the saleable coal for the life of mine will be SSCC. This is illustrated by **Figure 2** extracted from CRU's market substitution study, which shows the Extension Project's production profile up to 2040.

Figure 2 Annual saleable production of Vickery Extension Project

LHS: Mtpa; RHS: SSCC product share of annual production, %



Data: Whitehaven Coal

Source: CRU

- 6.31 Coal is not a standardised, homogeneous commodity, as the quality produced by different mines varies considerably. This is a critically important factor to recognise when comparing the environmental consequences of the production and use of coal.

- 6.32 The classification of thermal coal is dependent on the calorific value of the product. The term "calorific value" refers to the energy density of the coal and determines the volume of coal that needs to be combusted to generate a given level of energy. That is, the higher the calorific value of the coal, the less coal needs to be burned to generate electricity. The less coal burned, the less CO₂ is released into the atmosphere. Therefore, the use of high quality coal for electricity generation can reduce the amount of CO₂ that is released into the atmosphere per unit of electricity produced, compared to coal of an inferior quality. Ash and sulphur content also play a role in the quality of and environmental impacts associated with burning coal (as set out in **Appendix 4**).
- 6.33 In order to appreciate the likely consequences of the substitution of the Extension Project's coal with product coal from alternative mines, it is essential to first acknowledge the quality of the Extension Project's coal. This is because the quality of the Extension Project's coal, compared to alternative markets and projects, is key for assessing the potential environmental impacts of any supply substitution that may arise.
- 6.34 There are three particular measures by which the Extension Project's coal can be evaluated. They are:
- (a) calorific value (unit: kcal/kg);²⁶
 - (b) ash content (unit: %);²⁷ and
 - (c) sulphur content (unit: %).²⁸
- 6.35 The qualities of the Extension Project's coal products are presented in the following table.

	Unit	Life of Mine Weighted Average
Thermal Coal		
Calorific Value	kcal/kg	6420
Ash	%	7.6
Sulphur	%	0.4
Semi-soft Coking Coal		
Calorific Value	kcal/kg	7280
Ash	%	6.5
Sulphur	%	0.4
Phosphorus	%	0.003%

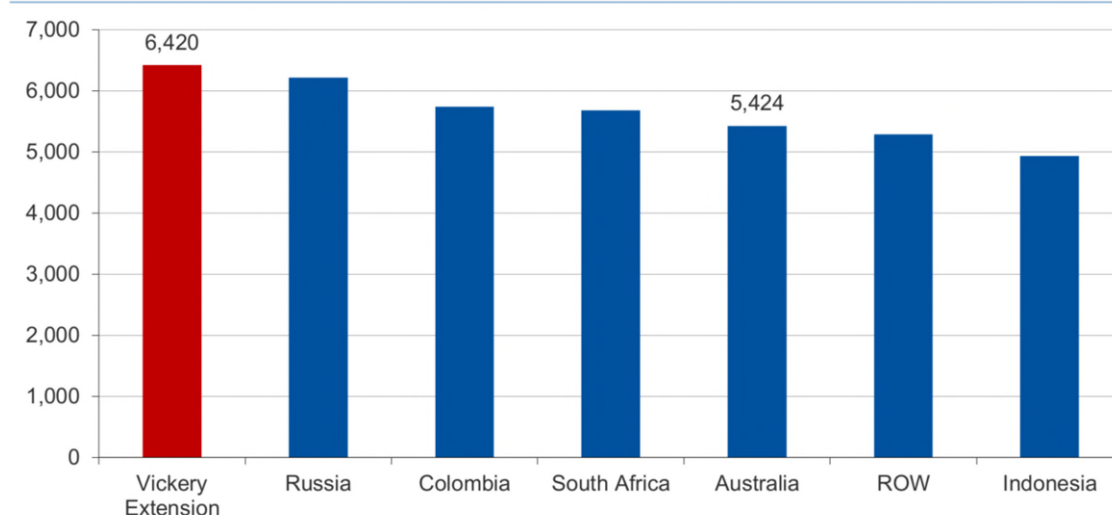
²⁶ The energy density of different coal sub product is a key driver of the volume of coal that is needed to be burned to attain a given level of power demand.

²⁷ This refers to the non-combustible residue left after the coal is burnt; it is a key driver of costs as it impacts power plant maintenance costs via equipment wear and ash-handling requirements.

²⁸ This contaminant impacts the level of atmospheric oxides which are emitted (a key local air pollutant and contributor to acid rain).

- 6.36 **Figure 11** extracted from the CRU study below shows that the Extension Project's thermal coal has a higher calorific value than the country weighted averages of all major seaborne thermal coal suppliers, including Australia.

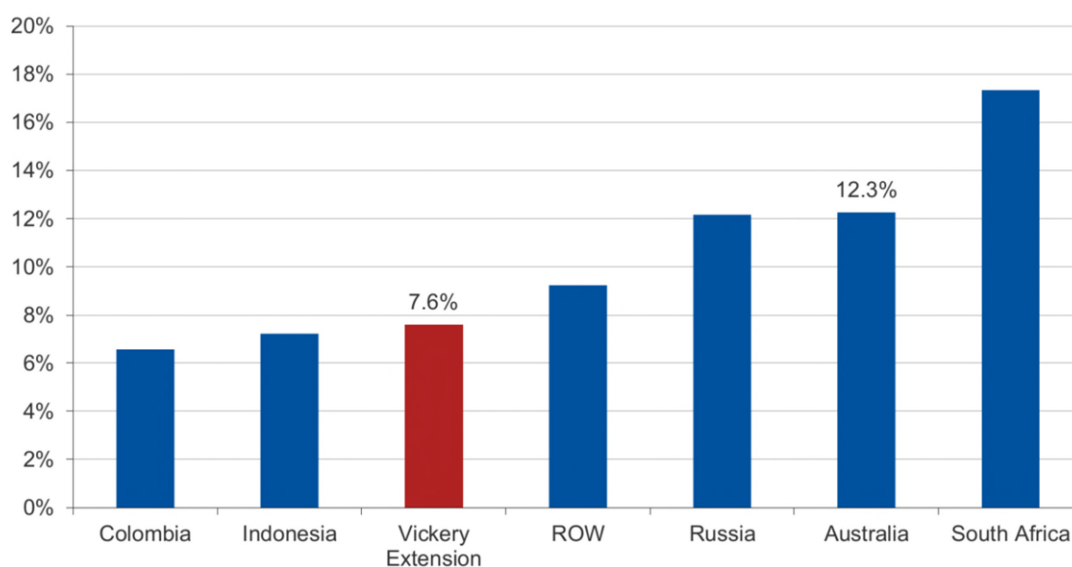
Figure 11 Thermal coal quality comparison (calorific value, CV) between Vickery Extension and country weighted average of operational mines (weighted: 2027 production), kcal/kg



Data: CRU, Whitehaven.
Source: CRU

- 6.37 **Figure 12** extracted from the CRU study below shows that the Extension Project's thermal coal has a lower ash content than the country weighted average of Australia and other major seaborne thermal coal suppliers.

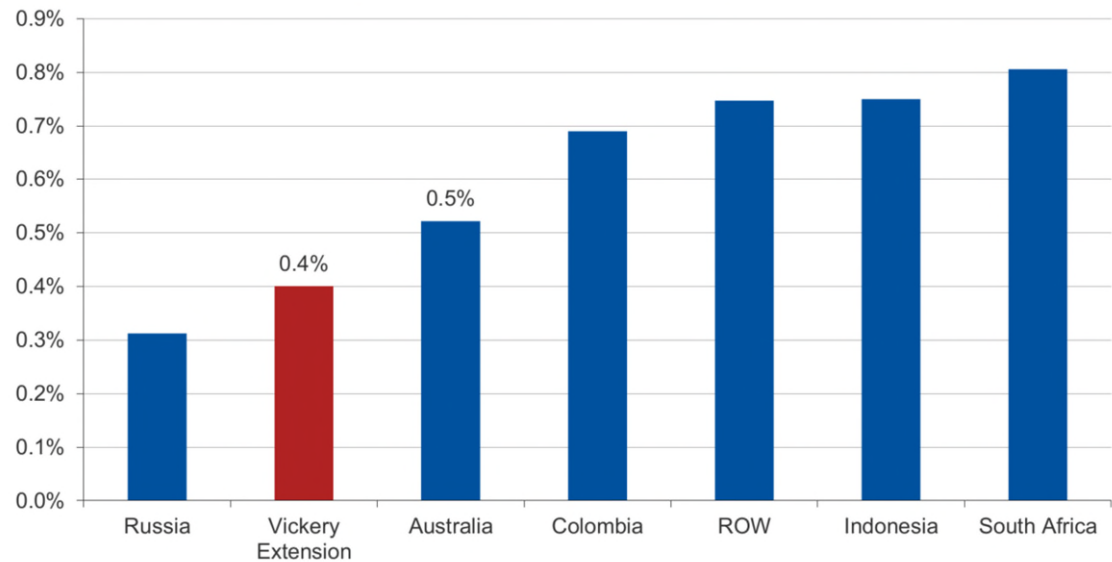
Figure 12 Thermal coal quality comparison (ash content) between Vickery Extension and country weighted average of operational mines (weighted: 2027 production), % ash



Data: CRU, Whitehaven.
Source: CRU

6.38 **Figure 13** extracted from the CRU study below shows that the Extension Project's thermal coal has a lower sulphur content than the country weighted average of all seaborne thermal coal suppliers except Russia.

Figure 13 Thermal coal quality comparison (sulphur content) between Vickery Extension and country weighted average of operational mines (weighted: 2027 production), % sulphur



Source: CRU

6.39 **Figure 67** extracted from the CRU study below, is a scatter chart ranking the Extension Project's thermal coal product (in terms of calorific value and ash content) against the quality of coal products from operational mines.

Figure 67 Thermal coal quality comparison between Vickery Extension and operational mines

Y-axis: CV; X-axis: Ash (TC Mines)



Source: CRU

6.40 **Figure 68** extracted from the CRU study below is a scatter chart ranking the Extension Project's thermal coal product (in terms of calorific value and sulphur content) against the quality of coal products from operational mines.

Figure 68 Thermal coal quality comparison between Vickery Extension and operational mines

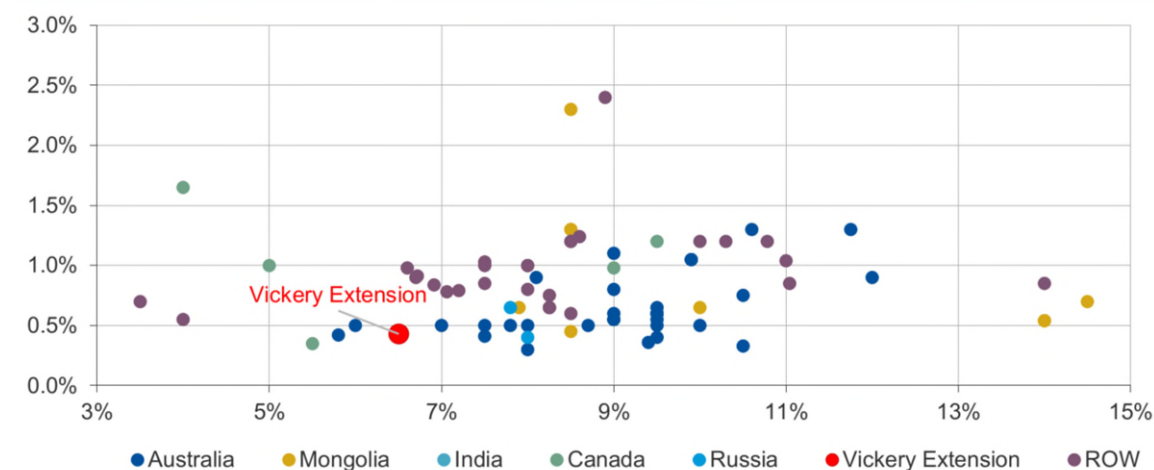


Source: CRU

6.41 **Figure 69** extracted from the CRU study below shows the quality of the Extension Project's SSCC product (in terms of ash and sulphur content) compared to operational mines.

Figure 69 SSCC quality comparison between the Vickery Extension and operational mines (weighted: 2027 production)

Y-axis: Sulphur content (%); X-axis: Ash content (%)



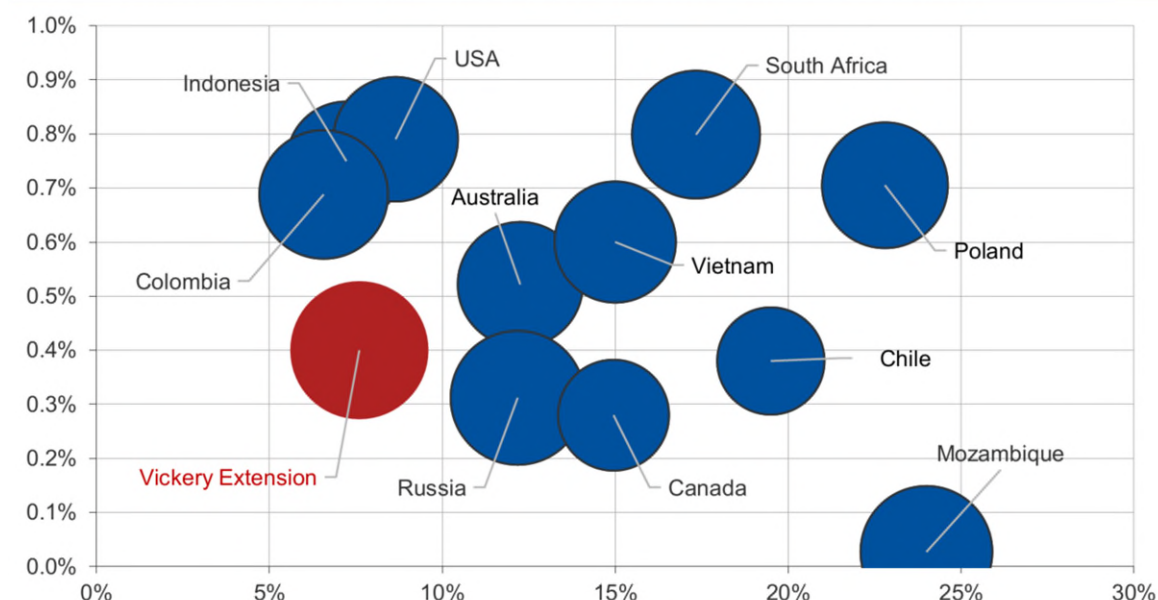
Data: CRU, Whitehaven.

Source: CRU

6.42 **Figure 70** extracted from the CRU study below shows the quality of the Extension Project's thermal coal product compared to the country weighted average of operational mines.

Figure 70 Thermal coal quality comparison between Vickery Extension and country weighted average of operational mines (weight: 2027 production)

X-axis: Ash content, %; Y-axis: sulphur content, %; Bubble size: Calorific value, kcal/kg.



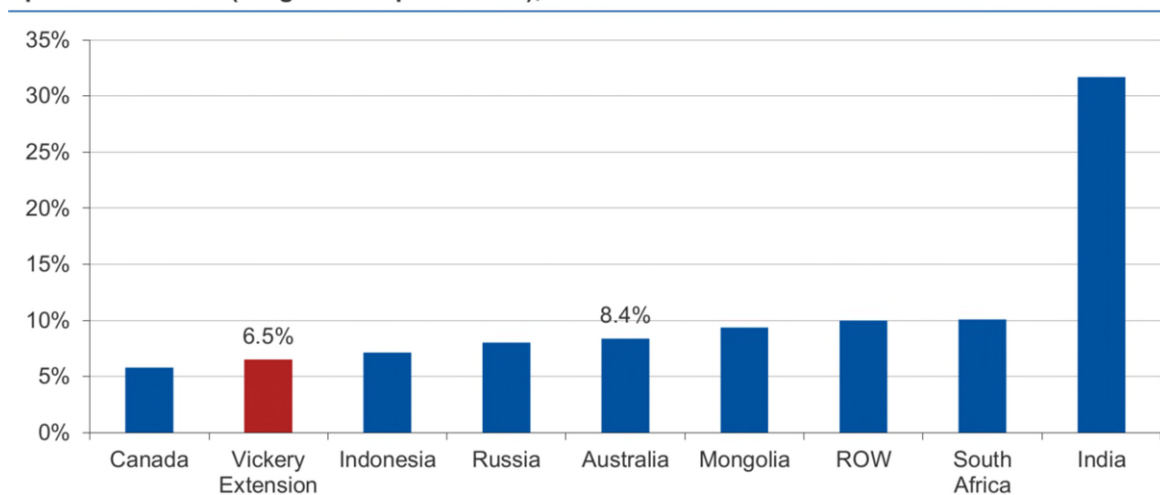
Data: CRU, Whitehaven.

Source: CRU

- 6.43 The Extension Project's thermal coal has a calorific value of 9% above the 6,000kcal/kg benchmark. The calorific values of the Extension Project's thermal coal is also higher than the country averages of Australia and other major exporters of thermal coal such as Indonesia, Russia, South Africa, Colombia and the United States of America.
- 6.44 The Extension Project's thermal coal has low (<10%) ash content, which is lower than the Australian average and lower than other major thermal coal exporters: Russia, South Africa and the United States of America.
- 6.45 The sulphur content of the Extension Project's thermal coal (0.4%) is also at the bottom end of the range globally for seaborne suppliers of thermal coal,²⁹ with only Russia having a lower average sulphur content.
- 6.46 CRU has assessed the Extension Project's premium thermal coal product as being in the fourth percentile of the cost curve for mines producing thermal coal for export. It is a quality premium thermal coal which is very cost competitive.
- 6.47 The Extension Project will produce approximately 150Mt of saleable coal, comprising thermal coal and SSCC. The indicative life of mine average proportion of thermal coal to SSCC will be 40:60. However, given its high energy content, SSCC can be used as premium quality thermal coal. At times during the life of mine, the prevailing pricing differentials between SSCC and thermal coal may drive SSCC into the premium quality thermal coal market for power generation.
- 6.48 SSCC and HCC are essential inputs for steelmaking using blast furnace-basic oxygen furnace technology. HCC and SSCC are both used in the production of coke before entering the blast furnace. The proportions of each coal used in the coking process are determined by various factors, including pricing differentials, blast furnace requirements and specific characteristics and qualities of the coal.
- 6.49 One of SSCC's key contributions to the coke blend is its lower impurities such as ash, sulphur, and phosphorus as well as being lower in cost compared to HCC. Sulphur is a local air pollutant and contributor to acid rain. Ash is the non-combustible residue left after the coal is burnt – a waste which reduces blast-furnace efficiency, increases operating costs and has local environmental impacts.
- 6.50 **Figures 44, 45 and 46** extracted from CRU's study below, show the ash, sulphur and phosphorus content of the Extension Project's SSCC compared to the country weighted averages of all other major seaborne suppliers of SSCC.

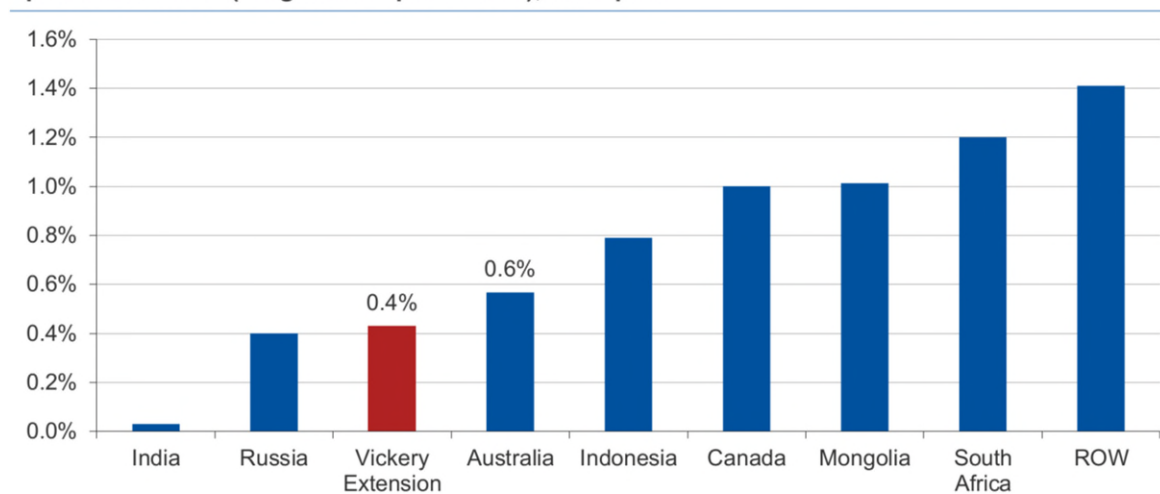
²⁹ Noting, in practical terms, that the lower the level of sulphur in the coal product, the higher the quality of that coal product.

Figure 44 SSCC quality comparison between Vickery Extension and country weighted average of operational mines (weight: 2027 production), % ash



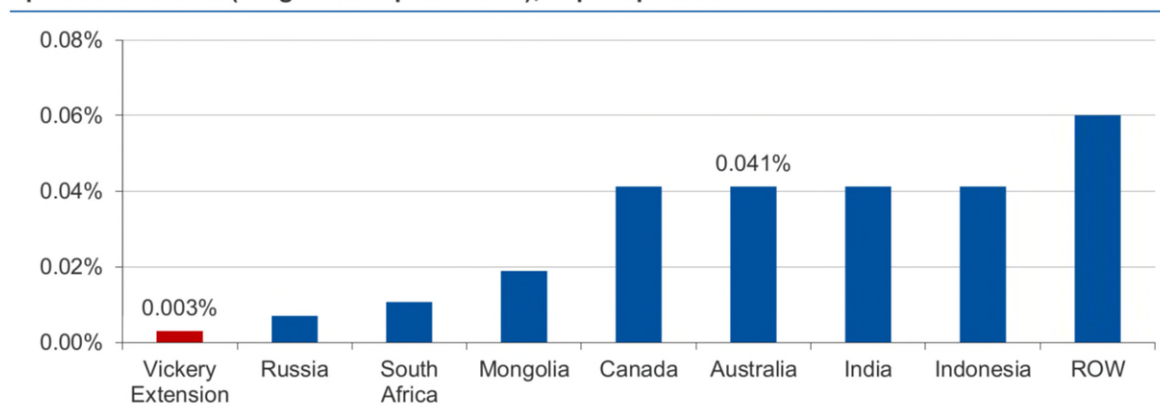
Data: CRU, Whitehaven.
Source: CRU

Figure 45 SSCC quality comparison between Vickery Extension and country weighted average of operational mines (weight: 2027 production), % sulphur



Data: CRU, Whitehaven.
Source: CRU

Figure 46 SSCC quality comparison between Vickery Extension and country weighted average of operational mines (weight: 2027 production), % phosphorus



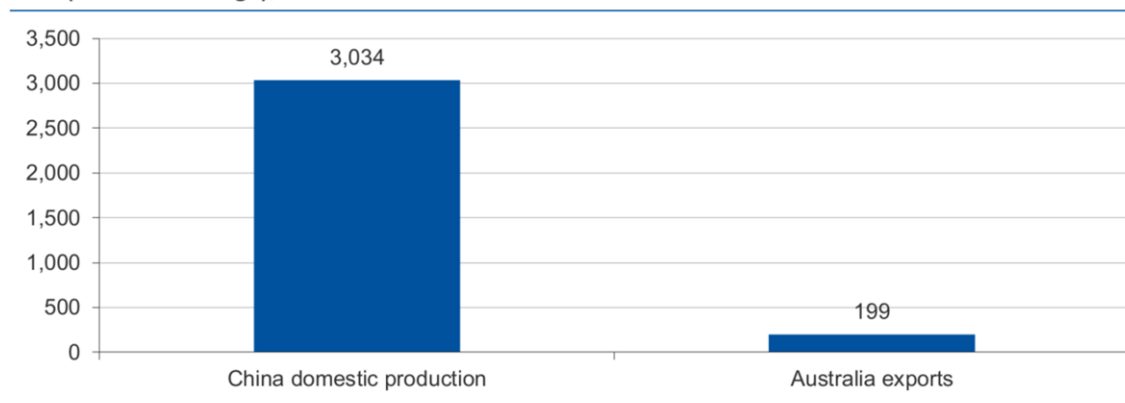
Data: CRU, Whitehaven.
Source: CRU

- 6.51 The ash content of the Extension Project's SSCC is lower than the average ash content of Australian SSCC and all other major seaborne SSCC suppliers, save for Canada. The sulphur content of the Extension Project's SSCC at 0.4% is also near the bottom end globally and lower than the average sulphur content of Australian SSCC. The phosphorus content of the Extension Project's SSCC at 0.003% is lower than the average of Australia and all other major seaborne SSCC suppliers. These qualities make the Extension Project's SSCC one of the most marketable SSCC products globally.
- 6.52 Ash and CSR are the two attributes of metallurgical coal that have the greatest impact on blast-furnace productivity and, consequently, the GHG emissions intensity of steelmaking (that is GHG emissions per tonne of hot metal produced). This means that the ash content and CSR of coking coal are important for the minimisation of GHGs and, in particular, CO₂ emissions from steel production. Sulphur and phosphorus levels also impact blast-furnace efficiency and hence emissions, however far less so, than ash and CSR.
- 6.53 For an average size blast-furnace operating at typical efficiencies, an increase of 1% in total coke ash results in an increase in coke consumption of approximately 15 kg per tonne of hot metal produced, which results in an increase of approximately 46 kg of CO₂ per tonne of hot metal produced. If SSCC is approximately 15% of the coke blend (the minimum percentage of SSCC used in advanced Asia Pacific countries excluding China), for every 1% reduction in the SSCC's average ash content, CO₂ emissions could be reduced by 6.9 kg per tonne of hot metal produced. Given the Extension Project's SSCC's low ash levels compared to the rest of the world, CO₂ emissions could be reduced by 13 kg per tonne of hot metal produced (compared to the average emissions intensity based on the average ash content of SSCC globally) if the Extension Project's coal were used as the only SSCC within the coke blend. CSR has not been measured for the Extension Project's SSCC at this stage because SSCC is generally selected for use in coking coal blends based on attributes other than CSR. CRU has assessed the Extension Project as being in the 60th percentile of the cost curve for mines producing SSCC for export to steelmaking customers. The relative low ash and sulphur content of the Extension Project's SSCC are important attributes.

