



# Cooking the Climate

## Wrecking the Reef

The global impact of coal exports from Australia's Galilee Basin

**GREENPEACE**



*The Alpha Project test  
pit is the first coal mine  
in the Galilee Basin.*

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Cover photo: Abbot Point coal terminal,  
with the Caley Valley Wetlands behind.

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An aerial photograph of a landscape. In the foreground, there is a large, calm body of water with a muddy, brownish tint. A dirt road or path runs along the edge of the water. The background shows a vast, flat landscape with sparse vegetation and a clear blue sky.

Advanced plans are in place to build nine mega mines in one region of Queensland, Australia. Located in the Galilee Basin, five of these projects would each be larger than any coal mine currently operating in the country. If these go ahead, they could produce more coal than Australia currently exports. If the Galilee Basin were a country, the carbon dioxide produced from using this coal would make it the seventh dirtiest fossil fuel burner on the planet.

The Galilee Basin coal boom is not just one of the greatest ever environmental threats to Australia, its climate implications are global.







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“This is the critical decade. Decisions we make from now to 2020 will determine the severity of the climate change our children and grandchildren experience. It is essential to transition to low emission development pathways if the world is to tackle climate change and achieve sustainable development.”

Australian Government submission to the Rio+20  
United Nations Conference on Sustainable Development, November 2011

# Introduction

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**At a time when the global scientific consensus indicates the world needs to shift away from climate damaging energy sources, Australia is embarking on a new coal rush at an unprecedented scale.**

With massive expansion plans across Queensland and New South Wales, and emerging coal export proposals in Victoria and Western Australia, Australian coal exports could more than double over the next decade. The one focus of this coal rush is the untapped Galilee Basin in Central Queensland. There are plans to build nine mega coal mines in the Galilee Basin, five of which would be larger than any existing coal mine in Australia. One of these mines, the Alpha Coal Project, including its 495km rail line, has already been approved by the Federal and Queensland Governments. If the nine mines proceed as planned, emissions from burning the coal would be around 700 million tonnes of carbon dioxide (CO<sub>2</sub>) every year. Ranked against current CO<sub>2</sub> emissions from fossil fuel burning of the biggest polluting countries in the world, the CO<sub>2</sub> emissions from burning the coal mined in the Galilee Basin would make it the seventh largest emitter of CO<sub>2</sub> globally.

Determining a coal mine's contribution to climate change is not a requirement of government environmental assessments. There is no legal mechanism to prevent development that represents an unacceptable lock-in of greenhouse pollution. Nor does Australia have to report the greenhouse emissions from burning the coal mined and exported here to the UN Framework Convention on Climate Change, because those emissions will be exported overseas. As a result, little consideration is given

to the cumulative climate implications of Australian coal exports. This report attempts to shed light on this, focussing on the impact the Galilee Basin would have on global efforts to avoid dangerous climate change if its development proceeds, as well as on Australia's own commitments to be part of a global agreement to do so.

Exploitation of the coal reserves in the Galilee Basin is incompatible with the internationally agreed goal of limiting global warming to below 2°C above pre-industrial temperatures. In fact, it would take us in precisely the opposite direction, releasing dangerously high levels of CO<sub>2</sub> emissions. It would undermine Australia's commitment to combating climate change and put the future of one of the world's greatest natural treasures – Australia's Great Barrier Reef – in jeopardy.

Developing the Galilee Basin involves building nine new mega coal mines, hundreds of kilometres of rail infrastructure and new and expanded coal export ports in the Great Barrier Reef World Heritage Area. In addition to the contribution to global warming, each individual project is accompanied by a range of threats to local ecosystems, human health, farmland and industries. This report analyses some of the threats from individual projects, who is driving the projects, and the role the Queensland and Australian Governments play in their oversight.

At a time when the science could not be clearer on the need to reduce global carbon emissions, and when governments worldwide are shifting to a low-carbon economy, exploiting the Galilee Basin is a reckless proposition. It is imperative that the Galilee Basin coal reserves remain in the ground.