The relative importance of Australian coal exports in terms of meeting projected demand for thermal and coking coal

- 6.54 While Australia is the world's largest exporter of coal, it should be acknowledged that coal investment and supply conditions in Australia have a limited impact on the global demand for coal for several reasons:
- (a) as a low-cost producer of thermal coal, it does not affect the price of thermal coal (which is determined by the marginal – typically Chinese coal producer);
 - (b) Australian coal supplies are small relative to domestic industries in the major importing countries: Chinese domestic coal production alone is more than 15 times larger than total Australian exports (see **Figure 53** extracted from the CRU study below); and
 - (c) there is a high degree of flexibility in the coal industries of major Asian demand centres, rendering it likely that any change in Australian exports would be offset by expansion in these domestic supplies. In 2017 alone, for example, China closed around 200 million tonnes of coal production capacity (roughly equivalent to the entire Australian export market). Such former producing assets can be readily restarted in response to any supply shortages. Similarly, the WEO 2019 (p 227) recognises that Indonesia is a swing producer that is able to quickly increase production in response to price signals from international markets.

Figure 53 Size comparison between China domestic market and Australian exports for thermal coal (2013-18 average), Mt



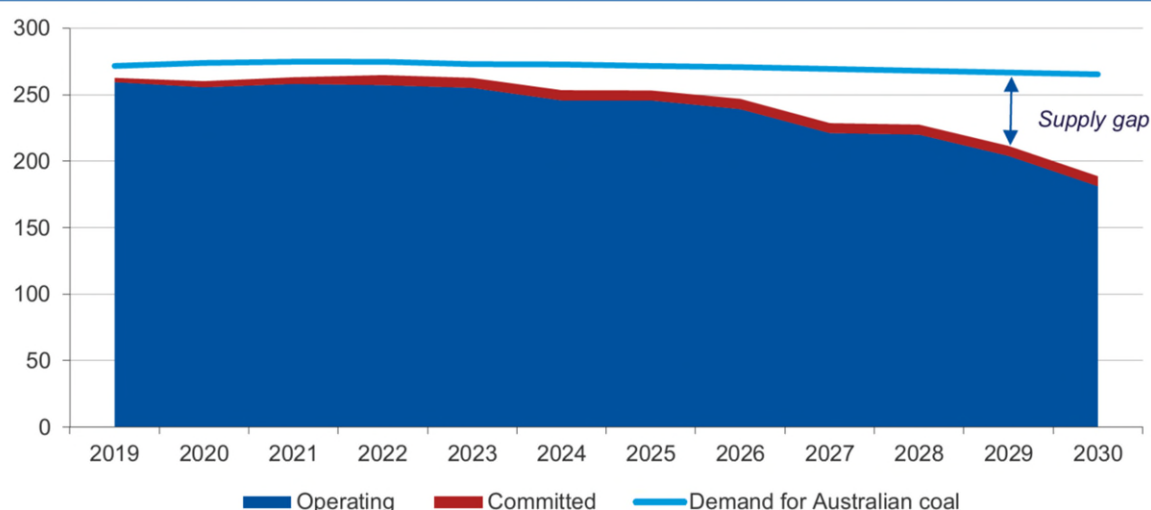
Source: CRU

Likelihood of coal market substitution

- 6.55 As noted above, thermal coal is differentiated based on calorific value. SSCC can fetch a higher price than thermal coal, which is why producers of coal sell SSCC as a separate product. However, it is not uncommon for SSCC to be sold as thermal coal when the respective pricing makes it attractive to do so. It is possible that this will become increasingly common as thermal coal importers become more willing to pay a premium for higher CV coals as climate change and environmental policies continue to intensify. CRU treated all of the Extension Project's product coal as thermal coal for the purpose of its analysis of market substitution. The results of that analysis therefore represent the increase in GHG emissions from the substitution of the Extension Project's entire coal product with alternative sources of thermal coal. The results nevertheless confirm that substitution of the Extension Project's thermal coal product with thermal coal from alternate sources would result in an increase in GHG emissions and that the increase in GHG emissions from market substitution would be greater where the price of SSCC drops to equal or below that for thermal coal.
- 6.56 For its market substitution analysis, CRU considered the following three different hypothetical scenarios:
- (a) the Extension Project is not approved and does not go ahead and the Approved Project also does not go ahead (**Scenario 1**);
 - (b) the Extension Project is not approved and does not go ahead, but the Approved Project does go ahead (**Scenario 2**); and
 - (c) no new Australian mines enter production and Australia's current coal mines naturally deplete (**Scenario 3**).
- 6.57 Two of CRU's three hypothetical market substitution scenarios (Scenarios 1 and 2) considered below cover a forecast period for the life of mine of the Extension Project. Scenario 3 covers only a forecast period to 2030 because the coal production that may be substituted in Scenario 3 is much larger: 77Mt in 2030 and 330Mt in the period 2019 to 2030 and it would be difficult to forecast beyond 2030 without creating a detailed profile of where lost Australian production may be replaced from. In other words, in Scenarios 1 and 2, the shortfall in supply of coal would be small enough such that it could be substituted by any one single supplier country. Whereas in Scenario 3, the large supply shortfall is unlikely to be substituted by a single supplier country and would require more detailed modelling to forecast beyond 2030.

- 6.58 It should be noted that the analysis of the impacts of the three hypothetical market substitution scenarios considered below has been informed by various technical factors, including:
- (a) the requisite coal volumes evaluated on an energy-equivalent basis;
 - (b) the relative average regional boiler efficiencies;
 - (c) the average fuel consumption and fuel emission intensity (Scope 1 GHG emissions) for coal mines by region;
 - (d) low and high fugitive emissions rates (Scope 1 GHG emissions) for underground and surface mines (see further explanation below);
 - (e) average power consumption of coal mines (Scope 2 GHG emissions) and average emissions intensity of grid power by region;
 - (f) the average distance coal is transported by rail by region (Scope 3 GHG emissions); and
 - (g) the Extension Project's product-specific energy content factor of 29GJ/t of product coal and the calculation of Scope 3 GHG emissions associated with energy production.
- 6.59 This analysis is reliant on the specific data that is available to CRU. It should be acknowledged that, like all market substitution analyses of this nature, the estimate of GHG emissions that is given can vary depending upon the data and parameters that are set for the particular analysis.
- 6.60 In relation to Scenarios 1 and 2, the shortfall in supply will be small: 8.3 Mtpa ROM coal and 3.8 Mtpa ROM coal respectively. There will remain a global demand for high quality Australian coal irrespective of whether or not the Extension Project is approved, as is evident from discussion of the three policy scenarios posited in the IEA's WEO 2019 discussed above. According to CRU, the projects most likely to supply coal as a substitute for the Extension Project's coal in the event that the Extension Project is not approved are in Russia and Australia. Alternative coal could also be sourced from other major producing countries, including China, India, Indonesia or Vietnam.
- 6.61 In relation to Scenario 3, there will, again, remain a global demand for high quality Australian coal irrespective of whether or not the Extension Project is approved. Based on CRU's modelling for the forecast period (i.e. 2019-2030), it is estimated that export thermal coal production in Australia will be 260 million tonnes in 2020 and 189 million tonnes in 2030.
- 6.62 CRU estimates that the demand for Australian export coal during the forecast period will be 274 million tonnes in 2020 and 265 million tonnes in 2030. Therefore, CRU forecasts that there will be a supply gap between export production and demand of 14 million tonnes in 2020, which will widen to 77 million tonnes in 2030, as shown in **Figure 60** extracted from the CRU study below. The shortfall represents 5% and 28.9% of demand for Australian thermal coal in 2020 and 2030 respectively.

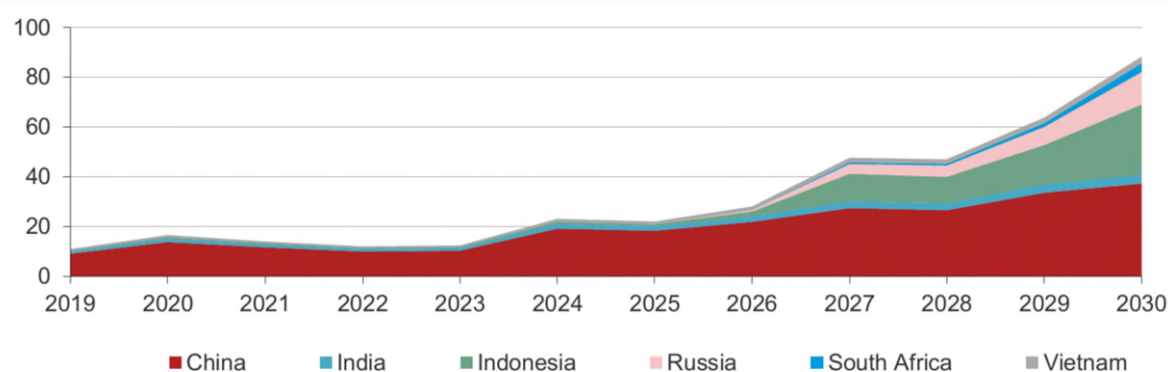
Figure 60 Supply shortfall if no Australian projects are approved in the future, Mt



Source: CRU

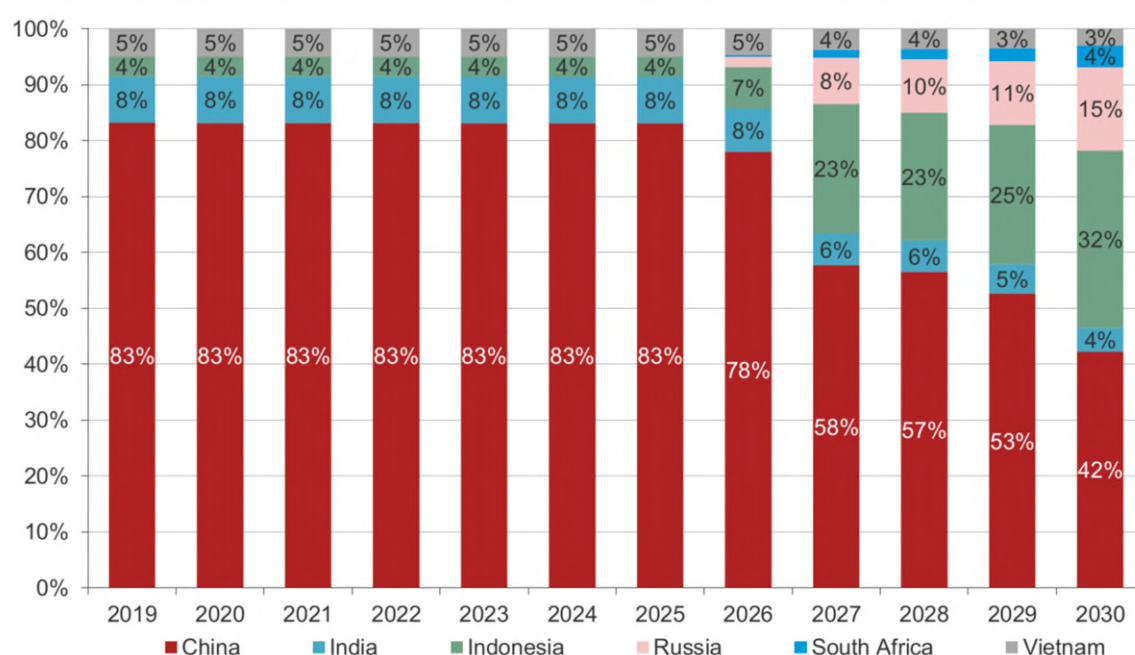
- 6.63 Given the ongoing demand for coal forecast by CRU, this supply shortfall is likely to be substituted by alternative supplies of coal from China, Russia, Indonesia, India, South Africa and Vietnam. Because those countries are also major coal producing countries, it is considered that those countries will be capable of absorbing the supply shortage, as well as providing replacement coal volumes to non-producing countries in the Asia-Pacific region that normally are net importers of Australian thermal coal.
- 6.64 The substituting volumes to fill the gap left by the Australian shortfall were allocated using the following assumptions:
- producing countries will substitute a shortfall in import volumes by domestic production going forward. As China is the largest coal producer, it can react quickly to a shortfall (see Figure 53 extracted from the CRU study above for a comparison of China and Australia's coal production); and
 - non-producing countries keep sourcing coal from Australia for a few years until the volumes are not enough to meet demand, resulting in those non-producing countries turning to other producing countries to meet the demand.
- 6.65 **Figure 61** extracted from the CRU study below, shows the replacement production profile of major producers likely to replace Australian supply and **Figure 62** extracted from the CRU study below shows the country breakdown of the substituted production.

Figure 61 Production profile from major producers which replace Australian supply, Mt



Source: CRU

Figure 62 Country breakdown of the substituted production, %



Source: CRU

- 6.66 As is evident in Figures 61 and 62 above, early substitution will mainly come from China as it is able to respond quickly to the shortfall with large scale domestic production. As the shortfall grows, non-producing countries will start diversifying their imports away from Australia and the share of other exporters like Indonesia and Russia are set to increase. Nonetheless, Chinese coal is likely to remain the largest substitute for Australian coal.

Consequences of substitution of the Extension Project's coal with coal from alternative mines, particularly in respect of GHG emissions

- 6.67 The high quality of the Extension Project's thermal and SSCC product coal (as explained above), means that it performs at a higher level of boiler efficiency when burned at power stations, compared with alternative supply sources. This has important consequences for the purpose of calculating the GHG emissions that would occur if the Extension Project were to proceed compared to the three hypothetical scenarios in which development consent to the Extension Project is refused.
- 6.68 As mentioned in paragraph 6.55 above, for the purpose of assessing the GHG emissions if the Extension Project is not approved, the Extension Project's product coal has been treated as a single thermal coal product with the characteristics set out in **Table 5** extracted from the CRU study below.

Table 5 Properties of the Vickery Extension's coal: treated as a single thermal coal product for the scenarios

	Total Moisture	Inherent Moisture	Ash	Total Sulphur	Gross Calorific Value (ad)	NCV (ad)
	(%ar)	(%ad)	(%ad)	(%ad)	(kcal/kg)	(kcal/kg)
Vickery Extension average	11	3.2	6.9	0.4	7048	6936

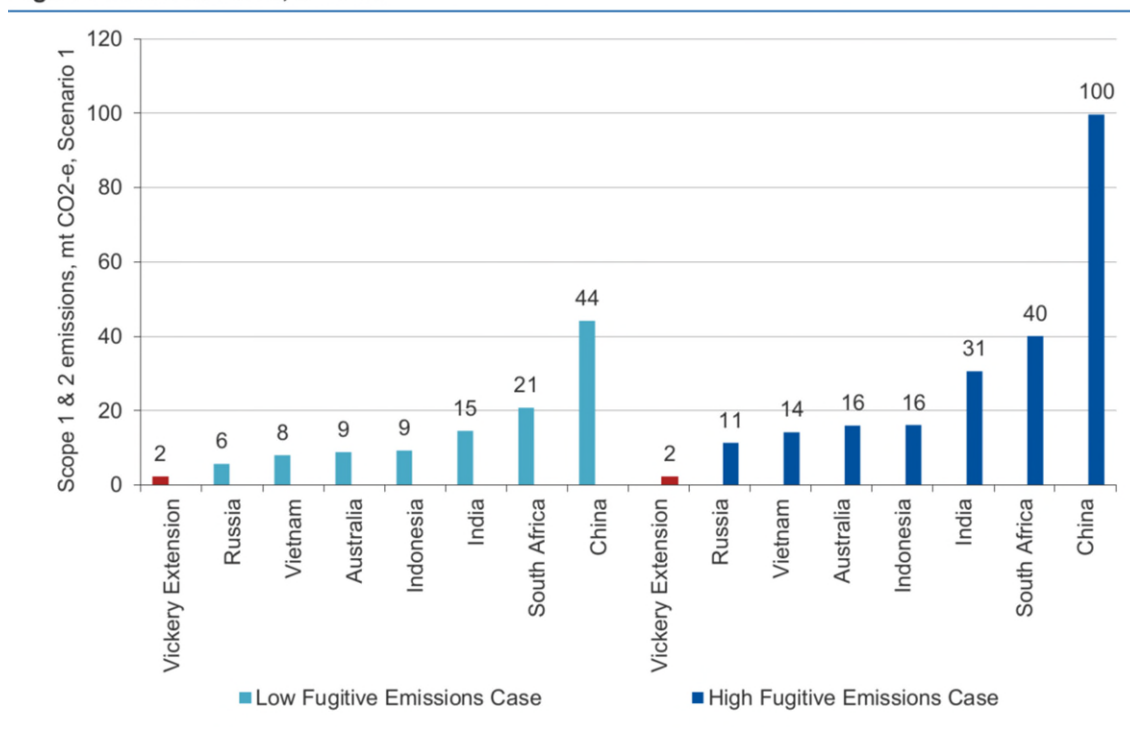
Data: CRU, Whitehaven.

Source: CRU

Scenario 1: Neither the Extension Project nor the Approved Project proceed

- 6.69 In relation to Scenario 1 (where neither the Extension Project nor the Approved Project were to proceed), the Scope 1 and Scope 2 GHG emissions (from fuel, fugitive emissions and power consumption) (in MtCO₂-e) of the Extension Project and the alternative sources of coal over the period of the life of mine are compared in **Figure 54** extracted from the CRU study below.

Figure 54 Scope 1 & 2 emissions from Vickery Extension and alternative supply sources for both fugitive emission cases, 2019-30

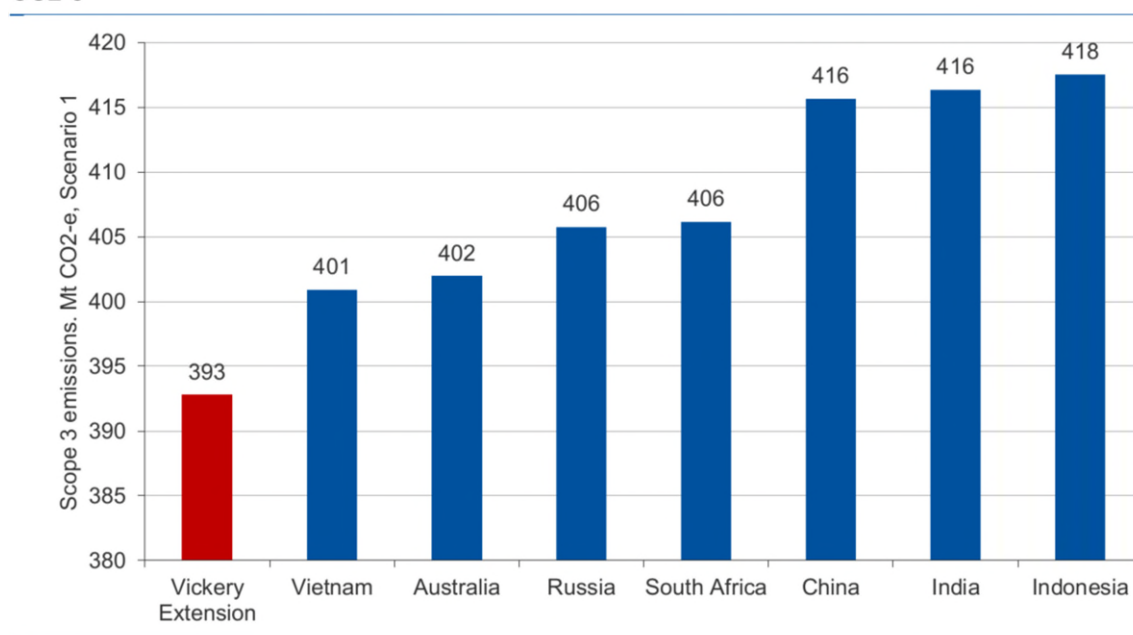


Data: CRU, Whitehaven. Note: Vickery Extension includes approved Vickery project.
Source: CRU

- 6.70 As a result of the absence of detailed estimates of fugitive emissions from a defined alternative supply source, a low and high fugitive emissions case needed to be adopted. The selection of the low and high cases was informed by the IPCC's estimates of fugitive methane emissions from coal mining, which range from 0.164 to 0.410 t CO₂-e per tonne of coal in the case of underground mining, and 0.005 to 0.033 t CO₂-e per tonne of coal in the case of surface mining. A range boundary of 0.005 to 0.164 t CO₂-e per tonne of coal was applied to alternative coal sources for the low fugitive emissions case, and 0.033 to 0.410 t CO₂-e per tonne of coal for the high fugitive emissions case.
- 6.71 In the low fugitive emissions case for Scenario 1, the Extension Project is expected to produce the lowest volume of Scope 1 and 2 GHG emissions compared to replacement sources from other countries, which would produce an additional 3.5 to 41.9 Mt CO₂-e over the life of mine of the Extension Project. In the high fugitive emissions case, the Extension Project is expected to produce the lowest volume of Scope 1 and 2 GHG emissions compared to replacement sources from other countries, which would produce an additional 9.1 to 97.5 Mt CO₂-e over the life of mine of the Extension Project.
- 6.72 Scope 1 and 2 emissions also account for approximately 0.6% of all direct and indirect GHG emissions calculated for the Extension Project. Therefore, direct mining activity by the Applicant is responsible for only a small fraction of emissions of the coal value chain.

- 6.73 In relation to Scope 3 emissions in Scenario 1, the substitution of the Extension Project's product coal with coal from alternate producing countries will increase Scope 3 emissions by an estimated 8.1 to 24.8 million tonnes of CO₂-e for the life of mine (between 2022 and 2046) (see **Figure 55** extracted from the CRU study below).
- 6.74 Scope 3 emissions account for 99.4% of all direct and indirect GHG emissions associated with the Extension Project. Therefore, the combustion of coal for power generation is responsible for almost all the emissions of the coal value chain.

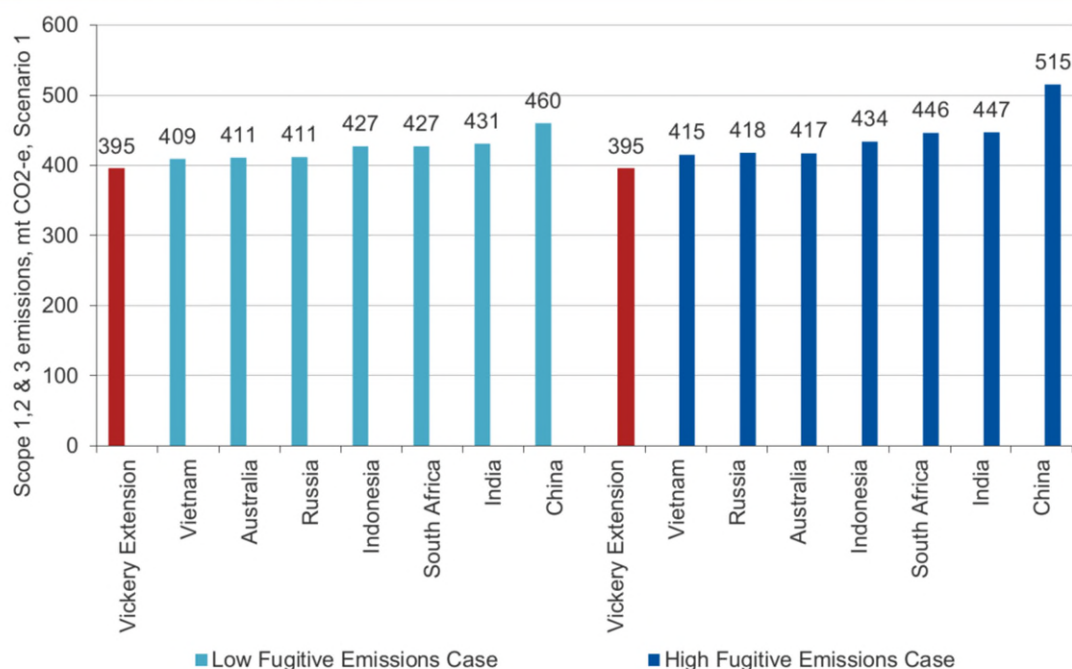
Figure 55 Scope 3 emissions from Vickery Extension and alternative supply sources, LOM, Mt CO₂-e



Data: CRU, Whitehaven. Note: Vickery Extension includes approved Vickery project.
Source: CRU

- 6.75 When combining Scope 1, 2 and 3 GHG emissions, Scope 3 emissions are the main driver of GHG emissions and are much larger than Scope 1 and 2 emissions. Overall, CRU estimated that market substitution of the Extension Project's coal will release between 14 and 120.4 million tonnes CO₂-e into the atmosphere over the life of mine (see **Figure 56** extracted from the CRU study below).

Figure 56 Scope 1, 2 & 3 emissions from the Vickery Extension and alternative supply sources for both fugitive emission cases, LOM

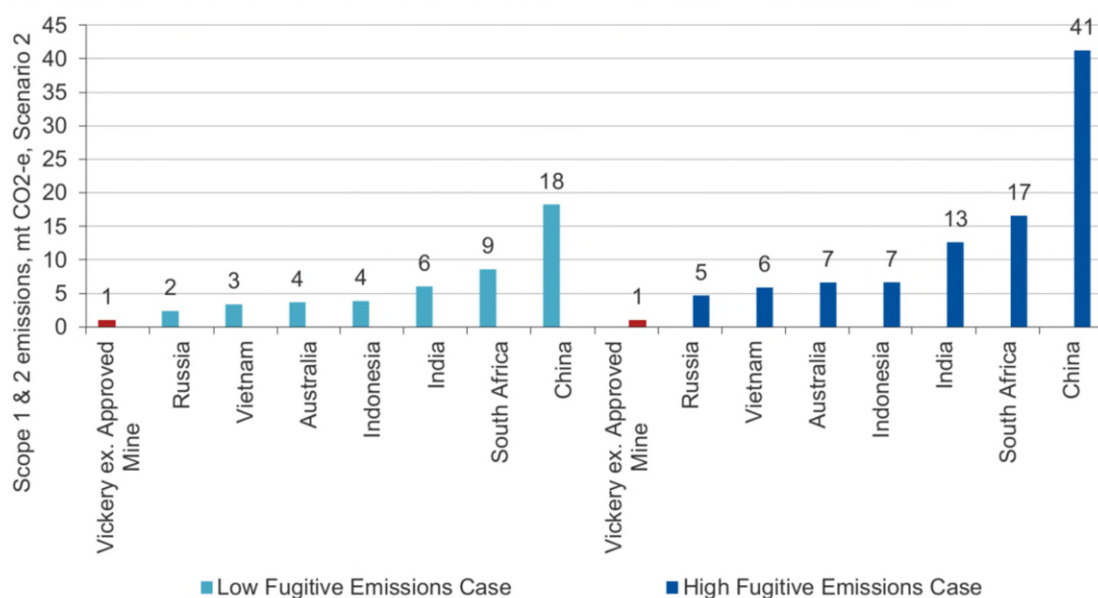


Data: CRU, Whitehaven. Note: Vickery Extension includes approved Vickery project.
Source: CRU

Scenario 2: The Extension Project does not proceed but the Approved Project does proceed

- 6.76 In Scenario 2 (where the Extension Project (150 Mt saleable coal) is not approved, but the Approved Project (80 Mt saleable coal) still goes ahead), there would be a shortfall of 70 Mt of saleable coal over the life of mine. The Scope 1 and 2 emissions (from fuel, fugitive emissions and power consumption) of the Extension Project and the alternative sources of coal over the life of mine of the Extension Project are compared in **Figure 57** of the CRU study extracted below. Coal market substitution would increase Scope 1 and 2 emissions by 1.4 to 40.2 million tonnes CO₂-e depending on the fugitive emissions case.

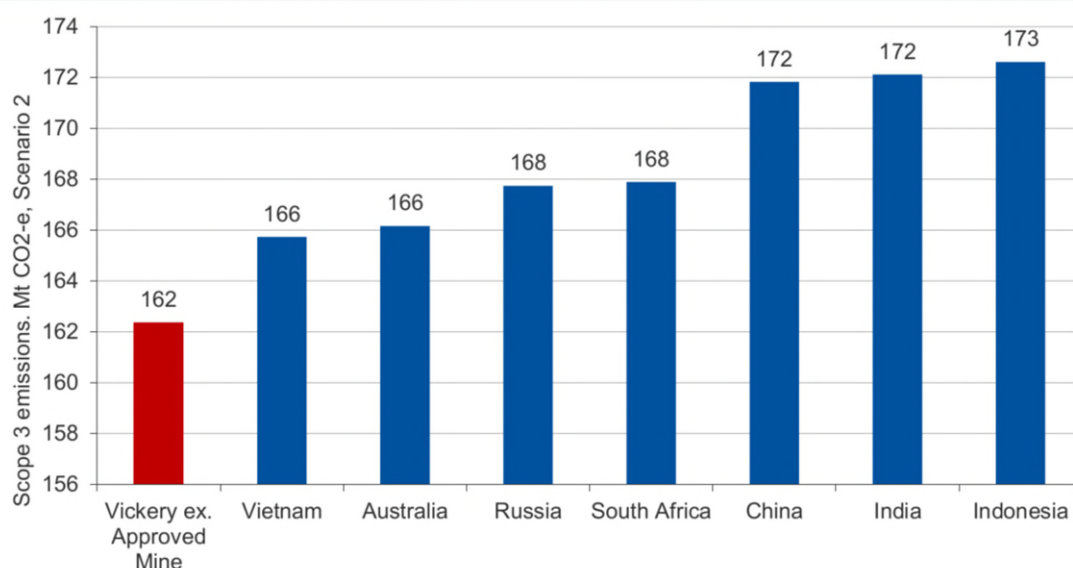
Figure 57 Scope 1 & 2 emissions from Vickery Extension (ex. approved Vickery mine) and alternative supply sources for both fugitive emission cases, LOM



Data: CRU, Whitehaven. Note: Vickery Project here excludes approved Vickery mine and only take account of the Extension.
Source: CRU

- 6.77 In relation to the Scope 3 emissions in Scenario 2, the alternative supply would release an estimated additional 3.4 to 10.2 million tonnes of CO₂-e into the atmosphere over the life of mine of the Extension Project (see **Figure 58** extracted from the CRU study below).

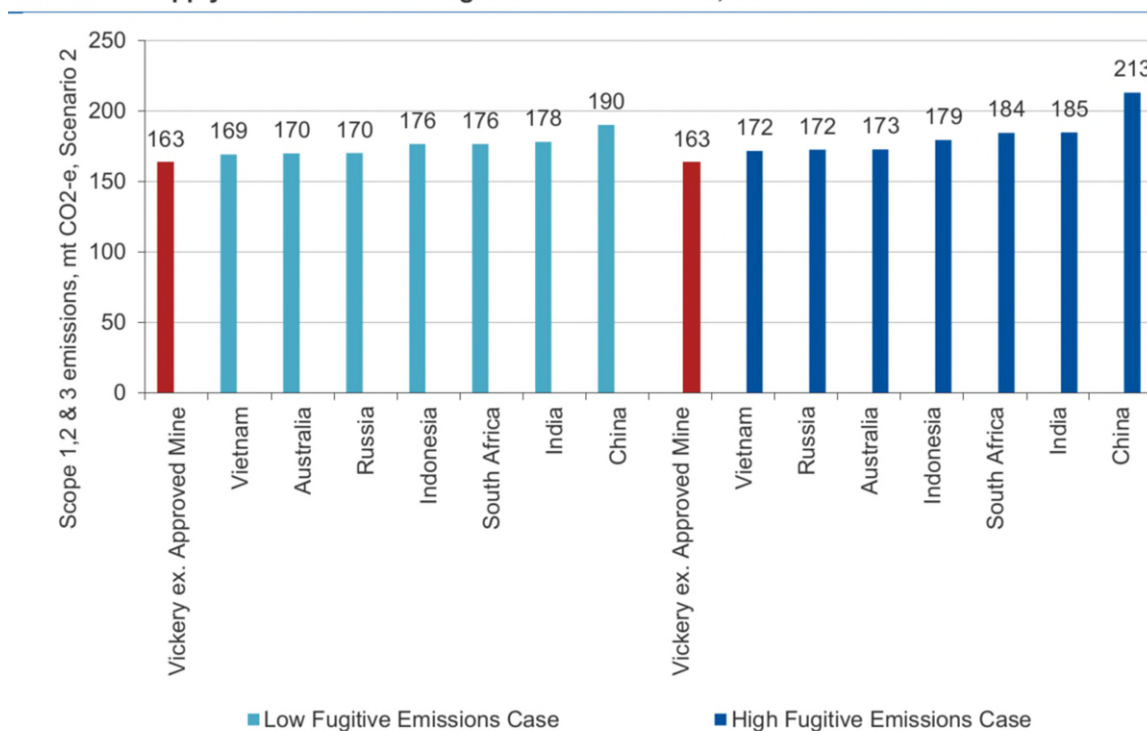
Figure 58 Scope 3 emissions from Vickery Extension (ex. approved Vickery mine) and alternative supply sources LOM, Mt CO₂-e



Data: CRU, Whitehaven. Note: Vickery Project here excludes approved Vickery mine and only take account of the Extension.
Source: CRU

- 6.78 When combining Scope 1, 2 and 3 emissions for Scenario 3, Scope 3 emissions comprise the vast majority of total GHG emissions associated with the Extension Project excluding the Approved Project. Overall, CRU estimated that substituting only the Extension Project's approximately additional 70 Mt saleable coal would result in the release of an additional 5.7 to 49.7 Mt CO₂-e depending on the fugitive emissions case (see **Figure 59** extracted from the CRU study below).

Figure 59 Scope 1, 2 & 3 emissions from Vickery Extension (ex. approved Vickery mine) and alternative supply sources for both fugitive emission cases, LOM

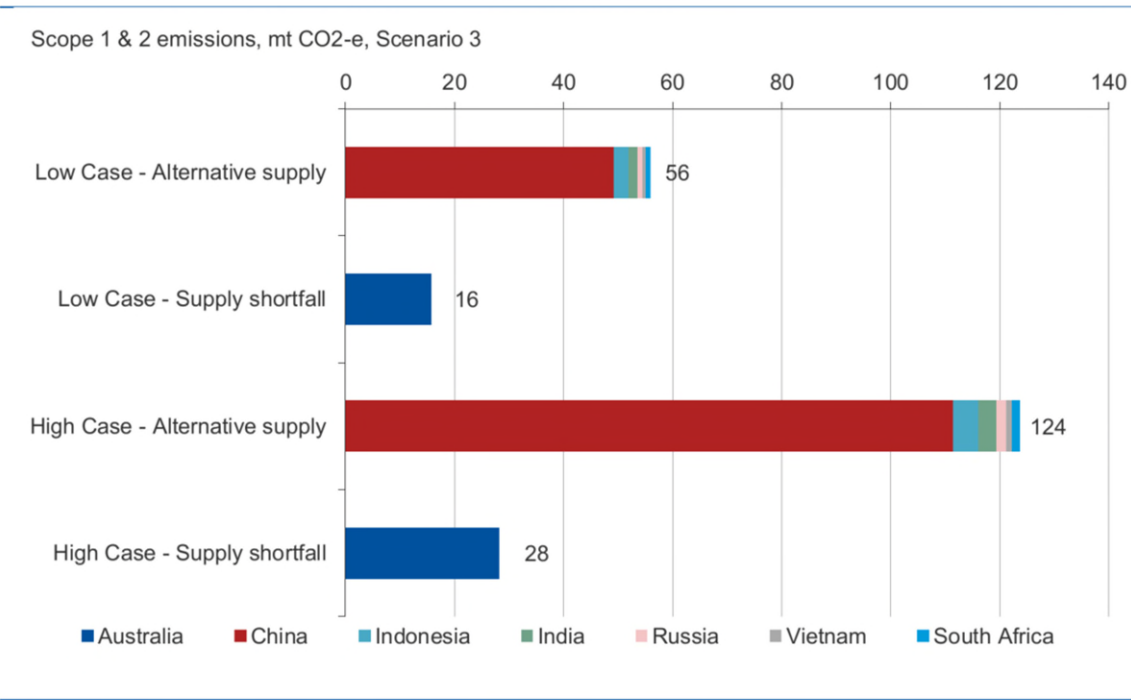


Data: CRU, Whitehaven. Note: Vickery Project here excludes approved Vickery mine and only take account of the Extension.
Source: CRU

Scenario 3: No expansions of existing coal mines and no new coal mines in Australia

- 6.79 In Scenario 3 (where the Extension Project is not approved and no new Australian coal projects enter production) CRU forecast that there will be a supply shortfall of 14 Mt in 2020 and 77 Mt in 2030 (see Figure 60 extracted from the CRU study at paragraph 6.62 above). The Scope 1 and 2 emissions (from fuel, fugitive emissions and power consumption) of the Extension Project and the alternative sources of coal over the period from 2019 to 2030 are compared in **Figure 63** of the CRU study extracted below. The coal substitution would increase Scope 1 and 2 emissions by 40.1 to 95.5 million tonnes CO₂-e depending on the fugitive emissions case.

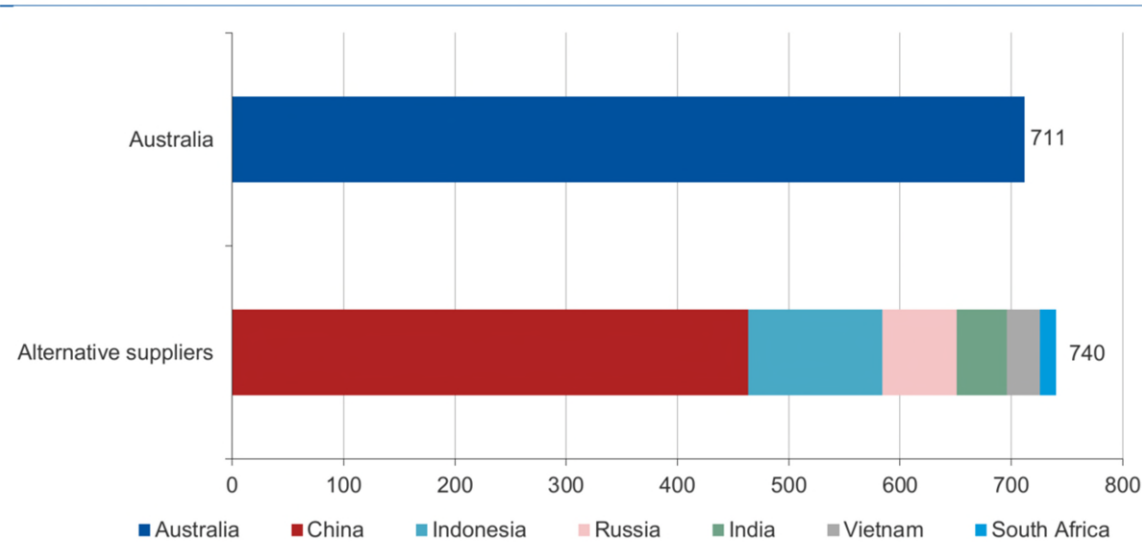
Figure 63 Scope 1 & 2 GHG emissions from Australian supply shortfall and alternative supply sources for both fugitive emissions cases, 2019-30, Mt CO₂-e



Source: CRU

6.80 In relation to the Scope 3 emissions in Scenario 3, the alternative supply would release an additional 28.5 million tonnes of CO₂-e into the atmosphere to 2030 (see **Figure 64** extracted from the CRU study below).

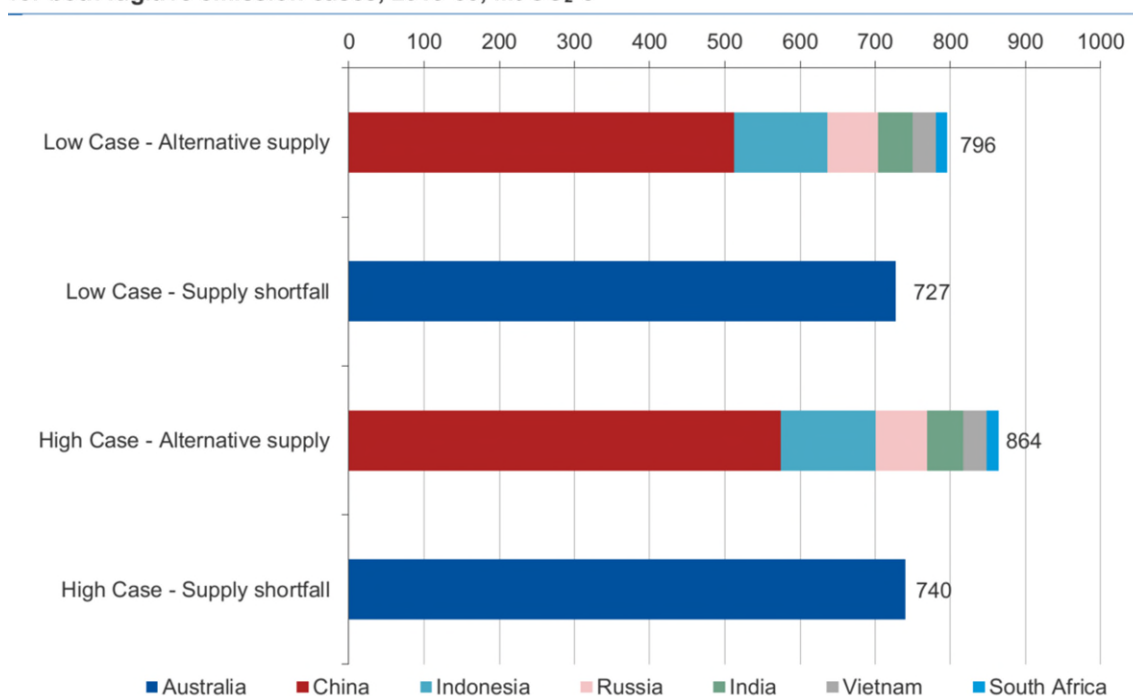
Figure 64 Scope 3 GHG emissions from coal use – Australia compared to alternative supply, 2019-30, Mt CO₂-e



Source: CRU

6.81 When combining Scope 1, 2 and 3 GHG emissions for Scenario 3, Scope 3 emissions comprise 96 to 98% of total GHG emissions. Overall, it is expected that substitution of the Australian supply shortfall by non-Australian coal will release between 68.6 and 124.1 million tonnes CO₂-e in the atmosphere over the 2019-2030 period (depending on the fugitive emissions case) (see **Figure 65** extracted from the CRU study below).

Figure 65 Scope 1, 2 & 3 emissions from Australian supply shortfall and alternative supply sources for both fugitive emission cases, 2019-30, Mt CO₂-e



Source: CRU

The uptake of HELE, CCUS and other low emission coal technologies in Asia and the Export Countries

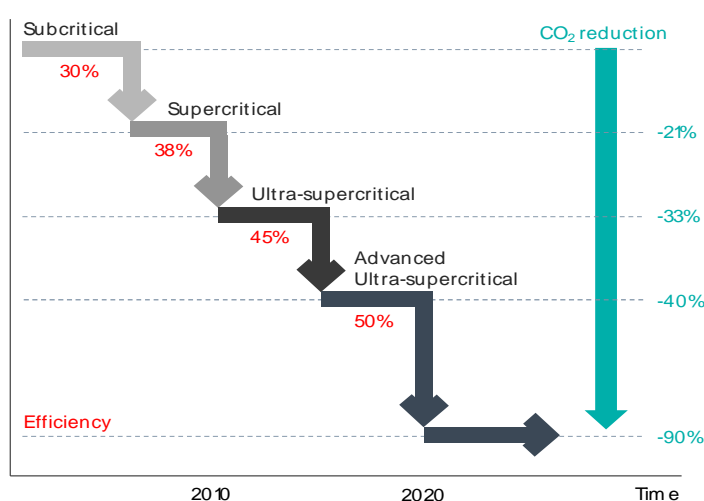
- 6.82 In Part B of this submission, the Applicant provided an overview of the climate change laws and policies which have been adopted by the Export Countries (to which coal from the Extension Project is likely to be exported) to meet their respective NDCs under the *Paris Agreement*.
- 6.83 A detailed account of the domestic climate change laws and policies which have been adopted by these countries has been annexed to these submissions in **Appendix 3**.
- 6.84 Before providing a summary of the main initiatives that have been implemented by these countries in relation to low emission coal technologies, it is worth briefly explaining two of the more important low emission coal technologies that are being deployed in these countries. They are:
- (a) high-efficiency, low-emissions (**HELE**); and
 - (b) carbon capture, use and storage (**CCUS**).
- 6.85 First, in relation to HELE:
- (a) HELE power plants have lower GHG emissions of all types per unit of power produced, including CO₂. Subcritical coal-fuelled power plants are not considered HELE, while supercritical (**SC**) and ultra-supercritical (**USC**) coal-fuelled plants with advanced emissions controls are considered to meet the HELE technology classification. Advanced ultra-supercritical (**A-USC**) coal-fuelled power plants are nearing commercial status and will be the most efficient plants once they are fully available.

- (b) Many coal-importing countries are leaders in the deployment of higher efficiency coal-fuelled power plants simply because power plants with higher efficiency require less coal per unit of electricity and reduce the fuel costs associated with electricity production.
- (c) Importantly, the higher efficiency plants result in lower CO₂ emissions per unit of electricity. According to the International Energy Agency Clean Coal Centre, "if a power producer decides to build a new SC or USC unit, it involves 13% and 19% fewer CO₂ emissions than a brand new subcritical unit respectively; and up to 40% fewer CO₂ emissions if the HELE unit is replacing an older plant."
- (d) Increasing the efficiency of coal-fuelled power plants is a well-understood approach to reducing CO₂ emissions. Under the Paris Agreement, it is the responsibility of each party to indicate how it will meet emissions reduction targets. Numerous countries that are major coal users (e.g. China, India and Japan) and customers of Australian coal have indicated a role for high-efficiency coal in their NDCs under the *Paris Agreement*.

6.86 Second, in relation to CCUS:

- (a) CCUS refers to the technological ability to capture CO₂ emissions from large point sources such as power stations and to store them for long periods of time in underground geological formations where they will not enter the atmosphere. The CO₂ could also be prevented from entering the atmosphere through means of beneficial reuse. CCUS is recognised as a means of mitigating the contribution of fossil fuel emissions to climate change.
- (b) CCUS applied to a contemporary power plant may prevent 90% or even more of CO₂ emissions from entering the atmosphere compared to power plants without CCUS. The two large-scale (i.e. at least 1 million tonnes per annum) CCUS projects operating at coal-fuelled power plants currently are designed to capture approximately 90% of the CO₂ from the treated flue gas.

6.87 The below figure from the World Coal Association's Fact Sheet on Coal and Climate Change³⁰ shows the efficiency gains that can be realised to substantially reduce CO₂ emissions when HELE and/or CCUS technology is deployed.



Source: World Coal Association

6.88 The IEA's Clean Coal Centre estimates that the installed capacity of HELE coal-fired power plants in South East Asia will increase to 2040 as shown in the following figure extracted from the IEA's report.³¹

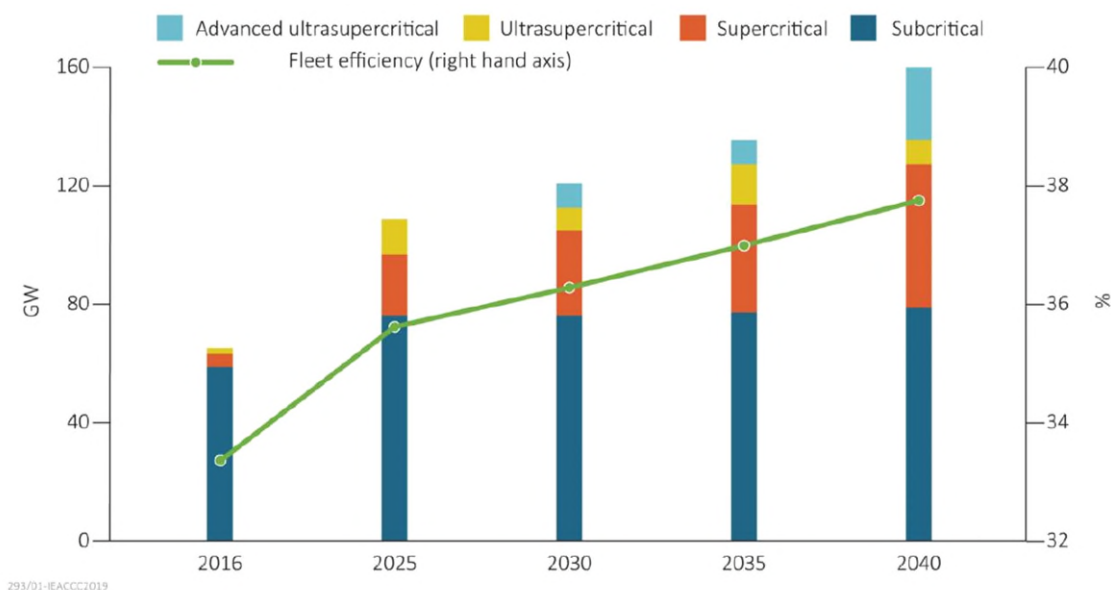


Figure 1 Installed and planned coal-fired capacity by technology and average fleet efficiency in South East Asia in the IEA's New Policies Scenario (Apportionment of ultrasupercritical (USC) and advanced ultrasupercritical (AUSC) plant author's estimates based on Barnes (2018)); (IEA, 2017a)

Source: IEA

6.89 The Applicant has summarised some of the main initiatives that have been implemented by these countries in relation to low emission coal technologies in the following table.³²

Country	Implementation of HELE, CCUS and other similar technologies
Japan	<ul style="list-style-type: none"> A global leader in the application of HELE coal-fueled power plants and built its first USC plant in 1993. 95% of the country's plants are HELE plants. Included high-efficiency coal as part of its contributions to the <i>Paris Agreement</i>. Japan's Fifth Strategic Energy Plan to 2050 recognises coal as an important fuel for baseload power generation. It is the stated policy of Japan to promote the conversion of its coal fleet to HELE technologies. The 'Rational Use of Energy' Policy provides that State approval for new coal-fired power stations will only be considered if state-of-the-art technologies are adopted (ultrasupercritical). Every electric power company is required to have

³¹ I Barnes, 'HELE Technologies and Outreach in Japan and South Korea' (International Energy Agency Clean Coal Centre, March 2019), <https://www.iea-coal.org/hele-technologies-in-japan-and-south-korea-2/>.

³² The content referred to in the table immediately below has been informed by the following sources: S&P Global Platts World Electric Power Plants Database, December 2018; M Wiatros-Motyka, 'An overview of HELE technology deployment in the coal power plant fleets of China, EU, Japan and USA' (December 2016); I Barnes, 'HELE Perspectives for Selected Asian Countries' (International Energy Agency Clean Coal Centre, May 2018); Global CCS Institute's Global Status Reports of 2018 and 2019: <https://www.globalccsinstitute.com/resources/global-status-report/>; I Barnes, 'HELE Technologies and Outreach in Japan and South Korea' (International Energy Agency Clean Coal Centre, March 2019); International Energy Agency Clean Coal Centre, 'Who's "Environmentally Backward"? Japan is Developing these New Energy Technologies' 26 February 2020: <https://www.iea-coal.org/whos-environmentally-backward-japan-is-developing-these-new-energy-technologies/>.

Country	Implementation of HELE, CCUS and other similar technologies
	<p>an average power generation efficiency of 44,3% or higher for all thermal power generation plants by 2030. This policy also required the power sector to agree on a GHG emissions cap consistent with Japan's 2030 energy mix and emissions targets.</p> <ul style="list-style-type: none"> • As at March 2019, a number of new USC coal-fired power projects were at various stages of development. Japan has long been at the forefront of newer integrated gasification combined cycle (IGCC) technology development. The 543 MW IGCC unit at the Nakoso Power Plant is scheduled for completion in 2020 and the 543 MW Hirono Power Plant is due to be completed in 2021. IGCC is said to be capable of reducing CO₂ emissions by approximately 15% compared to USC systems. • Long-term Low-carbon Vision, published in March 2017, refers to CCUS as a means of achieving emission reductions in the energy sector, as well as centralised/distributed energy management. • Long-term Strategy under the Paris Agreement was adopted on 11 June 2019 states that the Government will work to reduce CO₂ emissions from thermal power generation, including by accelerating "the efforts of a wide range of stakeholders, aiming to establish its first commercial scale CCU technology by 2023 as a trigger for wider usage in view of full social adoption in 2030 and thereafter." • Roadmap for Carbon Recycling Technologies published 7 June 2019 sets out specific goals for improving the competitiveness of CCUS; aiming to reduce the costs of CCUS to JPY 1000-2000/tCO₂ by 2030 and to JPY 1000/tCO₂ or lower by 2050. • Japan's second/updated NDC submitted to the UNFCCC on 31 March 2020 states that Japan "will strive to achieve a 'decarbonized society' as close as possible to 2050 with disruptive innovations, such as artificial photosynthesis and other CCUS technologies". • According to the Global CCS Institute's Global Status Reports of 2018 and 2019, Japan has achieved the following major milestones: <ul style="list-style-type: none"> ◦ commenced of CO₂ injections at the Tomakomai CCUS facility by Japan CCUS with the Ministry of Economy, Trade and Industry's full support – this is Asia's first full-cycle CCUS hydrogen plant, which will capture more than 300,000 tonnes of CO₂ by 2020. In 2019, it reached a capture milestone of 300,000 tonnes of CO₂, and continued intensive monitoring of storages; ◦ retrofitted the Toshiba Corporation 49MW Mikawa power plant in Omuta (Fukuoka Prefecture) to accept biomass (in addition to coal) with a carbon capture facility. Completion is expected in early 2020; ◦ launched JPOWER and Chugoku Electric Power Company's Osaka CoolGen facility, a 166 MW oxygen-blown IGCC (integrated gasification combined cycle) plant in Osakikamijima (Hiroshima Prefecture), which will separate and capture CO₂ from the end of 2019; ◦ completed construction of Toshiba's carbon capture and utilisation system at the Saga City Waste Incineration Plant (on Japan's Kyushu Island), using captured CO₂ for algae culture; and ◦ commencement of construction of the gasifier for the Hydrogen Energy Supply Chain project that plans to gasify Australian brown coal in Victoria's Latrobe Valley and transport it by ship to Japan for future decarbonised hydrogen developments. This project being developed by Kawasaki Heavy Industries (KHI), Electric Power Development Co. (J-Power), Iwatani Corporation, Marubeni Corporation, Sumitomo Corporation and AGL, with the support of the Governments of Japan, Australia and the State of Victoria. First hydrogen production is expected by 2021.

Country	Implementation of HELE, CCUS and other similar technologies
South Korea	<ul style="list-style-type: none"> As of December 2018, 83% of South Korea's coal-fuelled generation capacity was HELE and at least 90% of planned and under construction capacity is HELE. In the 5 years to 2023, at least 7 GW of HELE generating capacity is expected to come online in South Korea. The South Korean coal fleet has one of the world's largest shares of SC or USC coal-fired power generation in a single country. South Korea shares similarities with Japan in having a relatively young, high efficiency coal fleet in place. South Korea has one of only seven commercial IGCC projects worldwide with an installed capacity of 346.3 MW, which commenced operation in August 2016. There are plans to improve and commercialise the technology to a wider customer base. South Korea's NDC indicated that it would subsequently develop a detailed plan to implement its mitigation target. To this end, South Korea released a revised roadmap for achieving the 2030 National Greenhouse Gas Reduction Goal in July 2018 (the Roadmap). The Roadmap sets out sectoral targets, including emission reductions of 24 million tons in the energy conversion sector (power generation, group energy) through policies to reduce fine dust and promote the use of eco-friendly energy. National CCS Comprehensive Plan announced in July 2011 to promote research and development on CCUS with a view to commercialising the technology by 2020.³³ Final draft Integrated CCS Act published in 2018 will require yearly CCUS implementation plans.
Taiwan	<ul style="list-style-type: none"> Taiwan is not a member of the United Nations, consequently it cannot be a party to the UNFCCC or the Paris Agreement. Nevertheless, Taiwan put forward an intended nationally determined contribution (INDC) on 17 September 2015. HELE is included in Taiwan's INDC. As of December 2018, 31% of Taiwan's coal-fuelled generation capacity was HELE and 2.4 GW of planned and under construction capacity is USC HELE. Taiwan's EPA established a national CCUS strategic alliance in 2011. This alliance brings together domestic experts from government, academia and industry, for the purpose of developing the technology and regulatory framework required for the commercial use of CCUS technology, with the ultimate goal of achieving widespread use of CCUS technology by 2020. Through the alliance, the Taiwan Cement Corporation (in partnership with the Industrial Technology Research Institute) commissioned the world's first CCUS pilot project in the cement industry in 2013, with the two entities agreeing in 2016 to extend their cooperation on the project.

³³ Moonhyun Koh, Eunhae Shin and Woongchan Seo, 'Outline of Korean Integrated CCS Act Draft and Its Implication' *Energy Procedia* 154 (2018) 15-21.

7. **PART D: RESPONSE TO SUBMISSIONS MADE IN RESPECT OF GHG EMISSIONS, CLIMATE CHANGE, AND COAL DEMAND**

Overview

- 7.1 The initial stage of the public hearing was held by the IPC into the Extension Project on 4 and 5 February 2019. Numerous submissions made by members of the public, NGOs and other stakeholders at, and following, the initial stage of the public hearing raised the issue of GHG emissions, climate change impacts and the future demand for coal. Those submissions include:
- (a) the letter from the Environmental Defenders Office (**EDO**) to the IPC of 12 February 2019 (**EDO Letter**);
 - (b) the report by Emeritus Professor Steffen, dated 9 February 2019 and submitted by the Environmental Defenders Office on behalf of Lock the Gate Alliance (**Steffen Report**);
 - (c) the submission of Tim Buckley of the Institute for Energy Economic and Financial Analysis (**IEEFA**) dated February 2019 (**Buckley Submission**); and
 - (d) IEEFA's report titled "New South Wales Thermal Coal Exports Face Permanent Decline: Grim Outlook Prompts the Need for Transition" dated November 2018 (**IEEFA Report**)
 - (e) the letter from Lock the Gate Alliance dated 11 February 2019; and
 - (f) the letter from Boggabri Farming and Community Group (undated).
- 7.2 The EDO Letter states that the EDO was aware that Mr Roderick Campbell (among others) was also "providing advice to the IPC". However, no such advice from Mr Campbell appears to have been made available on the IPC's website. The Applicant reserves its right to make a response in respect of any submission from Mr Campbell.
- 7.3 Rather than address each submission individually, this Part D addresses the common themes or elements of those submissions.

Common themes raised by public submissions regarding GHG emissions, climate change and demand for coal

- 7.4 The following common themes or elements were contained in the public submissions that oppose the Extension Project:
- (a) Theme 1: anthropogenic climate change is a real phenomenon that is occurring and coal is one of the major sources of human-induced GHG emissions;
 - (b) Theme 2: in order for the "well below 2°C" goal of the *Paris Agreement* to be realised, no new fossil fuel developments should be approved, and those existing, already approved fossil fuel developments should be rapidly phased out;
 - (c) Theme 3: coal market substitution is speculative and should not be considered by the IPC;
 - (d) Theme 4: the approval of the Extension Project would be inconsistent with existing climate change laws and policies, particularly Australia's NDC and the NSW Climate Change Policy Framework;
 - (e) Theme 5: approval of the Extension Project creates a financial risk for the Applicant, existing coal mines in NSW, Australia and the local community; and

- (f) Theme 6: the IPC should follow *Rocky Hill* and refuse development consent for the Extension Project.

7.5 Each of these themes will be addressed in turn below.

Theme 1: anthropogenic climate change is a real phenomenon that is occurring and coal is one of the major sources of human-induced GHG emissions

7.6 Many of the submissions describe, at a high level, the science of climate change and the impacts that can be caused to the world's and Australia's climate and environments as a result of anthropogenic climate change. This was particularly the case in the Steffen Report: see especially paragraphs 7 to 32.

7.7 The Applicant does not contest that climate change is real and happening and that global GHG emissions must be reduced.

7.8 The Applicant considers that comments about the effects of anthropogenic climate change generally, which are not intelligently tied or made referable to the determination of the development application for the Extension Project, are of little to no assistance to the IPC's consideration of the impacts of the Extension Project.

7.9 The relevant impact to be assessed is the impact of the Extension Project. That involves considering the difference to the environment if the Extension Project goes ahead and if it does not. In that regard, the Applicant submits that:

- (a) its total contribution of Scope 1 emissions will be 0.099% of total GHG emissions in NSW and 0.024% of total GHG emissions for Australia, as set out in the Air Quality and Greenhouse Gas Assessment dated June 2018 (noting that the total ROM coal to be extracted has been revised downwards to 169 Mt ROM coal since the Air Quality and GHG Assessment was prepared, which resulted in a reduction of Scope 1 GHG emissions from 3.2 MtCO₂-e to 3.1 MtCO₂-e: see Amendment Report at 11);
- (b) the improved operational efficiency and the shorter life of mine of the Extension Project compared to the Approved Project will reduce the Applicant's Scope 1 GHG emissions by approximately 1 MtCO₂-e;
- (c) the life of the Extension Project will be completed before 2050, whereas the Approved Project would still be operating beyond that date, which is the target date for NSW achieving net zero emissions;
- (d) the incremental increase in total GHG emissions (including Scope 3) compared to the Approved Project is estimated to be approximately 98.3 MtCO₂-e;
- (e) the GHG Assessment did not take into account:
 - (i) the reduction in GHG emissions that would be attributable to the revegetation of previously cleared areas as part of biodiversity offset measures for the Extension Project; or
 - (ii) that the Extension Project will reduce the GHG emission intensities of the Tarrawonga Coal Mine by decreasing the distance that coal will need to be hauled by road from that mine for processing;
- (f) to the extent that the total Scope 1 emissions for the Extension Project will exceed 100,000 tCO₂-e in a year (which they are likely to after the fourth year of the Extension Project), then the Applicant must comply with the Federal government's Safeguard Mechanism by offsetting its emissions above a baseline set by the CER or otherwise managing compliance;

- (g) if the Extension Project does not proceed there will be no corresponding reduction in global GHG emissions in the atmosphere because the global demand for coal will be satisfied by other sources. Indeed, refusal of consent would likely result in a net increase in GHG emissions globally due to market substitution of the Extension Project's high quality coal with inferior quality coal (lower calorific value and higher ash and sulphur content), as discussed in **Part C** of this submission.
- 7.10 The Applicant readily acknowledges that coal mining projects, like other forms of development, generate GHG emissions. However, many of the submissions characterise the generation of Scope 3 GHG emissions from the Extension Project as being direct of the product of the coal mining activity. This is not an accurate characterisation. Coal is currently, and will continue to be for several decades, vital to the provision of affordable, reliable energy particularly to countries in the Asia-Pacific region. It is the world's demand for coal-fired electricity generation that is the main cause of Scope 3 GHG emissions.
- 7.11 This point was recognised by Member Smith of the Queensland Land Court, in the context of considering the Alpha coal mine, in the decision of *Hancock Coal Pty Ltd v Kelly & Ors and Department of Environment and Heritage Protection (No 4)* [2014] QLC 12, where he relevantly observed:
- [230] ... [I]t is the demand for electricity to the extent that it is met by coal-fired generators that causes the Scope 3 emissions, and the facts as set out in this case clearly show that Alpha is but one of a myriad of suppliers, both local and around the world, who will seek to meet this existing demand.
- [231] ... I must on the evidence of this case determine that it is the demand for coal-fired electricity, and not the supply of coal from coal mines, which is at the heart of the problem.
- [232] ... the clear and unambiguous facts of this case show that there will be no reduction of GHGs if the Alpha mine is refused, and, indeed, depending on the source of replacement coal, such replacement coal may well, on the evidence, result in an increase in GHG emissions.
- 7.12 The Applicant considers that the observations made by Member Smith are equally applicable to the Extension Project, and would submit that it is both open to, and appropriate for, the IPC to adopt the same approach to consideration of Scope 3 emissions that Member Smith did in the *Hancock Coal* case.
- Theme 2: in order for the "well below 2°C" goal of the Paris Agreement to be realised, no new fossil fuel developments should be approved**
- 7.13 The Applicant does not dispute that action needs to be taken to reduce GHG emissions globally in order for the "well below 2°C" goal of the *Paris Agreement* to be realised.
- 7.14 However, in circumstances where:
- (a) the *Paris Agreement* has not been enacted as part of the law of Australia, and parties to the *Paris Agreement* individually determine their national contribution to its goal in the form of an NDC;
 - (b) the development of new coal mines, or the continuation of existing coal mines, is not prohibited by the operation of international, Australian or NSW law or policy;
 - (c) the prohibition of new coal mines is not one of the many measures that Australia has adopted as part of its NDC under the *Paris Agreement*;
 - (d) indeed, to the contrary, NSW law or policy:

- (i) aims to "foster the significant social and economic benefits" to NSW "that result from the efficient development of mineral resources";³⁴ and
 - (ii) permits the carrying out of coal mining projects with development consent under the Mining SEPP; and
 - (iii) prescribes that the State's action on climate change will not undermine the NSW's \$36 billion mining sector and the jobs and communities it supports;³⁵
 - (e) the IPC must have regard to the objects of the Mining SEPP, which include:
 - (i) to facilitate the orderly and economic use and development of land containing mineral resources (such as coal); and
 - (ii) to promote the development of significant mineral resources; and
 - (f) the material produced in Part C of this submission demonstrates that the failure to approve the Extension Project would likely result in a net increase in GHG emissions (particularly Scope 3 emissions) due to market substitution of the Extension Project's high quality coal with inferior quality coal,
 - (g) the Applicant considers that any suggestion that the refusal of the development application would demonstrate a commitment on the IPC's part to take action to achieve the goal of the *Paris Agreement* is misconceived, at risk of giving rise to a legal error on the part of the IPC, and places at risk the realisation of the significant social and economic benefits that the Extension Project will deliver at a local, regional and State level.
- 7.15 In particular, the Applicant considers that the critique presented of the two arguments set out at paragraphs 59 to 62 of the Steffen Report is untenable in light of the detailed and specific material addressed in Part C of this submission.
- 7.16 In relation to the first argument critiqued in those paragraphs of the Steffen Report, Professor Steffen suggests that the argument of "my emissions are too small to matter" is flawed because all GHG emissions "are important because cumulatively they constitute the global total of greenhouse gas emissions, which are destabilising the global climate system at a rapid rate". There are some important points to make in response to that submission.
- 7.17 First, it is important to be clear as to which GHG emissions should be counted towards a given development's total of GHG emissions. Given that the intent of the climate change laws and policies set out in Part B of this submission is to avoid double counting of GHG emissions towards a country's NDC under the *Paris Agreement*, the GHG emissions that should be counted towards a development's total are the Scope 1 and 2 emissions, not Scope 3 emissions. In this regard, the Extension Project's Scope 1 and 2 emissions will be approximately 3 MtCO_{2-e} representing approximately 1% of all direct and indirect emissions associated with the Extension Project.

³⁴ *Mining Act 1992* (NSW), s 3A.

³⁵ *Net Zero Plan Stage 1: 2020–2030* (March 2020) at 22.

- 7.18 Secondly, when one considers and compares the Scope 1 and 2 emissions generated from different types of development, it is evident that some developments may produce more GHG emissions than others. Professor Steffen's position in this regard would suggest that it does not matter whether a given development that is reliant on fossil fuels for energy is large or small: no matter what size the development is, it will contribute GHG emissions and these emissions matter in the context of seeking to reduce GHG emissions worldwide. As a corollary to that point, Professor Steffen appears to take the position that any development that is reliant on fossil fuels for energy generation should be either refused (in the case of new development) or may be maintained (in the case of existing development) for a short period of time only, before being phased out completely.
- 7.19 Professor Steffen's position has legal and practical problems.
- 7.20 Legally, it is problematic because NSW planning laws do not prohibit or restrict (as distinct from regulate, pursuant to development consent conditions) the carrying out of fossil fuel development, including coal mines (nor, for that matter, does any other climate change law or policy considered in Part B of this submission).
- 7.21 More specifically, the carrying out of the Extension Project here is permissible with development consent under the Mining SEPP. The objects of the Mining SEPP include:
- (a) to facilitate the orderly and economic use and development of land containing mineral resources (such as coal); and
 - (b) to promote the development of significant mineral resources.
- 7.22 If Professor Steffen's approach of no new fossil fuel development is adopted by the IPC as a decision-making practice, it would mean that all development applications for fossil fuel developments would be rejected without being assessed on their own merits and such decisions would almost certainly be invalid in that:
- (a) the EP&A Act, the Mining SEPP and the *Mining Act 1992* (NSW) all contemplate that fossil fuel developments may be carried out with lawful authority in NSW; and
 - (b) a failure to entertain a development application for such fossil fuel development on its merits would amount in numerous legal errors rendering the IPC's decision invalid, including:
 - (i) a failure to have regard to all relevant considerations set out in s 4.15 of the EP&A Act;
 - (ii) a failure to accord the proponent of the proposed project with procedural fairness;
 - (iii) a constructive failure to exercise its decision-making power or jurisdiction; and
 - (iv) rigid adoption and application of a decision-making practice or policy without due regard to the circumstances or merits of the development application before it.
- 7.23 Indeed, the Court in *Rocky Hill* did not go so far as to accept Professor Steffen's evidence (which, by and large, is the same as the material produced in the Steffen Report in respect of the Extension Project). In *Rocky Hill*, the Court remarked on this aspect of Professor Steffen's evidence that (underline added):

[552] ... It gives priority to existing and approved fossil fuel developments, along the lines of "first in, best dressed". It also frames the decision as a policy decision that no fossil fuel development should ever be approved.

[553] I consider the better approach is to evaluate the merits of the particular fossil fuel development that is the subject of the development application to be determined. Should this fossil fuel development be approved or refused? Answering this question involves consideration of the GHG emissions of the development and their likely contribution to climate change and its consequences, as well as the other impacts of the development ...

7.24 Thus, the Applicant suggests that the position of Professor Steffen is fundamentally at odds with the decision-making framework of NSW planning laws.

7.25 Further, Professor Steffen's position also has practical problems. If the approach is to be adopted that any form of development – new or existing – that will be reliant on fossil fuels (either directly or indirectly) should be refused, then this could have crippling and devastating consequences for human populations that rely on fossil fuels as a reliable, affordable and efficient means for energy or electricity. It could result in many different forms of development, such as schools and hospitals, being without electricity, which would, in turn, have flow-on effects for human development globally. Such consequences would give rise to distributive injustice to different populations and undermine the achievement of intra-generational equity, which is one of the principles of ecologically sustainable development. Moreover, as the Department of Planning recognised in its Addendum Report on the Wallarah 2 Coal Project in considering the principle of inter-generational equity:

[The Department] recognises that there remains for the foreseeable future a clear need to continue to mine coal deposits to meet society's basic energy needs ... The Department also acknowledges that the downstream energy and other socio-economic benefits generated by the amended project would benefit future generations, particularly through the provision of international energy needs.

7.26 If Professor Steffen's position were to be applied equitably to all development applications, then consent authorities should also refuse all other types of development whose Scope 1, 2 and 3 emissions contribute to climate change. For example, all new commercial buildings and residential developments that are not carbon neutral should be refused, as the construction industry accounts for almost 20% of Australia's GHG emissions.³⁶ So many sectors of the Australian economy contribute to GHG emissions that applying Professor Steffen's approach to planning decisions would virtually halt all major development in NSW.

7.27 Thirdly, while the Applicant does make the point in its EIS that its contribution to Australia's GHG emissions "would be relatively small", the Applicant would not suggest that the GHG emissions that are generated by the Extension Project "do not matter" or are irrelevant. The Applicant takes the GHG emissions generated by the Extension Project seriously, which is why the Applicant has committed to implementing the following measures to mitigate its Scope 1 and 2 GHG emissions:

- (a) regular maintenance scheduling;
- (b) limiting the length of material haulage routes;
- (c) optimising ramp gradients for operating haul trucks;
- (d) improving fuel efficiency of haulage trucks and mine equipment, including implementing high efficiency motors; and
- (e) reducing engine idle times.

7.28 Further information about these mitigation measures can be found in the EIS for the Extension Project at section 4.10.3 (page 4-72).

³⁶ See Man Yu, Thomas Wiedmann, Robert Crawford and Catriona Tait 'The Carbon Footprint of Australia's Construction Sector' (2017) 180 *Procedia Engineering* 211-220;

- 7.29 These mitigation measures will be implemented in accordance with DPIE's recommended conditions of consent for the Extension Project that:
- (a) all reasonable steps are taken to improve energy efficiency and reduce Scope 1 and 2 GHG emissions of the Extension Project; and
 - (b) that an Air Quality and Greenhouse Gas Management Plan is prepared describing the measures to be implemented to ensure that best management practice is employed to minimise the Extension Project's Scope 1 and 2 GHG emissions and to improve the Extension Project's energy efficiency.
- 7.30 In addition to the mitigation measures outlined above:
- (a) the improved operational efficiency and the shorter life of mine of the Extension Project compared to the Approved Project will reduce the Applicant's Scope 1 GHG emissions by approximately 1 MtCO₂-e;
 - (b) revegetation of previously cleared areas as part of biodiversity offset measures would also assist with reducing the Extension Project's net GHG emissions although the effect of this has not been quantified;
 - (c) the Extension Project will reduce the GHG emissions intensity of the Tarrawonga Coal Mine as a result of reduced haulage distances to the Project CHPP instead of the Whitehaven CHPP (see section 4.10.2 of the EIS). This benefit was not quantified as part of the Air Quality and Greenhouse Gas Assessment for the Extension Project; and
 - (d) Whitehaven continues to integrate climate change considerations across its business, understanding potential risks, managing its operational energy and emissions footprint, supporting a suite of low emission technologies and playing a proactive role in public policy and regulatory developments, as set out in its 2019 Sustainability Report. Further details on Whitehaven's corporate initiatives concerning GHG emissions, including its support of HELE and CCUS may be found in **Appendix 5** to this submission.

Theme 3: Coal market substitution is speculative and should not be considered by the IPC

- 7.31 Professor Steffen argues (at [61] of the Steffen Report) that any suggestion that "another new coal resource... will be developed to take [the Extension Project's] place" is flawed because "it assumes that there is now, and will continue to be, a demand for new coal resources beyond those that already exist".
- 7.32 The Applicant has not *assumed* that there will be demand for coal as asserted by Professor Steffen. The independent IEA acknowledges that there will be continued demand for coal in both the Stated Policies Scenario and the Sustainable Development Scenario of the WEO 2019, which will need to be met by expansions of approved coal mines (such as the Extension Project) or the development of new coal mines (see paragraph 6.21 above). This has been confirmed by the independent forecasts prepared by CRU which are explained in **Part C** and summarised in **Appendix 4** of this submission.
- 7.33 The Applicant considers Professor Steffen's critique to be unconvincing and, in light of the evidence produced in Part C of this submission, unsustainable. In the absence of the Extension Project's coal becoming available on the market for export, the Applicant's prospective customers will simply source their coal from elsewhere and, as the evidence produced in Part C of this submission suggests, those customers would most likely need to rely upon, as a substitute, an inferior quality of coal which would, in relative terms, actually generate more GHG emissions than those that would be generated by the Extension Project.

- 7.34 In considering Scope 3 emissions as part of the public interest (alongside myriad other public interest considerations, including other objects of the EP&A Act), the IPC must have regard to the evidence before it and should not act against the weight of that evidence.
- 7.35 The Applicant has assessed the impacts of the Extension Project in absolute terms, as well as by comparing the estimated Scope 3 emissions if the Extension Project goes ahead and if it does not. Given that Scope 3 emissions are the result of third-party activities which are beyond the control of the Applicant, it is only reasonable and logical to compare the estimated Scope 3 emissions of the Extension Project to the estimated Scope 3 emissions that would likely occur in the absence of the Extension Project.
- 7.36 It would be inconsistent for the IPC to ignore the complexity of supply chain GHG emissions by, on the one hand, embracing the estimate of the Extension Project's Scope 3 emissions as incontrovertible fact and, on the other hand, rejecting the expert evidence of coal market substitution. In this regard, the Applicant reiterates that:
- (a) Scope 3 emissions will be generated by third parties using the Extension Project's product coal. This means that Scope 3 emissions relate to activities that are outside the operational control of the Applicant and are not the subject of the development application;
 - (b) estimating Scope 3 emissions inherently involves hypothetical assumptions about the actions of third parties;
 - (c) there are inherent uncertainties in the estimation of Scope 3 emissions which are based on forecasts and assumptions about the actions of third parties, particularly when matters such as technology and end uses are taken into account. For example, if the coal were exported and used in a supercritical coal-fired power station or in conjunction with carbon capture and storage, then the actual GHG emissions would likely be quite different than if used in a less-efficient, unabated power station;³⁷ and
 - (d) because Scope 3 emissions will be generated by third parties, considering the Scope 3 emissions of the Extension Project, should logically also include a consideration of what those third parties would do if the Extension Project were not approved. That is, whether those third parties would still emit GHG emissions if they were unable to purchase the Extension Project's product coal. This has been estimated by experts as set out in Part C of this submission.
- 7.37 Further, the Applicant is not required to establish with certainty that there will be coal market substitution if the Extension Project is not approved. Section 4.15(1)(b) of the EP&A Act requires the IPC to consider the *likely* impacts of the Extension Project, not the certain impacts. The courts have determined that the word "likely" used in various provisions in the EP&A Act (including in s 79C (now s 4.15)) means a real and not remote chance or possibility, rather than proof to a probability greater than 50 per cent.³⁸ The Applicant has established in Part C of this submission that coal market substitution is likely to occur if the Extension Project is not approved. Based on the evidence in Part C, the impact to the environment if the Extension Project does not go ahead will likely be worse in terms of GHG, ash and sulphur emissions.

³⁷ Uncertainty in the estimation of Scope 3 GHG emissions was pointed out in the letter from the Hon. Angus Taylor, Minister for Energy and Emissions Reduction to the Hon. Rob Stokes, Minister for Planning and Public Spaces dated 20 November 2019 being Appendix G2-3 to the Assessment Report.

³⁸ *Harika v Tupaea* (2003) NSWLR 675 per Mason P at [27]; *Hoxton Park Residents Action Group Inc v Liverpool City Council* (2011) 81 NSWLR 638 at [46]; *Fullerton Cove Residents Action Group Incorporated v Dart Energy No 2* (2013) 195 LGERA 229 at [227]–[229]; *Harrison Perdikaris* [2015] NSWLEC 99 at [68].

Theme 4: Approval of the Extension Project would be inconsistent with existing climate change laws and policies

- 7.38 This theme has already been addressed in the context of discussing Theme 3 above. As pointed out there, and in Parts A and B of this submission:
- (a) there is nothing in existing climate change laws and policies which prohibits the approval of new coal mining development; and
 - (b) the prohibition of new coal mines is not one of the specific mechanisms or measures that Australia has adopted for the specific purpose of meeting its NDC under the *Paris Agreement*;
 - (c) indeed, to the contrary,
 - (i) the Federal government's Safeguard Mechanism which will apply to the Extension Project when its GHG emissions exceed 100,000 tCO₂-e is one of the measures that Australia has adopted to meet its NDC under the *Paris Agreement*;
 - (ii) NSW planning laws recognise that the carrying out of coal mining projects is permitted with development consent; and
 - (iii) NSW's Net Zero Plan Stage 1 states that it is important that the State's action on climate change does not undermine the State's mining businesses and the jobs and communities they support; and
 - (d) the objects of the Mining SEPP include:
 - (i) to facilitate the orderly and economic use and development of land containing mineral resources (such as coal); and
 - (ii) to promote the development of significant mineral resources.

Theme 5: Approval of the Extension Project creates a financial risk for the Applicant, existing coal mines in NSW, Australia and the local community

- 7.39 This theme arises from the Buckley Submission and the IEEFA Report. The following arguments are made in those documents:
- (a) the IEA's WEO 2019 Sustainable Development Scenario is the most likely future and it forecasts that the seaborne thermal coal market will more than halve by 2040;
 - (b) global financial institutions are increasingly divesting from coal projects;
 - (c) cheaper renewable energy technologies will make thermal coal uncompetitive;
 - (d) flooding the seaborne market with a new supply of thermal coal will lower the value of Australia's existing coal mining businesses; and
 - (e) the likelihood of stranded assets are creating significant risks for Australia and the local community.
- 7.40 The Applicant submits that Mr Buckley's and IEEFA's arguments are unpersuasive and not supported by the evidence.

- 7.41 First, the WEO 2019 is not and never has been a forecast of the likely future (but rather an illustration of different carbon reduction pathways). Mr Buckley offers no evidence to support his belief that the IEA's Sustainable Development Scenario is the most likely future, apart from the collection of announcements of new policy, all of which would already be captured in the IEA's Stated Policies Scenario. The economic forecasting carried out by CRU shows that future demand for coal actually aligns more closely with the IEA's Stated Policies Scenario. The IEA's commentary on the Stated Policies Scenario clearly states that, despite incorporating announced climate change policies, demand for coal is expected to continue to grow as a result of overarching structural trends of population growth, urbanisation and economic growth. As Part C of this submission demonstrates, there is a clear global demand for coal that will not be met by existing mines. Even in the Sustainable Development Scenario, there will be continued demand for coal that will not be met at 2040 by existing mines. Accordingly, any assertion that demand for coal will fall so as to make the Extension Project unviable, is not supported by the evidence.
- 7.42 Secondly, although some institutions are divesting from coal projects, the WEO 2019 states that financing restrictions for coal projects based on the preferences of lenders and their shareholders is not yet an issue affecting projects in China and India, and that financing restrictions in developed economies could provide an opening for Russian, Indian and Indonesian coal producers to increase their market share.
- 7.43 Thirdly, there is simply no evidence that the Extension Project would result in a flooding of the seaborne market with a new supply of thermal coal which would lower the value of Australia's existing coal mining businesses. Australia's export coal supply is small relative to global coal production and fluctuations in the supply of Australian coal have relatively little impact on demand (and therefore coal prices). In this regard, see paragraph 6.54 in Part C above. Whitehaven is a large and successful Australian mining company and its views on the economics of its projects should be preferred to those expressed by Mr Buckley.
- 7.44 Fourthly, in support of their assertion that the Extension Project is at risk of becoming a stranded asset, Mr Buckley and IEEFA proffer a list of policy announcements and new projects in India, Japan and South Korea relating to the uptake of renewable energy. Again, those policy announcements and any trends regarding the uptake of renewable energy are already captured by the Stated Policies Scenario of the WEO 2019, which recognises the increasing share of electricity generated by renewable sources but nevertheless projected a continuing demand (although declining share) for coal-fired power (as set out in Part C of this submission). These projections are supported by CRU's forecasts.
- 7.45 By including policy announcements only about renewable energy, Mr Buckley's submission is overly selective and does not provide an accurate picture of trends in demand for different sources of energy. Needless to say, energy policies are complex and often include a broad mix of energy-generation technologies. For example, although India seeks to increase electricity from renewable sources (as Mr Buckley has pointed out), India will also double its production of coal by 2040 on the strength of government output targets. Coal India Limited, a state-owned company, remains the largest coal producer in the world by tonnes and India will overtake China by the mid-2020s to become the world's largest coal importer (WEO 2019, pp 220, 225, 226, 240).
- 7.46 Coal is a commodity and potential future coal prices (taking into account all the factors that may cause fluctuation including competing sources of energy and climate change policy) have already been considered in the Applicant's investment decisions and indeed in the Economic Assessment for the Extension Project at Appendix J to the EIS. That Economic Assessment included a coal price sensitivity analysis to account for potential fluctuations in coal prices, including due to potential future climate change policies.

- 7.47 In any event, it is for the Applicant to make its own assessment of the economic viability of the Extension Project and then decide whether it wishes to proceed to seek development consent for the Extension Project. The Applicant has undertaken that course of action in lodging the development application for the Extension Project.
- 7.48 Lastly, it should be noted that the Buckley Submission and the IEEFA Report focus on thermal coal and they do not address demand for metallurgical coal. However, as established in Part C:
- (a) the Extension Project's coal product will comprise thermal coal and SSCC at an indicative life of mine ratio of 40:60;
 - (b) steel will remain an important material for global development, particularly in South East Asia;
 - (c) 70% of global crude steel is produced through the blast furnace-basic oxygen furnace route which is heavily dependent on coking coal (SSCC and HCC);
 - (d) global demand for carbon crude steel (crude steel, excluding stainless steel) is expected to grow steadily at a compound annual growth rate of approximately 1% from 2018 to 2040;
 - (e) the IEA projects that industrial coal use which today accounts for around one-third of coal consumption, increases by some 225 Mtce to 2040 in the Stated Policies Scenario, as coal remains the backbone of steel and cement manufacturing;
 - (f) the scope to shift away from coal by making greater use of scrap-based or direct reduction of iron (DRI)-based electric arc furnaces is limited by the availability and cost of scrap steel, as well as the cost competitiveness of electricity;
 - (g) despite the share of steel produced by blast furnace-basic oxygen furnace declining in the long term, as electric arc furnace steelmaking grows, there will continue to be a significant requirement for new iron units from coal produced by blast furnace-basic oxygen furnaces (as opposed to iron from recycled steel which is used in electric arc furnace steelmaking);
 - (h) given the relatively young age of the installed capacity of blast furnace-basic oxygen furnaces in Asia, much of the future demand for steel is forecast to be met by this existing capacity;
 - (i) by 2040, the blast furnace-basic oxygen furnace process will still account for approximately 57% of global steel production; and
 - (j) there is a limit to the amount of HCC that can be used in a coke blend. A coke blend containing approximately 15-20% SSCC is the likely technical, minimum level of SSCC that can be used in highly efficient blast furnaces;
 - (k) the Extension Project's SSCC is low in sulphur, ash and phosphorus, which makes it one of the most marketable SSCC products globally;
 - (l) the GHG emissions intensity of steelmaking increases with ash content of the SSCC used; and
 - (m) given the Extension Project's SSCC's low ash levels compared to the rest of the world, the Scope 3 GHG emissions of the Extension Project's SSCC could be, on average, 13 kg CO₂-e lower per tonne of hot metal produced than other SSCC globally.

Theme 6: the IPC should follow *Rocky Hill* and refuse development consent for the Extension Project

- 7.49 Opponents of the Extension Project argue that the IPC should follow *Rocky Hill* having regard to the GHG emissions of the Extension Project and in the interest of consistency in administrative decision-making.
- 7.50 Consistency in administrative decision-making would not require the same outcome for the Extension Project as that which occurred in *Rocky Hill*. For consistency in administrative decision-making to be achieved, like cases need to be treated alike. The Extension Project and the Rocky Hill Coal Project are very different developments. The Rocky Hill Project was proposed to be developed in the Gloucester Valley, close to the town of Gloucester; a location that was considered to be incompatible with other land uses in the vicinity of the development, contrary to cl 12 of the Mining SEPP. The Department of Planning's assessment report recommended that development consent to the Rocky Hill Coal Project be refused. The Court found that the mine would have significant adverse impacts on the visual amenity and rural and scenic character of the valley, significant adverse social impacts on the community and particular demographic groups in the area, and significant impacts on the existing, approved and likely preferred uses of land in the vicinity of the mine. The Court also found that (at [421]):
- although the [Rocky Hill Coal Project] has the potential to generate some positive social benefits, including from the local economy and employment, these benefits will be outweighed by the significant negative social impacts that the Project will cause.
- 7.51 The purpose of this submission is not to describe all the differences between the Extension Project and the Rocky Hill Coal Project because, in determining the development application for the Extension Project, the IPC is not required to refer to *Rocky Hill*, distinguish *Rocky Hill* on its facts, or otherwise opine that the decision in *Rocky Hill* was wrong.³⁹ The differences set out in paragraph 7.50 above are not exhaustive. They merely illustrate that the Extension Project is different to the Rocky Hill Coal Project such that following *Rocky Hill* would not achieve consistency in administrative decision-making.
- 7.52 The IPC is required to consider the merits of the Extension Project itself, taking into consideration the matters set out in s 4.15 of the EP&A Act as are of relevance to the Extension Project. This is the best way to achieve consistency in planning decisions. Indeed, the NSW Court of Appeal has acknowledged that applying ministerial policy, such as the Mining SEPP, is one of the most useful aids in achieving consistency with other decisions in comparable cases.⁴⁰

³⁹ *Segal v Waverley Council* (2005) 64 NSWLR 177 at [56].

⁴⁰ *Segal v Waverley Council* (2005) 64 NSWLR 177 at [52].

8. **PART E: WEIGHING THE BENEFITS OF THE EXTENSION PROJECT AGAINST GHG EMISSIONS AND CLIMATE CHANGE CONSIDERATIONS**

8.1 The Extension Project has been subject to extensive environmental impact assessment that has been carried out over the course of the last four years, since the Project Description and Preliminary Environmental Assessment for the Extension Project was prepared and finalised in January 2016. The key features of the Extension Project have already been described and assessed elsewhere in documents before the IPC, particularly the Applicant's Environmental Impact Statement, its Submissions Report, Amendment Report and its submission in response to the points of interest raised by the IPC following the public meeting hearing held on 4 and 5 February 2019.

8.2 It is not intended, in this submission, to repeat the impact assessment material that is before the IPC. Rather, in this Part E of the submission, we only provide a brief summary of some of the benefits of the Extension Project that weigh against climate change considerations and, therefore, to assure the IPC that there is more than sufficient material before it to grant development consent to the Extension Project.

More efficient extraction of coal

8.3 Compared to the Approved Project, the Extension Project will maximise recovery and result in a more efficient extraction of ROM coal reserves within the mining tenements, with an additional 33 million tonnes of ROM coal extracted over a life-of-mine that is five years shorter than the Approved Project.

Land use and final landform

8.4 The Extension Project is located in a part of the Gunnedah Basin that has been subject to extensive coal mining operations for more than 30 years. The Extension Project is to be undertaken partly across two existing mine sites (for which the mining tenements are already held by the proponents) and there are other mining operations in the vicinity of the Extension Project, including the Rocglen Coal Mine (see Figure 2 of the Submissions Report). Mining is thus, for the purposes of clause 12 of the *Mining SEPP*, an already existing and approved use in the area where the Extension Project is proposed to be carried out, and is likely to continue to be a preferred land use in that area in the coming decades.

8.5 The EIS for the Extension Project concluded at section 5.1.5 of Annexure 5 that, while other land uses in the vicinity of the Extension Project include the Vickery State Forest and grazing and cropping, the Extension Project is not incompatible with existing, approved or likely preferred land uses in the vicinity of the development, including because there would be no significant impacts on land uses in the vicinity of the Extension Project. Similarly, the Assessment Report stated (at 154) that the Extension Project "could be managed to minimise any potential land use conflicts and meet the aims, objectives and provisions of clause 12" (see also p 13 of the Assessment Report).

8.6 The Extension Project is also an extension (over a shorter 25-year life of mine) of the Approved Project, which would involve open cut mining with annual ROM coal production of 4.5 million tonnes per annum (Mtpa) over a 30 year mine life. ROM coal from the Approved Project is approved to be transported by road to the Whitehaven Coal Handling and Preparation Plant (**CHPP**) located 5 km north-west of Gunnedah.

8.7 Once the Extension Project's CHPP, train load-out and rail spur infrastructure reach full operational capacity, the Extension Project will remove the need for ROM coal to be transported on public roads to be processed at the Whitehaven CHPP.

8.8 As noted in Section 1 of the EIS, parts of the area to be mined by the Extension Project have been disturbed by previous mining activities of:

- (a) the former Vickery Coal Mine at which:

- (i) a small underground mining operation was carried out from 1986 to 1991;
 - (ii) approximately 4 million tonnes (Mt) of coal was extracted from three additional open-cut areas from 1991 to 1998
 - (iii) extraction ceased in 1998; and
 - (b) the former Canyon Coal Mine, which was operated by Whitehaven between 2000 and 2009.
- 8.9 Following the cessation of extraction, the former Vickery Coal Mine and the Canyon Coal Mine were rehabilitated, returning disturbed areas to groundcover suitable for grazing and woodland areas. Five final voids and some supporting infrastructure and access roads associated with previous mining remain.
- 8.10 At the cessation of mining for the Extension Project, one final void would remain in the south-eastern corner of the open cut (in addition to the existing Blue Vale final void). The Extension Project would therefore reduce the number of final voids in comparison to the five final voids in the current landscape and three voids for the Approved Project. The final landform will be a contiguous undulating final landform that seeks to blend with the natural topography of the surrounding land.

Social and economic benefits

- 8.11 The Extension Project will result in significant social and economic benefits at a local, regional and State level. One of the key benefits of the Extension Project is the economic benefit to the State and region associated with job creation, capital expenditure, ongoing operational expenditure and employee expenditure.
- 8.12 As noted in the EIS, the Extension Project will provide approximately 450 full-time equivalent positions during peak production (an increase of approximately 200 personnel compared to the Approved Mine), plus additional contract personnel. Over the life of the Extension Project, it is projected to generate an additional approximately 181 full-time equivalent jobs in the region, and approximately 316 full-time equivalent jobs in NSW. The Extension Project may provide for the on-going employment of existing Whitehaven employees working at the Rocglen Coal Mine, which is nearing the end of its approved operational life.
- 8.13 The Extension Project will also require an additional construction workforce of up to approximately 500 full-time equivalent personnel during the construction phase.
- 8.14 The Extension Project will contribute an estimated total net economic benefit for the NSW community of approximately \$1.16 billion (in net present value terms) with an increase of the net economic benefit to NSW of \$454 million compared to the Approved Project. For the local region, the Economic Assessment estimated net economic benefits at \$227 million or \$203 million in the Project Region or SA3 region, respectively.⁴¹ Importantly, this means that the benefits for both NSW and the local region in net present value terms are estimated to exceed the costs of the Extension Project borne by NSW and the local region.

⁴¹ The Amendment Report p 11 states that there are no changes to employment benefits accrued to the NSW workforce, attributed to salaries and wages (including disposable income, personal income taxes and Medicare contributions); taxation benefits and land taxes/shire rates paid to NSW and local government; net benefits of the Project that would accrue to the local region; and potential economic impacts on agriculture in the local region.

- 8.15 The Economic Assessment dated August 2018 prepared by AnalytEcon at Appendix J to the EIS incorporated the cost of GHG emissions to NSW (modelling high, low and moderate carbon prices) and included a sensitivity analysis to account for potential fluctuations in coal prices, including due to potential climate change policies. The calculated net value to NSW incorporates this analysis, which means that a significant benefit will accrue to NSW even if coal prices are affected by climate change.

Consequence of not carrying out the Extension Project

- 8.16 Clause 7(c) of Sch 2 of the *Environmental Planning and Assessment Regulation 2000* (NSW) requires that an environmental impact statement include (underline added):
- an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives including the consequences of not carrying out the development, activity or infrastructure.
- 8.17 Alternatives to the Extension Project (including a no-project alternative) were considered in sections 6.1.7 and 6.1.11 of the EIS. The IPC should have regard to that analysis.⁴² In particular, if the Extension Project is not approved, Whitehaven would be entitled to carry out the Approved Project with the consequence that the benefits of the Extension Project compared to the Approved Project would be foregone, including:
- (a) the additional 33 Mt of ROM coal would not be mined;
 - (b) the 33 Mt of ROM coal not mined to meet global demand would likely result in a net increase in GHG, sulphur and ash emissions due to market substitution of the Extension Project's high quality coal with inferior quality coal;
 - (c) approximately 200 additional operational employment opportunities would be foregone and the associated flow on effects would be lost;
 - (d) an incremental peak of up to 500 direct construction employment opportunities (from 60 for the Approved Project) and associated flow on effects would not be created;]
 - (e) the opportunity to reduce haul truck movements along public roads associated with transporting ROM coal from the Approved Project and Tarrawonga Mine to the Whitehaven CHPP, and the associated operational efficiency improvement, would not be realised;
 - (f) additional flow-on net benefits of \$454 million compared to the Approved Project would be foregone;
 - (g) additional tax revenue from the Extension Project would not be generated;
 - (h) additional royalties to the State of NSW would not be generated;
 - (i) three final voids would remain in the landscape (five if the Approved Mine was not to proceed) as opposed to two following completion of the Extension Project;
 - (j) the potential incremental environmental and social impacts described in this EIS for the Extension Project would not occur;
 - (k) economic and social benefits to the Gunnedah and Narrabri LGAs associated with the Extension Project would not be realised;

⁴² See e.g., *Nessdee Pty Ltd v Orange City Council* [2017] NSWLEC 158, [92]–[121].

- (l) the incremental benefits of the Extension Project biodiversity offset strategy and other revegetation areas would not be realised; and
- (m) mining will extend beyond 2050, which is NSW's target date for achieving net zero emissions. This would not be the case with the Extension Project.

Conclusion

- 8.18 As noted in Part A of this submission, it is for the IPC to engage in an "intuitive synthesis" of weighing all of the various positive and negative impacts associated with the Extension Project. Climate change impacts and GHG emissions are just one of many different factors that the IPC may take into account. Certainly, climate change impacts and GHG emissions should not be the single determinative consideration for the IPC in making a decision in respect of the development application for the Extension Project.
- 8.19 The Applicant considers that, in light of the benefits of the Extension Project summarised above and as detailed elsewhere in the material before the IPC, the positive aspects associated with the Extension Project clearly outweigh the negative aspects associated with the Extension Project, and that the Extension Project should be approved.
- 8.20 Not proceeding with the Extension Project would result in a failure to realise these significant benefits for the local, regional and State economy, including approximately 450 operational employment positions and \$1.16 billion in economic benefits to NSW (in net present value terms).
- 8.21 The Assessment Report states (at [715]):

Overall, the Department considers that the GHG emissions for the Project have been adequately considered and that, with the Department's recommended conditions, are acceptable when weighed against the relevant climate change policy framework, objects of the EP&A Act (including the principles of ESD) and socio-economic benefits of the Project.

APPENDIX 1: COMMENTARY ON ROCKY HILL AND WALLARAH 2

Preliminary observations by way of context

- 1.1 In *Gloucester Resources Limited v Minister for Planning* [2019] NSWLEC 7 (**Rocky Hill**), the Court refused consent to the Rocky Hill Coal Project for numerous reasons. In particular, the Court found that the "significant and unacceptable planning, visual and social impacts" of that project warranted refusal for those reasons alone (at [556]). While it was unnecessary for the Court to do so, and did not affect the outcome which the Court had already arrived at, the greenhouse gas (**GHG**) emissions of the Rocky Hill Project and their contribution to climate change was "a further reason for refusal" (at [556]).
- 1.2 As the IPC would be aware, there has been much commentary in the media about the decision of the Court in *Rocky Hill*. A significant proportion of that commentary has been misleading in reporting the findings of the Court in the case, or exaggerating the implications of the findings made on climate change and GHG emissions in that case for future coal mining projects in NSW and, to a lesser extent, other jurisdictions in Australia.
- 1.3 Generally speaking, a significant proportion of the media commentary has reflected the following observations about *Rocky Hill*:
- (a) the decision sets a new precedent;
 - (b) the decision is the first time a court in Australia has considered the climate impacts of coal mining and is a landmark case that will set a very high hurdle for any future coal mine to obtain development consent;
 - (c) the decision will generally be applicable to any new coal mine in Australia; and
 - (d) a key reason given by the Court for refusing the Rocky Hill Coal Project was the climate change impacts and GHG emissions generated by the project.
- 1.4 Each of these observations is either wrong, misleading or overstated.

Rocky Hill did not set a new legal precedent

- 1.5 First, it should be recognised that *Rocky Hill* did not set a new, legal precedent that the IPC is obliged to follow or even consider in determining the development application for the Extension Project.
- 1.6 This is because *Rocky Hill* was a merit appeal in Class 1 of the Court's jurisdiction. When the Court determines these types of appeals, it exercises a form of administrative decision-making power, rather than judicial power.⁴³ The role of the Court in a merit appeal is to "stand in the shoes" of the consent authority and exercise the same functions as the consent authority to reach a determination about whether a particular project should, on its merits, be permitted.
- 1.7 This means that the decision in *Rocky Hill* is equivalent to a decision of a consent authority and therefore does not set any new, legal precedent. As far back as 1960, the courts in NSW have recognised that, in the context of applications made for development consent or planning permission, "each application must be considered on its individual merits and ... there is no such thing as binding precedent in these matters".⁴⁴

⁴³ *Ku-ring-gai Council v Bunnings Properties Pty Ltd* [2019] NSWCA 28 at [182] per Preston CJ of LEC (Beazley P agreeing). See also Linda Pearson and Peter Williams, 'The New South Wales planning reforms: Undermining external merits review of land-use decision-making?' (2009) 26 EPLJ 19 at 27.

⁴⁴ *Shellcove Gardens Pty Ltd v North Sydney Municipal Council* (1960) 6 LGRA 93 at 104 per Sugerman J.

- 1.8 It follows that the IPC is not obliged to refer to or consider *Rocky Hill*, nor is it obliged to follow any of the Court's findings in *Rocky Hill* in determining the development application for the Extension Project.
- 1.9 The IPC is, in accordance with law, obliged to consider the development application for the Extension Project on its own individual merits. The IPC is entitled to take a different approach to the issues of climate change and GHG emissions than the Court did in *Rocky Hill*, as the decision in *Wallerah 2* confirms.
- 1.10 In *Australian Coal Alliance Inc v Wyong Coal Pty Ltd* [2019] NSWLEC 31 (***Wallerah 2***), the NSW Land and Environment Court upheld the Planning Assessment Commission's (**PAC's**) decision (as the Minister for Planning's delegate) to grant development consent to the Wallarah 2 Coal Project. The Court rejected all three grounds of judicial review concerning the PAC's consideration of GHG emissions and climate change.
- 1.11 The status of *Rocky Hill* can be contrasted with *Wallerah 2*. *Wallerah 2* was a judicial review challenge in Class 4 of the Court's jurisdiction. The Court's role was to exercise judicial power in reviewing the PAC's decision to determine whether any legal error was made by the PAC in approving that project.
- 1.12 Therefore, *Wallerah 2* constitutes binding legal precedent (established after the judgment in *Rocky Hill* was handed down) in which the Court found that there was no legal error in a consent authority approving a coal mining project that has Scope 3 emissions, even where:
- (a) the combustion of its coal was predicted to generate Scope 3 emissions significantly greater (by a factor of 7) than those of the Rocky Hill Coal Project; and
 - (b) there was no proposal to offset those emissions by way of afforestation of land or otherwise.
- 1.13 Further, the consent authority, in determining the development application for the Wallarah 2 Coal Project:
- (a) considered and applied the concept of market substitution in arriving at its decision to grant development consent;
 - (b) acknowledged that Scope 3 emissions from the combustion of coal (including any potential to abate those emissions) should be dealt with at the location where those emissions are generated or at higher policy levels; and
 - (c) in relation to the principle of ESD, the PAC's Determination Report under the heading "intergenerational equity" (extracted at [99] in the judgment), stated:
- The Department acknowledges that coal and other fossil fuel combustion is a known contributor to climate change, which has the potential to impact future generations. However, it also recognises that there remains for the foreseeable future a clear need to continue to mine coal deposits to meet society's basic energy needs. The Department also notes that climate change is a global phenomenon, the project's contribution to climate change would be very small and that WACJV has considered greenhouse gas mitigation measures. The Department also acknowledges that the downstream energy and other socio-economic benefits generated by the amended project would benefit future generations, particularly through the provision of international energy needs.
- 1.14 This approach did not give rise to any error of law on the part of the PAC.⁴⁵

⁴⁵ (see generally [49]-[66] (at [79]) (at [84]))

- 1.15 Even if *Rocky Hill* were legal precedent (which it is not), the findings made by the Court in *Rocky Hill* in relation to climate change and GHG emissions cannot be considered, on any fair reading of the decision, to form the essential reason for refusing development consent.
- 1.16 The Court's decision makes very clear (at [556]) that the "significant and unacceptable planning, visual and social impacts" were the essential reasons why the Court refused to grant consent to the Rocky Hill Coal Project. The remarks on climate change and GHG emissions were observations that did not form part of the essential reasons for the decision. Because of this, even if *Rocky Hill* were legal precedent (which it is not), only the parts of the judgment that constitute the essential reasons for the decision would be binding.
- 1.17 Although the Court in *Rocky Hill* engaged in an intuitive synthesis of the relevant factors before reaching a decision, it does not follow that all the factors were weighted equally by the Court in reaching its decision and are therefore all, equally, the essential reasons for the refusal of consent.

Rocky Hill is not the first time an Australian court has considered the impacts of coal mining on climate

- 1.18 Secondly, in relation to the claim that the decision is the first time a court in Australia has considered the climate impacts of coal mining and is a landmark case that will set a very high hurdle for any future coal mine to obtain development consent, this overstates the position.
- 1.19 *Rocky Hill* is not the first case to consider climate change issues associated with a new coal mine. Objections to new coal mines on climate change grounds have been relatively common over the past 10 years, and a number of courts throughout Australia have considered these issues previously, including both in the context of merit appeals (like *Rocky Hill*) and judicial review proceedings.
- 1.20 A non-exhaustive list of examples of Australian cases where climate change impacts have been considered in the context of coal mining projects is produced below:
 - (a) *Wildlife Preservation Society of Queensland Proserpine/Whitsunday Branch Inc v Minister for the Environment & Heritage* [2006] FCA 736;
 - (b) *Gray v Minister for Planning and Ors* [2006] NSWLEC 720;
 - (c) *Anvill Hill Project Watch Association Inc v Minister for the Environment and Water Resources* [2007] FCA 1480;
 - (d) *Hunter Environment Lobby Inc v Minister for Planning* [2011] NSWLEC 221;
 - (e) *Hunter Environment Lobby Inc v Minister for Planning (No 2)* [2012] NSWLEC 40;
 - (f) *Xstrata Coal Queensland Pty Ltd v Friends of the Earth, Brisbane Co-op Ltd & Ors* [2012] QLC 13 (**Xstrata**);
 - (g) *Hancock Coal Pty Ltd v Kelly & Ors and Department of Environment and Heritage Protection (No 4)* [2014] QLC 12;
 - (h) *Adani Mining Pty Ltd v Land Services of Coast and Country Inc & Ors* [2015] QLC 48;
 - (i) *Coast and Country Association of Queensland Inc v Smith* [2016] QCA 242;
 - (j) *Australian Conservation Foundation Incorporated v Minister for the Environment* [2016] FCA 1042;

- (k) *Australian Conservation Foundation Incorporated v Minister for the Environment and Energy* [2017] FCAFC 134;
 - (l) *New Acland Coal Pty Ltd v Ashman & Ors and Chief Executive, Department of Environment and Heritage Protection (No 4)* [2017] QLC 24;
 - (m) *Wollar Progress Association Incorporated v Wilpinjong Coal Pty Ltd* [2018] NSWLEC 92; and
 - (n) *Australian Coal Alliance Incorporated v Wyong Coal Pty Ltd* [2019] NSWLEC 31.
- 1.21 Some of these cases were referred to by the Court in *Rocky Hill*, and others were not. On the whole, the climate change objections raised by persons in respect of new greenfield coal mines, or expansion of approved coal mines, were unsuccessful, generally because either:
- (a) the Court, exercising administrative power in a merit appeal type context, was satisfied, on the evidence before it, that the mine should be approved on the merits and did not consider that the climate change impacts or GHG emissions generated by the mine, or the combustion of the mine's coal by other developments, outweighed the benefits of allowing the mine to proceed; or
 - (b) the Court, exercising judicial power in a judicial review context, was not satisfied that an approval authority committed an error of law by failing to consider the climate change impacts or GHG emissions generated by the mine, or the combustion of the mine's coal by other developments, when determining to grant approval to the mine. In this regard, *Wallarah 2* is a recent example where a court has rejected a challenge to a decision to grant planning approval to a coal mining project on grounds which, in part, related to an alleged failure of the decision-maker to consider the climate change impacts or GHG emissions generated by a proposed coal mining project, or the combustion of the coal produced by the proposed coal mining project.

Rocky Hill is not applicable to any new coal mine in Australia

- 1.22 Thirdly, for the reasons already given in relation to the issue of "precedent", it is incorrect to assert that the decision and reasoning in *Rocky Hill* case will be applicable to any new coal mine in Australia. *Rocky Hill* has no legal "precedent" value in NSW, much less so in the context of other Australian jurisdictions.
- 1.23 For example, the decision in *Rocky Hill* sits uncomfortably with a series of decisions of the Queensland Land Court (as to which, see paragraph 1.20 above) where climate change impacts and GHG emissions were considered but ultimately not found to outweigh the benefits associated with the particular mining project before the Queensland Land Court.
- 1.24 It would be useful, at this point, to provide a summary of the relevant decisions from the Queensland Land Court that have involved consideration of climate change issues in the context of coal mining proposals.
- 1.25 The most useful starting point for consideration of the Queensland cases is the decision of President MacDonald in *Xstrata*.
- 1.26 In that matter, Xstrata Coal (along with two other applicants) had applied for three mining leases and an associated environmental authority in respect of a proposed open cut coal mine near the Wandoan township in the Surat Basin. The role of the Land Court was to conduct a hearing into the applications for the grant of the mining leases and environmental authority and objections made to the grant of those statutory approvals, so as to then make recommendations to the relevant Minister about whether those statutory approvals should be granted and, if so, what conditions should be imposed on the grant of those approvals (at [18]). Thus, the Land Court's task was very much in the nature of a merits hearing, involving the exercise of administrative rather than judicial decision-making power.

- 1.27 As noted by the President (at [52]), there were two broad categories of objectors: landowners (who generally had private property concerns) and Friends of the Earth (FoE) (who raised concerns about the environmental impacts of the proposed project, including on climate change).
- 1.28 In relation to climate change, Xstrata (and the other applicants) submitted that (amongst other matters):
- (a) a company is not responsible for Scope 3 emissions under either Commonwealth or international law. Rather, Scope 3 emissions are the legal responsibility of others who will account for them as Scope 1 or Scope 2 emissions (at [491]);
 - (b) emissions from coal sold to a power station for electricity generation will be reported by the power station as part of their Scope 1 emissions (at [497]);
 - (c) approximately 99% of the project's GHG emissions will be attributable to end-use of the coal for electricity production which will occur predominantly, if not totally, overseas (at [503]); and
 - (d) the demand for coal for electricity production would exist regardless of the location of the source – i.e. "stopping the project will not affect the amount of coal actually burned globally" (at [503]).
- 1.29 FoE's submissions in response included the following:
- (a) the Court ought to recommend refusal of the project because GHG emissions will result from the project and will contribute to climate change (at [511]); and
 - (b) while the supply of coal from elsewhere in the world is a relevant consideration, the Court is primarily concerned with assessing the impact of this individual mine, not other mines that are not subject of this application and are not subject to the jurisdiction of the Court (at [512]).
- 1.30 President MacDonald made numerous findings in relation to climate change factors. Several of those findings were concerned with matters of the correct statutory construction of provisions contained in the relevant Queensland statutes (e.g. finding that Scope 3 emissions are not a relevant consideration under s 269(4)(j) of the *Mineral Resources Act 1989* (Qld) in determining whether to recommend the grant or refusal of a mining lease). Other findings were of a more general nature.
- 1.31 One of the findings that was of a more general nature concerned the issue of "carbon leakage". As the Court explained in *Rocky Hill* (at [535]):
- [carbon leakage can occur] where, as a result of more stringent climate policies or more stringent application of climate policies in a country, businesses move their production from that country to other countries with less ambitious climate policies or less ambitious application of climate policies, which can lead to a rise in global GHG emissions.
- 1.32 In *Xstrata*, President MacDonald stated (at [558]) that she was "not persuaded that the GHG impacts justify refusal of the proposal". The President then went on to say the following (underlining added):

[559] In the first place, it is difficult to see from the evidence that this project will cause any relevant impact on the environment. In the *Wildlife Preservation Society* case, Dowsett J said that "[t]he relevant impact must be the difference between the position if the action occurs and the position if it does not". In this case, the applicants say that stopping the project will have a negligible impact on climate change because other coal will be mined elsewhere which will in turn produce the same or higher amounts of emissions when burned. They rely on the evidence of Mr Simes and Mr Stanford, who are experts on the economics of coal markets. In general terms, their opinion was that if the project does not proceed, there will be no impact on global demand for coal because that demand will be satisfied from another source. In other words, stopping the project will have no impact on climate change because it will have no impact on the global demand for coal and therefore no impact on global GHG emissions.

...

[570] ... [E]ven on the most favourable interpretation of the FoE's submissions, that is, if it is assumed that it is sufficient to establish a general adverse environmental impact, such as a contribution to increased global warming, the evidence indicates a comparatively minor impact on the environment in terms of its GHG emissions. I do not consider therefore that the extent of the impact of the scope 1 and 2 emissions of the operations has been proved to be such as to warrant refusal of the proposed MLs.

...

[581] The evidence has established that the project will make significant economic contributions on a local, State and Commonwealth level. Although it is not disputed that the project will generate GHG emissions that will contribute to climate change, the evidence was that stopping the project will not result in any, or any substantial difference, in the levels of GHGs in the atmosphere. As previously mentioned, if the project proceeds, the evidence indicated that it will have a comparatively minor impact on the environment in terms of its GHG emissions. Balancing all these factors, I am not persuaded that the FoE's climate change objections justify a refusal of the proposed mining leases on public interest grounds.

...

[603] Most of the evidence led by the FoE centred on GHG emissions from the use of the coal in power stations, ie. scope 3 emissions. In my view, this evidence is irrelevant to the Court's task under the EPA.

[604] The evidence establishes that the project's scope 1 and 2 emissions will contribute to climate change. The FoE contend that this issue should outweigh all other factors to be taken into account in the assessment of the project and that this should lead to a recommendation that the environmental authority be refused. I do not accept that submission. It also follows from what I have said above that I do not consider that the project is unsustainable within the meaning of s.3 of the EPA.

[605] As discussed above in the context of the MRA, the project will make significant economic contributions on a local, State and Commonwealth level which is relevant to a consideration of the public interest ... Stopping the project will not result in any, or any substantial, difference in the levels of GHGs in the atmosphere. If the project proceeds, the evidence indicates that it will have a comparatively minor adverse impact on the environment in terms of its GHG emissions. In the circumstances, I do not consider that the climate change issue outweighs all other issues so as to justify a recommendation under the EPA that the EA be refused.

- 1.33 Thus, in this case, President MacDonald found that Scope 3 emissions were not relevant to the decision-making task before her concerning the mining leases but, if she was wrong in that finding, she accepted the "carbon leakage" argument that the project would not result in any, or any substantial, difference in the levels of GHGs in the atmosphere and that, if she was to refuse the project, it will have no impact on climate change because it will have no impact on the global demand for coal. She ultimately rejected FoE's submission that the Court ought to recommend that the statutory approvals for the project be refused on the basis of its GHG emissions and contributions to climate change.

- 1.34 The subsequent decision of a different member of the Queensland Land Court in *Hancock Coal Pty Ltd v Kelly & Ors and Department of Environment and Heritage Protection (No 4)* [2014] QLC 12 generally adopted the same approach as President MacDonald in *Xstrata*. In particular, at [221]-[232], Member Smith made the following observations of relevance (underlining added):

[221] There is no dispute on the evidence that Hancock will mine thermal coal. Thermal coal is used for burning in power stations to cause the generation of electricity. It is also not in contention in this case that the burning of the thermal coal (or, in other words, the Scope 3 emissions) will occur overseas, in Asia, most probably in India or China.

[222] As Hancock put it in its submissions:

The world has abundant coal resources. The amount of coal combusted in the world, including for the purposes of generating electricity, is driven by demand. That is to say, global supplies exceed demand such that preventing a particular mine from proceeding will not lead to demand not being met. Rather, the demand would be met from another source. To take a simple example, India's coal requirements for electricity generation will not abate merely because it is unable to source that coal from one mine in Australia. That is because, rather than leave its citizens without electricity, India would simply obtain the coal from another source. There was a substantial body of evidence to this effect.

...

[228] Hancock provides forceful submissions on this aspect in their reply submissions filed 23 October 2013 where they say:

But whatever figure is taken, this evidence which CCAQ itself refers to and therefore accepts as reliable, demonstrates the proposition that there are more than enough globally proven (in the sense of economically recoverable) reserves to supply demand in the event the Alpha mine does not proceed.

Rather than address this matter as a relevant fact, CCAQ attempts to dismiss it in other parts of its submissions as "the hypothetical possibility of an alternative mine in a foreign country". CCAQ makes no attempt to meet the proposition. In consequence the evidence is all one way [in favour of Hancock] ...

[229] I agree with Hancock's reply submissions. This has the result that, even if both myself and President MacDonald are wrong in our assessment of the proper methods for dealing with climate change under the MRA and the EPA, the evidence [before the Court] would necessarily lead to the conclusion that global Scope 3 emissions will not fall if Alpha does not proceed as the coal will simply be sourced from somewhere else.

[230] Put another way, it is the demand for electricity to the extent that it is met by coal-fired generators that causes the Scope 3 emissions, and the facts as set out in this case clearly show that Alpha is but one of a myriad of suppliers, both local and around the world, who will seek to meet this existing demand.

[231] I can sympathise with the position of the objectors who see GHG emissions rising, and the likely adverse climate change consequences that will flow should nothing be done to alter the course that the world is heading down. I have no reason to doubt the eminent expert evidence that was presented in this case to that effect. However, I must on the evidence of this case determine that it is the demand for coal-fired electricity, and not the supply of coal from coal mines, which is at the heart of the problem.

[232] Clearly, the possibility of dire consequences from climate change is a matter which falls to be addressed by the international community and the Federal Government. Even if it were within the jurisdiction of this Court (which apart from "Public Interest" principles I have found it not to be) then the clear and unambiguous facts of this case show that there will be no reduction of GHGs if the Alpha mine is refused and, indeed, depending on the source of replacement coal, such replacement coal may well, on the evidence, result in an increase in GHG emissions.

- 1.35 These findings of Member Smith were not disturbed on appeal to either the Supreme Court of Queensland or the Queensland Court of Appeal: see *Coast and Country Association Inc v Smith & Ors* [2016] QCA 242. In particular, Justice Fraser of the Court of Appeal (with

whom Justice Morrison agreed) found that Member Smith was entitled, on the evidence before him, to find that, if the proposed mine did not proceed the power stations that would have burned coal from the mine would instead burn the same quantity of coal from other mines and there would be no difference in Scope 3 emissions. Further, the Member was entitled to have regard to that finding in making his decision.

- 1.36 Member Smith adopted the same approach in his decision in *New Acland Coal Pty Ltd v Ashman & Ors and Chief Executive, Department of Environment and Heritage Protection (No 4)* [2017] QLC 24. At [1091] to [1094], Member Smith relevantly said:

[1091] Some points in this case are not contentious, just as they were not contentious in *Hancock*. For instance it is not contentious in this case that the burning of thermal coal (or in other words, Scope 3 emissions) will occur predominantly overseas, in Asia. Also, just like in *Hancock*, the science of climate change is not of itself an issue in this matter, although some of the objectors who object on the basis of climate change led evidence as to the global impact of climate change. It is therefore unnecessary for me to consider in any detail the exhibits tendered relating to climate change as a science.

[1092] I accept the joint evidence of Mr Campbell and Mr Williams set out above, as well as the individual evidence of Mr Williams on climate change also set out above. In many respects, the evidence of Mr Williams that, in effect, if the Revised Expansion Project does not proceed New Hope's customers will obtain their coal from another source and that source will likely be of a lower quality than the NAC coal and so potentially greenhouse gas emissions may increase depending upon the country involved and the quality of the coal used for Stage 3 purposes, is telling.

[1093] Having made the above findings of fact, it must follow as a logical consequence that I must accept the submissions of NAC regarding climate change. The law with respect to the considerations to be taken into account by this Court in hearing MRA and EPA climate change objections has clearly been settled by *Hancock* and the various appeals in that case. The facts as found in this case are in effect identical to the facts as I found at first instance in *Hancock*, so it follows that I must reach the same conclusion in this case as I did in *Hancock*.

[1094] The objections in so far as they relate to climate change with respect to both the MRA and the EPA have not been made out.

- 1.37 Whilst Member Smith's decision in the *New Acland* case was set aside by the Supreme Court of Queensland (see *New Acland Coal Pty Ltd v Smith & Ors* [2018] QSC 88), it is relevant to note that the paragraphs extracted above from the Member's decision were not challenged or doubted by the Supreme Court. Member Smith's decision was set aside on other grounds.
- 1.38 Thus, the approach taken by the Queensland Land Court to considering the issue of climate change and GHG emissions has been endorsed by both the Supreme Court of Queensland and the Queensland Court of Appeal. One disappointing aspect of the *Rocky Hill* judgment was the absence of any detailed engagement with the Queensland case law, noting that an incomplete and selective reference was made to it at [502] in the Court's decision.
- 1.39 Even in NSW, it must be acknowledged that the most recent legal precedent on the requirement to consider climate change impacts and GHG emissions is *Wallarah 2*. In the Applicant's submission, that case is instructive to the IPC as to how the issue of climate change and GHG emissions may be addressed by the IPC in determining the development application for the Project.
- 1.40 In that case, the ACA raised 10 grounds of challenge in the proceedings. Three of these 10 grounds were related to climate change and GHG emissions (i.e. Grounds 1 to 3). Those grounds of challenge, in short, were:
- (a) **Ground 1:** the PAC failed to consider the downstream GHG emissions (including Scope 3 emissions) generated by the combustion of the project's coal by other developments when determining to grant development consent for the project or

determining whether or not to impose conditions on the development consent for the project to regulate GHG emissions;

- (b) **Ground 2:** the PAC failed to consider clause 14(2) of the Mining SEPP (in effect or substance, this was the same allegation that formed Ground 1). Clause 14 of the Mining SEPP relevantly states:

14 Natural resource management and environmental management

(1) Before granting consent for development for the purposes of mining ... the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure the following:

(a) that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable,

(b) that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable,

(c) that greenhouse gas emissions are minimised to the greatest extent practicable.

(2) Without limiting subclause (1), in determining a development application for development for the purposes of mining ... the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable State or national policies, programs or guidelines concerning greenhouse gas emissions.

- (c) **Ground 3:** the PAC failed to consider principles of ecologically sustainable development, including the precautionary principle and principle of intergenerational equity, by failing to consider the downstream GHG emissions (including Scope 3 emissions) generated by the combustion of the project's coal by other developments.

1.41 Justice Moore rejected all of Grounds 1 to 3.

1.42 In short, the key observations made by Moore J in addressing, and ultimately rejecting, Grounds 1 to 3 are as follows:

- (a) it was common ground that the PAC was required to discharge, as the consent authority, the obligations imposed on it by clause 14(2) of the Mining SEPP (at [31]);
- (b) that obligation required the PAC to consider an assessment of GHG emissions including Scope 3 emissions (at [32]);
- (c) the proceedings before Chief Judge Preston in *Rocky Hill* were "entirely different in nature" from the proceedings brought before the Court concerning the Wallarah 2 Coal Project (at [36]);
- (d) there was much material before the PAC that addressed climate change and GHG emissions, including Scope 3 emissions (see generally [49]-[66]). In particular, the Court identified and discussed the following material of relevance:

[52] Critical to my consideration of Grounds 1 to 3 pressed by the Applicant, this portion of the PAC's Determination Report then continued saying:

The Commission also acknowledges the greenhouse gas emissions that would be produced from any future burning of the coal extracted, whether it is consumed locally or internationally. It is noted that presently there are alternative coal sources available to the market in the event that this mine does not proceed. Consequently, the downstream use of the coal (and any emissions abatement or capture technologies deployed) will need to be considered at that location.

...

[61] The next relevant document was the Department's Preliminary Assessment Report. The relevant section is reproduced below (Evidence Book, folios 1701 and 1702):

5.7.3 Greenhouse Gas Emissions

The EIS includes an assessment of greenhouse gas (GHG) emissions and potential impacts, undertaken by PAEHolmes.

The Department acknowledges the potential climate change impacts caused by the burning of coal and other fossil fuels to provide the energy needs of various human societies, but does not consider that these in themselves should necessarily preclude the approval of the project. Rather, consideration of potential GHG impacts needs to be balanced, with due consideration given to:

- the project's particular contribution to global warming/climate change
- whether refusing the development application would reduce global GHG emissions;
- the benefits of the project, including job creation and its contribution to the NSW economy;
- the objects of the EP&A Act, including the encouragement of ESD; and
- available GHG impact mitigation measures.

The GHG assessment calculates direct and indirect GHG emissions associated with the project, including 'Scope 1' emissions (ie direct GHG emissions from sources controlled by WACJV), 'Scope 2' emissions (ie indirect emissions associated with the import of electricity for use in the project) and 'Scope 3' emissions (ie other indirect emissions, such as those associated with the downstream combustion of the product coal). The calculated GHG emissions associated with the project are shown in Table 9.

The assessment indicates that the vast majority (97.76%) of the total GHG emissions generated as a consequence of the project are those associated with the downstream burning of the product coal for energy production purposes – ie Scope 3 indirect emissions. The Department is satisfied that the project's contribution to annual global GHG emissions, even when assessed on a full life-cycle basis (ie including downstream GHG emissions) would be very small.

[62] The Preliminary Assessment Report then reproduced a table which was, in effect, a summary of what had been set out in the greenhouse gas scope calculations in the EIS. It then continued:

It must be noted that if the project was not allowed to proceed, the resultant gap in the thermal coal supply would be almost certainly filled by another coal resource, sourced either from elsewhere in NSW, Australia or overseas. In other words, preventing GHG emissions from the project would not result in any decrease in global CO₂ emissions. This point illustrates the reality that the key response to the issue of climate change needs to be made at a national and international policy or strategic planning level, outside and above the project assessment process in NSW.

- (e) the ACA was seeking to employ an impermissible "fine-tooth comb" approach to contending that the PAC's reasons for decision (as reflected, non-exhaustively, in its Determination Report) revealed legal error on the basis of a failure to consider climate change and GHG emissions as required by clause 14(2) of the Mining SEPP (at [79]);

- (f) there was material before the PAC that addressed Scope 3 emissions either expressly or by necessary implication and, in particular, there were passages from the PAC's Determination Report which were "sufficient to establish that the PAC has had regard [to], as it was obliged to by cl 14(1) and (2) of the Mining SEPP, the question of downstream emissions that will arise from the burning of the coal proposed to be produced from this mine, and that it has considered what conditions were appropriate to consider imposing and then actually impose concerning greenhouse gas emissions" (at [84]);
- (g) the existence of this material was considered to be "a complete answer to Grounds 1 and 2" (at [85]);
- (h) it did not matter whether or not the text of clause 14(2) of the Mining SEPP was referred to frequently or infrequently. The absence of (repeated) references to clause 14(2) of the Mining SEPP would not invalidate the development consent granted by the PAC if the PAC's Determination Report "has adequately addressed the substance of what would be required to satisfy the terms of the provision despite the fact that it was not expressly referenced. I am satisfied that that is here the case" (at [86]-[87]);
- (i) in relation to the ACA's contention that the downstream emissions should have been dealt with in the context of the coal mining development before the PAC, rather than being deferred for consideration in the context of GHG emissions at the location of the burning of the coal proposed to be extracted from the mining development, the Court observed that the material before the PAC supported the finding that the PAC:

... did consider the issue of whether or not it was appropriate or possible to apply conditions to this consent dealing with Scope 3 emissions but that the PAC concluded that the appropriate place to deal with such emissions was at the location where they were caused to be emitted by the burning of the coal proposed to be produced by this mine or at the higher policy levels discussed in the earlier extract at [62].
- (j) there was, again, material before the PAC (and statements in its reports) which supported the conclusion being reached that principles of ecologically sustainable development (**ESD**) were considered as required by law (at [99]-[105]). In particular, the Court noted the following relevant observations made in the PAC's Determination Report under the heading "intergenerational equity" (extracted at [99] in the judgment):

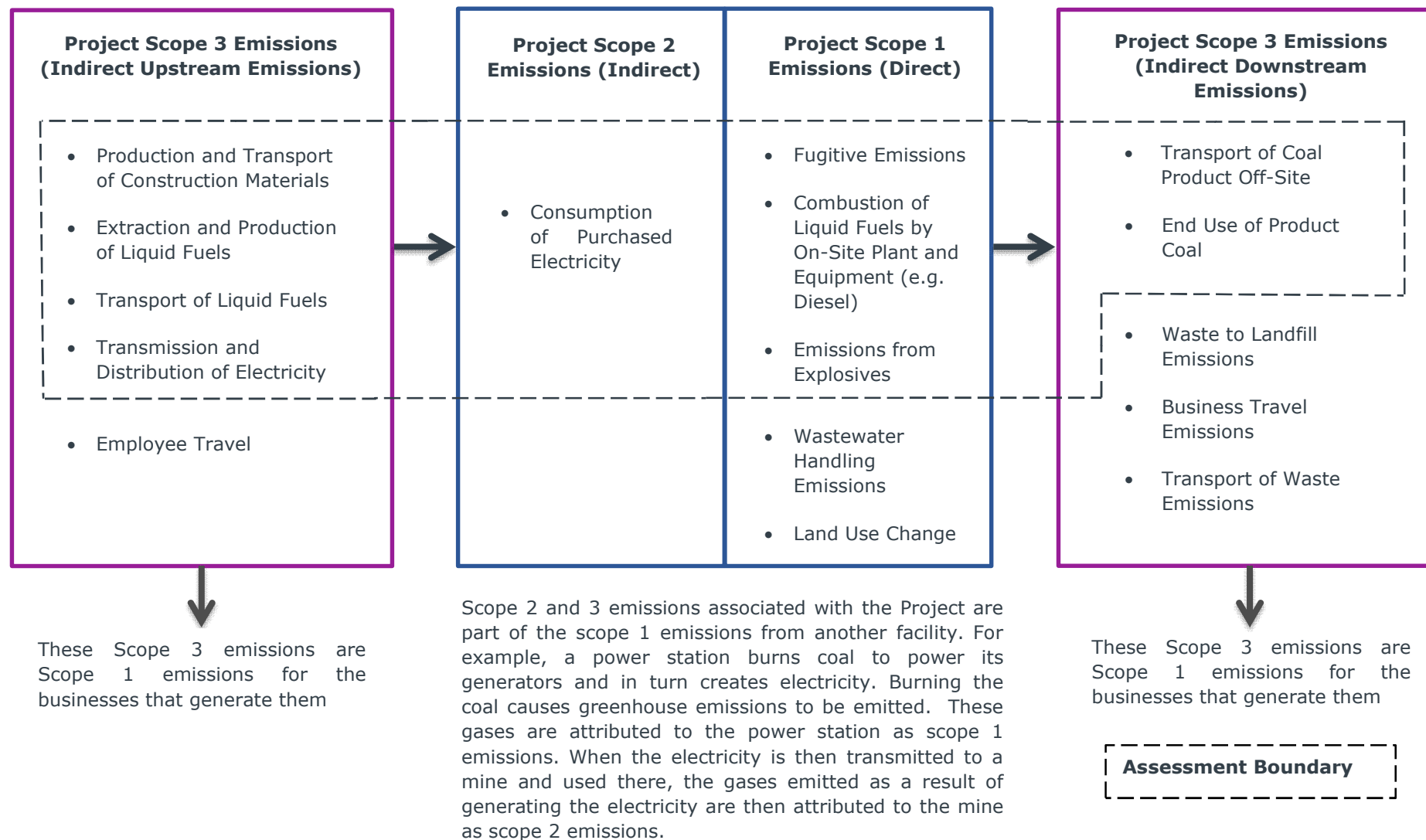
The Department acknowledges that coal and other fossil fuel combustion is a known contributor to climate change, which has the potential to impact future generations. However, it also recognises that there remains for the foreseeable future a clear need to continue to mine coal deposits to meet society's basic energy needs. The Department also notes that climate change is a global phenomenon, the project's contribution to climate change would be very small and that WACJV has considered greenhouse gas mitigation measures. The Department also acknowledges that the downstream energy and other socio-economic benefits generated by the amended project would benefit future generations, particularly through the provision of international energy needs.

The climate change impacts and GHG emissions were not a key reason that consent to the Rocky Hill Project was refused

- 1.43 Fourthly, commentators' statements that the key reason given by the Court for refusing the Rocky Hill Coal Project was the climate change impacts and GHG emissions associated with the Project, is wrong. As already noted, the Court (at [556]) indicated that the "significant and unacceptable planning, visual and social impacts" of the Rocky Hill Coal Project warranted refusal of that project in and of themselves. It was these impacts that were the key reasons for refusing the Rocky Hill Coal Project. Climate change impacts and GHG emissions were cited as a "further reason for refusal", but were certainly not the key reasons why the Rocky Hill Coal Project was refused.

APPENDIX 2: FIGURE SHOWING OPERATIONAL CONTROL THE PROPONENT OF A COAL MINING PROJECT HAS OVER GHG EMISSIONS

OPERATIONAL CONTROL



APPENDIX 3: DOMESTIC LAWS, POLICIES AND MEASURES OF EXPORT COUNTRIES DIRECTED TOWARDS CLIMATE CHANGE IMPACTS, GHG EMISSIONS AND ACHIEVEMENT OF THE COUNTRY'S NDC

Country	Summary												
Japan	<p>Paris Agreement and NDC</p> <p>Japan signed the Paris Agreement on 22 April 2016, and ratified it on 8 November 2016. The Paris Agreement entered into force for Japan on 8 December 2016. Japan's first NDC includes an emissions reduction target of 26% below 2013 levels in 2030. This equates to emissions of approximately 1.042 billion tCO₂-e in 2030.</p> <p>Japan submitted its second/updated NDC on 31 March 2020. That NDC re-affirms Japan's commitment to reducing its greenhouse gas emissions by 26% by 2030 from 2013 levels and states that Japan "will strive to achieve a 'decarbonized society' as close as possible to 2050 with disruptive innovations, such as artificial photosynthesis and other CCUS technologies".</p> <p>The table below sets out further information relating to Japan's First NDC:</p> <table> <tr> <td>Emissions reduction target</td><td>Emission reductions of 26% below 2013 levels in 2030.</td></tr> <tr> <td>Total emissions in 2030</td><td>Approximately 1.042 billion tCO₂e in 2030.</td></tr> <tr> <td>Coverage</td><td>100% (economy-wide)</td></tr> <tr> <td>Scope</td><td>All sectors, including: <ul style="list-style-type: none"> energy; industrial processes and product use; agriculture; Land Use, Land-Use Change and Forestry (LULUCF); and waste. </td></tr> <tr> <td>Gases</td><td>CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ and NF₃.</td></tr> <tr> <td>Sectoral targets</td><td> <p>Japan has sector-specific emissions reduction targets. Relevantly, Japan's target for:</p> <ul style="list-style-type: none"> the industry sector is to reduce emissions from 429 MtCO₂ in 2013 to 401 MtCO₂ in 2030; and the energy conversion sector is to reduce emissions from 101 MtCO₂ in 2013 to 73 MtCO₂ in 2030. <p>Japan also has a "removals target" for the LULUCF sector, of removing 37 MtCO₂ from the atmosphere by 2030. Japan did not provide a base year figure.</p> </td></tr> </table> <p>Japan's First NDC sets out a variety of measures to achieve its 2030 emissions reduction target. Relevantly, measures in the energy conversion sector include:</p> <ul style="list-style-type: none"> expanding renewable energy introduction to the maximum extent possible; utilizing nuclear power generation whose safety is confirmed; and pursuit of high efficiency in thermal power generation, including coal- 	Emissions reduction target	Emission reductions of 26% below 2013 levels in 2030.	Total emissions in 2030	Approximately 1.042 billion tCO ₂ e in 2030.	Coverage	100% (economy-wide)	Scope	All sectors, including: <ul style="list-style-type: none"> energy; industrial processes and product use; agriculture; Land Use, Land-Use Change and Forestry (LULUCF); and waste. 	Gases	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ and NF ₃ .	Sectoral targets	<p>Japan has sector-specific emissions reduction targets. Relevantly, Japan's target for:</p> <ul style="list-style-type: none"> the industry sector is to reduce emissions from 429 MtCO₂ in 2013 to 401 MtCO₂ in 2030; and the energy conversion sector is to reduce emissions from 101 MtCO₂ in 2013 to 73 MtCO₂ in 2030. <p>Japan also has a "removals target" for the LULUCF sector, of removing 37 MtCO₂ from the atmosphere by 2030. Japan did not provide a base year figure.</p>
Emissions reduction target	Emission reductions of 26% below 2013 levels in 2030.												
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Gases	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ and NF ₃ .												
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Country	Summary
	<p>fuelled technologies such as USC, A-USC, integrated gasification and combined cycle, etc.</p> <p>Measures in the industry sector are classified as measures which relate to the iron and steel industry, the chemical industry, the ceramics, stone and clay products industry, factory energy management and cross-sectoral/other. Measures in the iron and steel industry include:</p> <ul style="list-style-type: none"> • efficiency improvement of electricity-consuming facilities; • increased chemical recycling of waste plastic at steel plants; • introduction of a next-generation coke making process (SCOPE21); • improvement of power generation efficiency; • enhanced energy efficiency and conservation facilities; • introduction of an innovative ironmaking process (Ferro Coke); and • introduction of an environmentally harmonized steelmaking process (COURSE50). <p>Japan's second/updated NDC does not include a detailed set of further measures to meet its commitment but specifically mentions artificial photosynthesis, other CCUs technologies, and hydrogen.</p> <p>Current policies</p> <p><u>Plan for Global Warming Countermeasures</u></p> <p>The Plan for Global Warming Countermeasures was adopted by the Cabinet of Japan on 13 May 2016. The Plan incorporates the emissions reduction target in Japan's NDC of 26% below 2013 levels in 2030. The Plan also sets out strategic actions towards Japan's long-term goal of an 80% reduction by 2050. The base year of this long-term goal is not specified. The Plan incorporates the sectoral targets and measures set out in Japan's NDC (see above). The Plan also emphasises the key role of innovative technology, which the Government is promoting through its "Environmental and Energy Technology Innovation Plan" and its "National Energy and Environment Strategy for Technological Innovation towards 2050". The Plan will be revised every three years as necessary.</p> <p><u>Long-term Low-Carbon Vision</u></p> <p>Japan's Long-term Low-carbon Vision, published in March 2017, establishes that Japan's long-term goal of reducing emissions by 80% in 2050 will be met through energy efficiency, low-carbon energy supply and a switch to end-use low-carbon energies. This will be achieved through existing technologies and the development and deployment of new technologies. Carbon pricing is highlighted as a key policy direction. Relevantly, Japan's vision refers to CCUS as a means of achieving emission reductions in the energy sector, as well as centralised/distributed energy management. The Vision sets out that "now" is the time to act, and refers to concepts including:</p> <ul style="list-style-type: none"> • the carbon budget, which is set in accordance with the total amount of cumulative emissions that can be emitted in order to allow Japan to achieve its 2°C target; • the avoidance of "lock-in" through introducing city structures and large-scale facilities; and • key principles of environmental policy including prevention, the precautionary principle and the polluter pays principle. <p><u>Long-term Strategy under the Paris Agreement</u></p>

Country	Summary
	<p>The Long-term Strategy under the Paris Agreement was adopted by the Cabinet of Japan on 11 June 2019. The Strategy covers the period 2018 to 2050 and outlines the country's intention to reduce its GHG emissions by 80% by 2050.</p> <p>In relation to energy, the Strategy sets out a "future vision" in which renewable energy will become an "economically self-sustained and decarbonised main power source" and in which all options and innovations will be explored, including renewable energy, energy efficiency, storage batteries, hydrogen, and CCUS.</p> <p>Specifically with respect to thermal power, the Strategy states that the Government will:</p> <ul style="list-style-type: none"> • "work to reduce reliance on coal-fired power generation as much as possible by fadeout inefficient coal-fired thermal power generation" (footnote omitted); • work to reduce CO₂ emissions from thermal power generation, including by accelerating "the efforts of a wide range of stakeholders, aiming to establish its first commercial scale CCU technology by 2023 as a trigger for wider usage in view of full social adoption in 2030 and thereafter." <p><u>Tax for Climate Change Mitigation</u></p> <p>Japan implemented a Tax for Climate Change Mitigation (a carbon tax) on 1 October 2012. It currently has a value of JPY289/tCO₂e (US\$3/tCO₂e). The tax covers all fossil fuels, which comprise 68% of Japan's emissions. Revenues earned from the tax are applied to bolstering mitigation activities, such as encouraging energy savings and increasing utilisation of renewable energy.</p> <p>Tokyo also has a cap and trade scheme and Saitama has an emissions trading system - these schemes are bilaterally linked and cover an additional 2% of Japan's emissions. In 2015, Tokyo's cap and trade scheme had reduced emissions by 26% compared to emissions in 2000, and Saitama's ETS had achieved a 27% reduction in emissions below 2005 levels. Both Tokyo's cap and trade scheme and Saitama's ETS cover large-scale facilities in all commercial and industrial sectors which consume more than 1,500KL of crude oil equivalent in energy per year.</p> <p><u>Joint Crediting Mechanism</u></p> <p>Japan has introduced a Joint Crediting Mechanism (JCM), through which Japan will cooperate with developing countries to achieve a reduction in greenhouse gas emissions through the diffusion of low-carbon technologies. The JCM's partnership document has been signed by 17 developing countries. Credits generated from emission reductions under the JCM will be allocated according to agreed terms between the participating countries.</p> <p><u>Development of CCUS technologies</u></p> <p>Japan is actively engaged in the development of CCUS technologies, including under its Roadmap for Carbon Recycling Technologies published 7 June 2019. According to the Global CCS Institute's Global Status Reports of 2018 and 2019, Japan has achieved the following major milestones:</p> <ul style="list-style-type: none"> • commenced CO₂ injections at the Tomakomai CCUS facility by Japan CCUS with the Ministry of Economy, Trade and Industry's full support – this is Asia's first full-cycle CCUS hydrogen plant, which will capture more than 300,000 tonnes of CO₂ by 2020. In 2019, it reached a capture milestone of 300,000 tonnes of CO₂, and continued intensive monitoring of storages; • retrofitted the Toshiba Corporation 49MW Mikawa power plant in Omuta (Fukuoka Prefecture) to accept biomass (in addition to coal) with a carbon

Country	Summary										
	<p>capture facility. Completion is expected in early 2020;</p> <ul style="list-style-type: none"> launched JPOWER and Chugoku Electric Power Company's Osaki CoolGen facility, a 166 MW oxygen-blown IGCC (integrated gasification combined cycle) plant in Osakikamijima (Hiroshima Prefecture), which will separate and capture CO₂ from the end of 2019; completed construction of Toshiba's carbon capture and utilisation system at the Saga City Waste Incineration Plant (on Japan's Kyushu Island), using captured CO₂ for algae culture; and commencement of construction of the gasifier for the Hydrogen Energy Supply Chain project that plans to gasify Australian brown coal in Victoria's Latrobe Valley and transport it by ship to Japan for future decarbonised hydrogen developments. This project being developed by Kawasaki Heavy Industries (KHI), Electric Power Development Co. (J-Power), Iwatani Corporation, Marubeni Corporation, Sumitomo Corporation and AGL, with the support of the Governments of Japan, Australia and the State of Victoria. First hydrogen production is expected by 2021. 										
South Korea	<p>Paris Agreement and NDC</p> <p>South Korea signed the Paris Agreement on 22 April 2016, and ratified it on 3 November 2016. The Paris Agreement entered into force for South Korea on 3 December 2016. South Korea's NDC has proposes an economy-wide target to reduce GHG emissions by 37% below BAU emissions of 850.6 MtCO₂e/year in 2030. The table below sets out key information relating to South Korea's NDC:</p> <table data-bbox="408 1111 1422 1536"> <tr> <td data-bbox="408 1111 703 1205">Emissions reduction target</td><td data-bbox="703 1111 1422 1205">37% below BAU by 2030. BAU emissions in 2030 are projected at 850.6 MtCO₂e.</td></tr> <tr> <td data-bbox="408 1205 703 1261">Coverage</td><td data-bbox="703 1205 1422 1261">Economy-wide</td></tr> <tr> <td data-bbox="408 1261 703 1317">Scope</td><td data-bbox="703 1261 1422 1317">100% (economy-wide)</td></tr> <tr> <td data-bbox="408 1317 703 1480">Scope</td><td data-bbox="703 1317 1422 1480">Energy, industrial processes and product use, agriculture and waste (A decision on whether to include land use, land-use change and forestry (LULUCF) will be made at a later stage.)</td></tr> <tr> <td data-bbox="408 1480 703 1536">Gases</td><td data-bbox="703 1480 1422 1536">CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆</td></tr> </table> <p>South Korea's NDC indicated that it would subsequently develop a detailed plan to implement its mitigation target. To this end, South Korea released a revised roadmap for achieving the 2030 National Greenhouse Gas Reduction Goal in July 2018 (the Roadmap). The Roadmap sets out sectoral targets, including:</p> <ul style="list-style-type: none"> emission reductions of 24 million tons in the energy conversion sector (power generation, group energy) through policies to reduce fine dust and promote the use of eco-friendly energy. The sector will create a detailed plan to reduce another 34 million tons before submitting the revised NDC in 2020 by establishing a third basic energy plan, revising the energy tax framework, and enhancing the dispatch of environmental power; and emission reductions of 99 million tons in the industry sector through the revision of industrial processes, energy use reduction, and sharing of emission reductions technologies. 	Emissions reduction target	37% below BAU by 2030. BAU emissions in 2030 are projected at 850.6 MtCO ₂ e.	Coverage	Economy-wide	Scope	100% (economy-wide)	Scope	Energy, industrial processes and product use, agriculture and waste (A decision on whether to include land use, land-use change and forestry (LULUCF) will be made at a later stage.)	Gases	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, and SF ₆
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Coverage	Economy-wide										
Scope	100% (economy-wide)										
Scope	Energy, industrial processes and product use, agriculture and waste (A decision on whether to include land use, land-use change and forestry (LULUCF) will be made at a later stage.)										
Gases	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, and SF ₆										

Country	Summary
	<p>The Roadmap indicates that South Korea intends to achieve a 32.5% reduction on BAU emissions domestically, and the remaining 4.5% through international market mechanisms.</p> <p>Current Policies</p> <p><u>Act on the Allocation and Trading of Greenhouse Gas Emission Permits</u></p> <p>South Korea enacted the Act on the Allocation and Trading of Greenhouse Gas Emission Permits in 2012, and launched an ETS on 1 January 2015. It currently has a price of approximately US\$20/tCO₂e. The ETS covers 68% of Korea's emissions, including emissions from the industry, power, aviation, building and waste sectors. Liable emitters comprise companies and factories in the relevant sectors which produce over 125,000 tons of CO₂ per year and 25,000 tons of CO₂ per year (respectively). This represents approximately 600 companies, including 5 domestic airlines.</p> <p>During the first phase of the scheme (2015-2017), only domestic offset credits could be used for compliance. CERs generated from domestic CDM projects and credits from domestically certified projects (Korean Offset Credits) were allowed. These credits had to be converted to Korean Credit Units (KCU) before being used for compliance. Offsets could only be used for up to 10% of each entity's compliance obligation. During the second phase of the scheme (2018-2020), CERs generated from international CDM projects developed by domestic companies can be used for compliance (up to 5% of each entity's emission volume). During the third phase of the scheme (2021-2025), credits of up to 10% of each entity's compliance obligation with a maximum of 5% coming from international offsets will be allowed.</p> <p><u>Framework Act on Low Carbon Green Growth</u></p> <p>South Korea enacted a Framework Act on Low Carbon Green Growth on 6 June 2016. Article 25 of the Act incorporates the 2030 emissions reduction target in South Korea's NDC. Article 4 of the Act requires the Government to establish a five-year National Strategy for Low Carbon Green Growth every five years. Article 39 of the Act requires the Government to gradually reduce the use of fossil fuels such as petroleum and coal.</p> <p><u>Third Energy Master Plan</u></p> <p>In June 2019, the government announced its Third Energy Master Plan which aims to increase the share of renewable energy to 20% by 2030 and 30 to 35% by 2040.</p> <p><u>Eighth Plan for Electricity Supply and Demand</u></p> <p>In December 2017, the government released its Eighth Plan for Electricity Supply and Demand which sets targets for increased electricity supply from renewables and natural gas, and decreases supply from coal and nuclear. The Plan sets an objective of 20% share of electricity production obtained from renewables by 2030, while natural gas would reach 18.8%, and both coal and nuclear decreasing to 36.1% and 23.9% respectively. These targets are intended to be achieved through the addition of 4.3GW in new LNG and pumped-storage hydroelectric generation facilities and an increase in the installed capacity of renewable energy (to be comprised mainly of wind and solar projects) from 11.3GW to 58.5GW, by 2030.</p>
Taiwan	<p>Paris Agreement and NDC</p> <p>Taiwan is not a party to the UNFCCC or the Paris Agreement. Nevertheless, Taiwan's Cabinet put forward an Intended Nationally Determined Contribution</p>

Country	Summary										
	<p>(INDC) on 17 September 2015. Taiwan's INDC has an emissions reduction target of 50% from the BAU level by 2030. The BAU level is 428 MtCO₂e and the 2030 target is 214 MtCO₂-e by 2030. The table below sets out key information relating to Taiwan's INDC:</p> <table border="1"> <tr> <td>Emissions reduction target</td><td>Emission reductions of 50% below BAU levels by 2030.</td></tr> <tr> <td>Total emissions in 2030</td><td>Approximately 214 MtCO₂e in 2030.</td></tr> <tr> <td>Coverage</td><td>Economy-wide</td></tr> <tr> <td>Scope</td><td> All sectors, including: <ul style="list-style-type: none"> energy; industrial processes and product use; agriculture; Land Use, Land-Use Change and Forestry (LULUCF); and waste. </td></tr> <tr> <td>Gases</td><td>CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ and NF₃.</td></tr> </table> <p>Taiwan's INDC sets out measures for achieving sectoral mitigation measures. Relevantly, in relation to energy, the government will:</p> <ul style="list-style-type: none"> • reduce energy demand by introducing energy conservation measures; • raise the renewable energy development target to 17,250MW in 2030; • continue to phase out nuclear power plants; • increase the use of natural gas; • replace old power plants with the "best feasible technology"; • promote the construction of smart grids; and • use low-carbon fuel and energy-efficient technologies in the refining sector. <p>Emissions reductions will be achieved in the industrial sector through:</p> <ul style="list-style-type: none"> • industrial structure adjustment; • technical advice service of energy conservation and carbon reduction; • integrated utilization of energy and resources in industrial zones; • regulation of energy efficiency standards; • alternative fuels; • heat recovery; and • a renewal of facilities. <p>Current policies</p> <p><u>Greenhouse Gas Reduction and Management Act 2015</u></p> <p>Taiwan enacted its Greenhouse Gas Reduction and Management Act on 1 July 2015. Key features of the Act are:</p> <ul style="list-style-type: none"> • Article 4 of the Act sets a goal to reduce GHG emissions to no more than 	Emissions reduction target	Emission reductions of 50% below BAU levels by 2030.	Total emissions in 2030	Approximately 214 MtCO ₂ e in 2030.	Coverage	Economy-wide	Scope	All sectors, including: <ul style="list-style-type: none"> energy; industrial processes and product use; agriculture; Land Use, Land-Use Change and Forestry (LULUCF); and waste. 	Gases	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ and NF ₃ .
Emissions reduction target	Emission reductions of 50% below BAU levels by 2030.										
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Scope	All sectors, including: <ul style="list-style-type: none"> energy; industrial processes and product use; agriculture; Land Use, Land-Use Change and Forestry (LULUCF); and waste. 										
Gases	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ and NF ₃ .										

Country	Summary
	<p>50% of 2005 emissions by 2050;</p> <ul style="list-style-type: none"> Article 5(1) requires the Government to draft mid- to long-term strategies for gradually reducing dependence on fossil fuels, with a mid-to long-term aim of improving renewable energy policies, and the gradual realization of a nuclear-free homeland; Article 5(3)-(4) recommends that the Government implement tax mechanisms on imported fossil fuels based on their CO₂-e emissions, and actively help traditional industries achieve energy conservation and carbon reduction or transition, develop green technology and green industry, create new employment opportunities and green economies, and promote a low-carbon, green growth plan for Taiwan's infrastructure; Article 8 requires relevant government agencies to promote GHG reduction and climate change adaptation through, relevantly, development of renewable energy and energy technology, reduction in GHG emissions by industrial sectors, establishment of GHG cap-and-trade scheme and facilitation of international emission reduction cooperation mechanism, and research, development and implementation of GHG reduction technologies; and Article 18 requires Taiwan's Environmental Protection Administration (EPA) to implement a domestic cap and trade scheme, and Article 20 outlines matters to be considered in the development of the scheme, including trade intensities of various sectors, avoiding carbon leakage and overall national competitiveness. <p><u>National Climate Change Action Guideline/GHG Reduction Action Plan</u></p> <p>The Act also required the Government to develop the National Climate Change Action Guideline (which was approved on 23 February 2017) and a GHG Reduction Action Plan.⁴⁶ The National Climate Change Action Guideline is to include periodic regulatory goals, implementation timetables, implementation strategies and an evaluation mechanism.⁴⁷ Under the GHG Reduction Action Plan, the authorities responsible for the Taiwan's energy, manufacturing, transportation, residential, commercial, and agriculture sectors are required to formulate GHG Emission Control Action Programs. These Action Programs must include GHG emissions targets, timetables and economic incentive measures. These Action Programs are to be regularly reviewed and revised and are to propose improvement plans if sectors are failing to meet their emission targets.</p> <p>Multiple subsidiary regulations have been introduced, including the:</p> <ul style="list-style-type: none"> Regulations Governing Incentives for Landfill Sites to Reduce Greenhouse Gas Emissions (announced 25 December 2015). Regulations Governing Greenhouse Gases Offset Program Management (announced 31 December 2015). Management Regulations Governing Greenhouse Gas Emission Inventories and Registration (announce 5 January 2016). Greenhouse Gas Reduction and Management Enforcement Rules (announced 6 January 2016). First Batch of Emission Sources Required to Report Greenhouse Gas

⁴⁶ Taiwan, *Greenhouse Gas Reduction and Management Act*, Article 9.

⁴⁷ Taiwan, *Greenhouse Gas Reduction and Management Act*, Article 9.

Country	Summary
	<p>Emission Inventory and Registration (announced 7 January 2016).</p> <ul style="list-style-type: none"> Greenhouse Gas Management Fund Revenues and Expenditures, Safekeeping, and Utilization Regulations (announced 30 January 2016). <p><u>Annual Emission Reports</u></p> <p>Since 1 January 2012, Taiwan's EPA has been, in batches, requesting major enterprises to submit annual emission reports. As of the end of 2015, the EPA had added 269 firms to the list, and the reporting rate has been 100%. These enterprises account for approximately 80% of CO₂ emissions from industry and fossil-fuel energy generation in Taiwan.</p> <p><u>National CCUS Strategic Alliance</u></p> <p>Taiwan's EPA established a national CCUS strategic alliance in 2011. This alliance brings together domestic experts from government, academia and industry, for the purpose of developing the technology and regulatory framework required for the commercial use of CCUS technology, with the ultimate goal of achieving widespread use of CCUS technology by 2020. Through the alliance, the Taiwan Cement Corporation (in partnership with the Industrial Technology Research Institute) commissioned the world's first CCUS pilot project in the cement industry in 2013, with the two entities agreeing in 2016 to extend their cooperation on the project.</p> <p><u>Renewable Energy Development Act</u></p> <p>Taiwan introduced a Renewable Energy Development Act in 2009, which encourages renewable energy use and promotes energy diversification.</p>

APPENDIX 4: CRU'S SUMMARY LETTER



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16th June 2020

Mark Brennan
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VICKERY EXTENSION PROJECT – INDEPENDENT STUDY ON COAL MARKET SUBSTITUTION AND CARBON LEAKAGE

Dear Mr Brennan,

Vickery Coal Pty Ltd ("VCPL"), a subsidiary of Whitehaven Coal Ltd ("Whitehaven") proposes to extend the Vickery approved coal mine (life of mine, "LOM", up to 4.5 Mtpa over 30 years). The proposed Vickery Extension Project aims to produce a LOM average of 6.7 Mtpa over 25 years. The development application for the Extension Project is currently subject to an assessment process under the Environmental Planning and Assessment Act 1979 ("EP&A Act").

CRU Consulting ("CRU") has prepared a report in response to a request from Ashurst Australia, on behalf of VCPL and Whitehaven, to carry out an independent study on coal market substitution and carbon leakage over the long term ("CRU Report").

The purpose of this letter is to provide a summary of the main findings we have made in the CRU Report. This letter is permitted to be shared with the New South Wales Independent Planning Commission ("IPC") and placed in the public domain.

We note that, for reasons relating to intellectual property protection, we are not prepared to grant permission for the CRU Report to be placed in the public domain. However, CRU is prepared to grant Ashurst Australia, VCPL and Whitehaven permission to disclose this report to the IPC if the IPC makes a direction under Clause 5 of Schedule 2 to the EP&A Act, that the CRU Report is to be treated as a confidential document that is not to be published.

Structure of the CRU Report

The study conducted by CRU comprised **six** main components:

(Unless otherwise stated, long term forecasts are provided to 2040; cost comparisons are provided for 2027 – the expected first year of full production).

1. Thermal coal: long term demand

CRU's forecast of the long term demand for thermal coal to 2040, key drivers of trends, and a comparison of CRU's demand forecasts with the Current Policies Scenario, Stated Policies Scenario and Sustainable Development Scenario of the International Energy Agency's ("IEA") World Energy Outlook 2019 ("WEO 2019"). This component also includes an overview of the main end uses of thermal coal.

2. Thermal coal: long term supply

CRU's forecast for long term seaborne thermal coal supply to 2040 and the links to seaborne demand; the Extension Project's position (including quality) in relation to the global market.

3. Steelmaking coal: long term demand

CRU's forecast of the long term demand for steelmaking coal to 2040, with a focus on semi-soft coking coal ("SSCC") which will be produced by the Extension Project. This includes an analysis of existing steelmaking technologies and the potential for alternative technologies in the future.

4. Steelmaking coal: long term supply

CRU's forecast for long term seaborne SSCC supply to 2040 and the links to seaborne demand; the Extension Project's position (including quality) in relation to the global market.

5. Cost competitiveness of the Vickery Extension

CRU's analysis of the cost competitiveness of the Extension Project and other competing supply sources in 2027, for both thermal coal and SSCC.

6. Carbon leakage and scenario analysis

An assessment of three coal supply substitution scenarios and their impact on greenhouse gas ("GHG") emissions:

- a. **Scenario 1:** Vickery Extension is not approved, and Vickery approved mine does not go ahead.
- b. **Scenario 2:** Vickery Extension is not approved, but Vickery approved mine goes ahead.
- c. **Scenario 3:** No new Australian projects enter production in the 2019-30 period.

Summary of key findings of CRU Report

In relation to the **First Component: thermal coal long term demand**, the main findings made by CRU were:

1. Long term thermal coal demand to 2040 was modelled using a top-down approach incorporating primary energy demand, including the share of primary energy demand for electricity versus other sources of energy, and the share of electricity generation from thermal coal-fired generation compared to other electricity-generating technologies;
2. Primary energy demand growth is projected to continue over the medium and longer term (1.1% compound annual growth rate “CAGR” to 2040), as a result of population growth, industrialisation and economic development. India and Southeast Asia will be the biggest contributors to this growth in demand;
3. Electricity's share of primary energy demand is expected to rise from 15.6% in 2018 to 18.4% in 2040. China will be the largest driver as rural areas are electrified and the whole economy shifts to a greater reliance on electricity;
4. Coal accounted for 38% of total power generation in 2018. It will continue to be a critical part of the global energy system but its share will fall to 24% in 2040. Developed regions, in particular, will shift away from coal-fired generation to reduce carbon emissions and as the levelized cost of electricity from renewables falls;
5. Although subject to downside risks to demand forecasts arising from policy response and technological innovation, CRU actively seeks to appraise the implications and forecasts that total thermal coal demand is expected to remain relatively flat between 2019 and 2040, with a CAGR of -0.4% over the period. Electricity's increasing share of primary energy demand almost entirely offsets the decline in coal's share of electricity generation. Our view of long term thermal coal demand is largely consistent with the IEA's Stated Policies Scenario (“STEPS”) in the WEO 2019.

In relation to the **Second Component: thermal coal long term supply**, the main findings made by CRU were:

1. In line with total thermal coal demand, global seaborne demand is forecast to fall by -0.3% CAGR (-67 Mt) during 2018-40. Significant declines in demand are expected from Japan, South Korea and Taiwan (“JKT”), China and Europe through the shift to non-coal generation; significant growth in Southeast Asia and India will not completely offset this;
2. Seaborne supply is expected to decline by 180 Mt between 2018 and 2040 due to mine depletion and a lack of recent investment in new projects. Most notably, seaborne supply is expected to decline by more than 200 Mt in Indonesia, as domestic demand is expected to rise considerably;

3. Based on the current global supply landscape, new projects will be required in the long term to satisfy demand – these will most likely come from high quality producers, such as Australia and Russia;
4. The Extension Project would account for ~0.3% of global thermal coal seaborne supply in 2027 and 1.3% of expected Australian seaborne supply in 2027.
5. Understanding the quality of the Extension Project's coal, relative to alternative markets and projects, is key for assessing the potential environmental impacts of any supply substitution arising from a given investment decision;
 - a. It is important to understand the calorific value ("CV") of coal, from both the Extension Project and competing supply sources, as this will determine how much coal will need to be mined from different regions to replace a given weight of the Extension Project's coal;
 - b. The CV of the Extension Project's thermal coal is 9% above the 6,000 kcal/kg benchmark (historically, coal of this quality has been the most traded globally, and therefore provides the most liquid market prices, suitable for use as the benchmark);
 - c. The CV of the Extension Project's thermal coal is higher than the country average of Australia and other major seaborne thermal coal suppliers such as Indonesia, Russia, South Africa, Colombia and the United States;
 - d. The ash content of the Extension Project's thermal coal is lower than the Australian average, as well as other major seaborne exporters, Russia and South Africa, although slightly higher than Colombia and Indonesia. Ash is the non-combustible residue left after coal is burnt; it is a key driver of costs as it impacts power plant maintenance costs via equipment wear and ash-handling requirements;
 - e. The sulphur content is also competitive, at the lower end of the range of major seaborne exporters – only Russia has a lower average. Sulphur content impacts the level of atmospheric oxides that are emitted (a local air pollutant and contributor to acid rain);
 - f. The Extension Project's thermal coal, as a result of its high CV and low ash content, performs at a higher level of boiler efficiency, when burned at power stations, compared to competing coal supply sources.

In relation to the **Third Component: steelmaking coal long term demand**, the main findings made by CRU were:

1. Demand for steelmaking coal (hard coking coal ("HCC") and semi-soft coking coal ("SSCC") combined) is driven by steel demand trends and the choice of steelmaking technology. Currently around 70% of

steel globally is produced via the blast furnace-basic oxygen furnace (“BF-BOF”) route, with the remainder from non-coal consuming technologies such as the scrap-electric arc furnace (“scrap-EAF”) or natural gas-direct reduced iron-EAF (“NG-DRI-EAF”) routes;

2. Metallurgical coals are essential inputs for the production of 70% of all steel globally using BF-BOF technology. HCC and SSCC are used together to produce coke, which is the primary source of carbon in steelmaking. The proportion of each coal used in the coking process is determined by various factors, including price, blast furnace requirements and the specific characteristics and qualities of the coal. One of SSCC's key contributions to the coke blend is its lower impurities such as ash and sulphur, as well as being lower cost compared to HCC;
3. Carbon crude steel (crude steel, excluding stainless) demand is expected to grow steadily at 1.0% CAGR from 2018 to 2040, driven by economic development and rising steel intensity per capita in the developing economies, particularly India and Southeast Asia. With an increasing focus on lowering emissions and with rising scrap availability in developed economies (including China), there will be a greater preference for scrap-EAF steelmaking in the future. As a result, the BF-BOF share will fall to 57% in 2040;
4. Demand for steelmaking coal is forecast to fall from 983 Mt in 2018 to 790 Mt in 2040 (-193 Mt), driven by falling BF-BOF steel production. SSCC demand will account for 88% (169 Mt) of the decline in demand because of the increasing share of HCC, which has superior coke strength after reduction (“CSR”), and changing coke requirements for steelmaking;
5. However, BF's cannot run using only HCC. BF's require a blend of coking coals, which means that SSCC's important role in steel production will continue into the future. There is evidence that a coke blend containing approximately 15-20% SSCC is the likely technical, minimum level of SSCC within highly efficient coke making facilities running under best practice operating procedures;
6. Other than the existing steelmaking technologies that do not require coal (scrap-EAF or NG-DRI-EAF routes), research is ongoing into the possibility of fossil fuel free steelmaking via a hydrogen-DRI-EAF route with renewable energy used to produce electricity. Technology is under development, funded by a number of major steel producers, but this is still on a very small scale and at very high cost compared to commercial requirements;
7. Based on the current stage of development, we do not expect widespread adoption of hydrogen-DRI-EAF technology until the late 2030s at the earliest. Existing EAF technology will gain share in the long term, but the BF-BOF route will still dominate to 2040, supporting the demand for steelmaking coal (including SSCC).

In relation to the **Fourth Component: steelmaking coal long term supply**, the main findings made by CRU were:

1. Australia, Mongolia and Canada are expected to be the largest contributors to growing seaborne SSCC supply in the long term to 2040 (partially offsetting declines in China). Along with Indonesia and Russia, these countries account for 95% of global seaborne supply;
2. Australia is expected to contribute around 16 Mtpa of new production between 2018 and 2030, with new projects in Queensland and New South Wales. The Tavan Tolgoi expansion in Mongolia will grow by almost 9 Mt and there are a number of greenfield Canadian projects expected to come online over this period. Beyond 2030, we expect seaborne supply from Australia and Mongolia to decline as various operations reach the end of their mine lives.
3. The Vickery Extension Project will account for ~5.7% of global SSCC seaborne supply and ~10.5% of expected Australian seaborne supply in 2027;
4. Understanding the quality of the Project's coal, relative to alternative markets and projects, is key for assessing the marketability of the product;
 - a. The Extension Project's SSCC has a lower ash content than all of the major exporting countries, except Canada;
 - b. The sulphur content of the Extension Project's SSCC at 0.4% is also near the bottom end globally and lower than the average sulphur content of Australian SSCC;
 - c. The phosphorus content of the Extension Project's SSCC at 0.003% is lower than the average of Australia and all other major seaborne SSCC suppliers.

These qualities make the Extension Project's SSCC one of the most marketable SSCC products globally;

5. Ash and CSR are the two key quality attributes of metallurgical coals that have the greatest impact on BF productivity and, consequently, the GHG emissions intensity of steel production. Given the Extension Project's SSCC's low ash levels compared to the rest of the world, CO₂ emissions could be reduced by 13kg per tonne (of hot metal produced (compared to the average emissions intensity inferred from ash content of SSCC globally) if the Extension Project's coal were used as the only SSCC within the coke blend. The measurement of CSR for SSCC is less important than in the HCC segment because SSCC is generally used in coking coal blends for attributes outside of CSR. For this reason an analysis of the Extension Project's SSCC's CSR has not been performed at this stage.

In relation to the **Fifth Component: cost competitiveness of the Vickery Extension**, the main findings made by CRU were:

1. Coal is not a standardised homogeneous commodity, as the quality produced by different mines varies considerably. This is a critically important factor to recognise when comparing both the costs of production of different mines as well as the environmental consequences of its production and use;
2. CRU's proprietary methodology – the Value Based Costing (VBC)TM system – takes differences in quality and their impacts on producers (and, indirectly, consumers) of coal into account in analysing the business performance and competitive position of individual production facilities in the extractive industries. A core principle of the VBC is that each commodity market has a benchmark price and the costs of all production facilities are compared against this benchmark. In the case of coal, the key 'benchmarks' are 6,000 kcal/kg CV for thermal coal and premium HCC grade for coking coal;
3. In order to allow for a 'like for like' value comparison with CRU's Business Cost curve, the Extension Project's Business Cost incorporates a negative adjustment (premium) of US\$ -13.55/t, because its thermal coal product is of higher quality than the benchmark. Compared to other global thermal coal producers, the Extension Project has a low Business Cost, positioned in the lower first quartile (4th percentile) of the 2027 cost curve (2027 being the expected first year of full production);
4. The Extension Project's cost of SSCC is presented on the global metallurgical coal (total production of HCC, SSCC and pulverized coal for injection ("PCI") Business Cost Curve. Compared to other metallurgical coal producers, the Extension Project is medium to high cost, in the third quartile (60th percentile) of the 2027 cost curve.

In relation to the **Sixth Component: carbon leakage and scenario analysis**, the main findings made by CRU were:

1. The Extension Project will produce approximately 150 Mt of saleable coal, comprising thermal coal and SSCC. The indicative life-of-mine average proportion of thermal coal to SSCC will be 40:60. However, given its high energy content, SSCC can be used as premium quality thermal coal. At times during the life of mine, the prevailing price differentials between SSCC and thermal coal can drive SSCC into the premium quality thermal coal market for power generation. For the purpose of analysing coal supply substitution, we have treated the Extension Project as producing a single thermal coal product;
2. In order to measure the GHG emissions associated with the coal value chain, CRU uses definitions consistent with the GHG Protocol Corporate Accounting and Reporting Standard:
 - a. In relation to Scope 1 (direct) emissions, comparison with other coal sources requires a low and high case value for fugitive emission rates; fuel use has also been included;

- b. In relation to Scope 2 (indirect) emissions, Australian coal mining consumes less power compared to many other regions;
 - c. In relation to Scope 3 (indirect) emissions, this focusses on the downstream impacts of coal substitution from the alternate countries.
- 3. Scenarios (*the lower and upper range of emissions from the low/high case for Scenarios 1 & 2 is due to coal substitution in a number of alternative supply countries*):
 - a. In **Scenario 1** (neither the approved Vickery project nor the Vickery Extension Project go ahead), non-Australian alternative supply is expected to release an additional amount of between **14.0 to 64.8 Mt CO₂-e** (low fugitive emissions case) and **20.1 to 120.4 Mt CO₂-e** (high fugitive emissions case) into the atmosphere over the **LOM of Vickery Extension** (Scope 1, 2 and 3 combined), compared to the case where Vickery Extension is approved;
 - b. In **Scenario 2** (Vickery goes ahead, but Vickery Extension not approved), non-Australian alternative supply is expected to release an additional amount of approximately **5.7 to 26.7 Mt CO₂-e** (low fugitive emissions case) and **8.2 to 49.7 Mt CO₂-e** (high fugitive emissions case) into the atmosphere over the **LOM of Vickery Extension** (Scope 1, 2 and 3 combined), compared to the case where Vickery Extension is approved;
 - c. In **Scenario 3** (no further Australian supply approved), non-Australian alternative supply is expected to release an additional amount of approximately **68.6 Mt CO₂-e** (low fugitive emissions case) and **124.1 Mt CO₂-e** (high fugitive emissions case) into the atmosphere over the **2019-30** period (not LOM for Scenario 3).
- 4. The environmental impacts of substituting the supply shortfall from the Extension Project's coal with alternative supply sources would be **adverse**, because Australian coal (including the Extension Project's thermal coal) is high quality, in calorific terms, and low in negative attributes, such as ash and sulphur. This means that substitution by other coal supply sources is likely to result in more physical coal being mined and combusted to meet the same power needs, resulting in higher Scope 3 emissions and concentrations of ash and sulphur globally. Moreover, the direct emissions (Scope 1 and 2) of these alternative supply sources are also likely to be higher, largely due to favourable geology and highly efficient production processes and technologies commonly employed in the Australian mining industry.
- 5. The impacts of these scenarios on Scope 1, 2 and 3 emissions, as well as total emissions, are detailed in Table 1. Overall, these results confirm the **material increase in total GHG emissions** that is likely to arise from lower investments in the Australian coal industry.

Table 1: Summary of scenarios

Scenario 1:					
LOM GHG emissions, million tonnes CO₂-e					
	Scope 1 & 2	Scope 1 & 2	Scope 3	Total emissions	
<i>Fugitive Emissions</i>	<i>Low case</i>	<i>High case</i>	<i>n/a</i>	<i>Low case</i>	<i>High case</i>
Vickery Extension	2	2	393	395	395
Alternative suppliers	6-44	11-100	401-418	409-460	415-515
<i>Additional emissions*</i>				14-65	20-120

Scenario 2:					
LOM GHG emissions, million tonnes CO₂-e					
	Scope 1 & 2	Scope 1 & 2	Scope 3	Total emissions	
<i>Fugitive Emissions</i>	<i>Low case</i>	<i>High case</i>	<i>n/a</i>	<i>Low case</i>	<i>High case</i>
Vickery Extension	1	1	162	163	163
Alternative suppliers	2-18	5-41	166-173	169-190	172-213
<i>Additional emissions*</i>				6-27	8-50

Scenario 3:					
2019-30 GHG emissions, million tonnes CO₂-e					
	Scope 1 & 2	Scope 1 & 2	Scope 3	Total emissions	
<i>Fugitive Emissions</i>	<i>Low case</i>	<i>High case</i>	<i>n/a</i>	<i>Low case</i>	<i>High case</i>
Australia shortfall	16	28	711	727	740
Total alternative suppliers	56	124	740	796	864
<i>Additional emissions*</i>				69	124

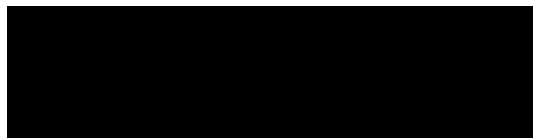
Note: * Additional emissions calculated from difference between Vickery Extension & alternative suppliers.

Rounded numbers - totals may not align with total of emission ranges. Scenario 1 & 2 over LOM, Scenario 3 for 2019-30.

The lower and upper range of emissions from the low/high case for Scenarios 1 & 2 is due to coal substitution in a number of alternative supply countries.

If you wish to discuss any aspect of this letter, or require further information, please do not hesitate to contact me.

Yours sincerely,



Alex Tonks

Head of CRU Australia & New Zealand

APPENDIX 5: WHITEHAVEN'S CORPORATE INITIATIVES CONCERNING GHG EMISSIONS (INCLUDING SUPPORT OF HELE AND CCUS)

Overview

The deployment of a range of low emission technologies will be critical to achieving significant carbon emission reductions and the transition to a low carbon economy including the goals of the *Paris Agreement*.

Whitehaven participates in a number of organisations that support the development and demonstration of low emission technologies. They include the following:

Member of Australian Coal Association Research Program (ACARP)

ACARP is a mining research program that has been running in Australia since its establishment in 1992. It is 100% owned and funded by all Australian black coal producers through a five cents per tonne levy paid on saleable coal. Whitehaven contributes a levy to this research program that includes working groups on mine site greenhouse gas mitigation and low emission coal use. Research work via the greenhouse committee of ACARP primarily focuses on estimating fugitive methane emissions from open cut operations and mitigating the methane in underground mine ventilation air. The ACARP program was also instrumental in designing regulation for insitu calculation of emissions for open cut coal mines as part of NGERs.

Further information: <https://www.acarp.com.au/>

Member of COAL21

The COAL21 Fund was established in 2006 by the Australian black coal industry for the demonstration of low-emissions coal technologies, such as carbon capture and storage. The Fund is supported by a voluntary levy on coal production and includes 26 investors from among Australia's black coal producers, including Whitehaven.

COAL21 primarily invests in the development of low-emissions technologies for the coal-fired power generation sector and in emissions reduction from coal mines.

Up to 30 June 2018, COAL21 has seen \$374m committed to demonstrating low-emission technologies in the coal-fired power generation sector, and safe fugitive emissions abatement from coal-mining operations.

COAL21 is now preparing to commit a further \$255m for the period to June 2027, to meet its objectives to:

- Build community confidence in CCUS technology for safe, long-term CO₂ storage
- Demonstrate safe abatement of fugitive emissions from coal mines
- Assist in making the case for coal to remain a key part of Australia's future energy supply.

Projects funded by COAL21 include the CTSCo Carbon Capture and Storage Project in the Surat Basin near Wandoan in Queensland. CCUS can capture and store carbon dioxide from coal and gas fired power stations, as well as a wide range of other industrial processes, such as steel making and chemical processes. The CTSCo project is trialling the injection and underground storage of approximately 60,000 tonnes of carbon dioxide over 3 years.

Further information: <https://coal21.com/>