## Cooking the climate: The current global outlook for climate change

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“A temperature of 4°C above pre-industrial levels would give an 85 per cent probability of initiating large-scale melt of the Greenland ice sheet, put 48 per cent of species at risk of extinction, and put 90 percent of coral reefs above critical limits for bleaching.”

Professor Ross Garnaut  
*Climate Change Review Update, 2011*

Scientists have tried to quantify the likely effects of different levels of global warming for people and weather patterns around the world. The last major assessment from the Intergovernmental Panel on Climate Change (IPCC) was the Fourth Assessment Report, completed in 2007. Work for the next report is currently underway, and is due to be completed in 2014.

The Fourth Assessment Report warned that CO<sub>2</sub> and other greenhouse gas pollution already in the atmosphere is likely to cause a contraction of snow cover area and a decrease in sea ice extent. It also warned that it is very likely global warming will increase the frequency of temperature extremes, heat waves and heavy precipitation and it's likely it will increase the intensity of tropical cyclones. Many semi-arid areas like the Mediterranean Basin, western United States, southern Africa and north-eastern Brazil are expected to suffer a decrease in water resources due to climate change. In Australia and New Zealand,



**“It would be irresponsible to ignore these scientific warnings and just hope the problem will go away. It won’t.”**

Australian Climate Change Minister Greg Combet, speech,  
*University of Korea, April 2012*

**“The outlook for the Great Barrier Reef ecosystem is at a crossroad, and it is decisions made in the next few years that are likely to determine its long-term future.”**

Great Barrier Reef Marine Park Authority (GBRMPA)  
*Great Barrier Reef Outlook Report 2009*

by 2030, “production from agriculture and forestry is projected to decline over much of southern and eastern Australia, and over parts of eastern New Zealand, due to increased drought and fire.”<sup>1</sup>

According to Australia's Climate Commission, there's a significant risk that if global average temperatures rise above 2°C relative to pre-industrial levels, “much of the Great Barrier Reef will be converted to an algae-dominated ecosystem.”<sup>2</sup>

Former Chief Scientist of the Australian Institute of Marine Science, Dr. Charlie Veron, has been frank in his assessment of the Reef's future due to the combined impacts of global warming and ocean acidification, both driven by CO<sub>2</sub> pollution, stating that “The way it is looking at the moment, I would expect the Great Barrier Reef to be largely destroyed by mid-century if we do not drastically reduce carbon dioxide emissions in the very near future. About mid-century, ocean acidification will have affected all coral reefs around the globe.”<sup>3</sup>

In July 2012, at an International Coral Reef Symposium held in Cairns, a consensus statement endorsed by 2000 scientists was released, which states that “The surface of the world's oceans has warmed by 0.7°C, resulting in unprecedented coral bleaching and mortality events” and that by the end of this century, “CO<sub>2</sub> emissions at the current rate will warm sea surface temperatures by at least 2-3°C, raise sea-level by as much as 1.7 meters, reduce ocean pH from 8.1 to less than 7.9, and increase storm frequency and/or intensity. This combined change in temperature and ocean chemistry has not occurred since the last reef crisis 55 million years ago.”<sup>4</sup>

However, the fate of the Reef is not yet sealed; we still have the opportunity to avoid the worst impacts of climate change.

In December 2010, Australia and 193 other nations committed at the UN climate talks in Cancun, Mexico, to take action to keep the average global temperature rise below 2°C, and to consider whether even this degree of warming was too high, as our understanding of the extent and degree of climate change grows prior to the release of the next Assessment Report from the IPCC.<sup>5</sup>

Limiting global warming to less than 2°C still carries significant risk. Based on the scientific research undertaken since the Fourth Assessment Report, small island states and least developed countries fear that warming greater than 1.5°C would mean their countries could not survive, threatening the lives and livelihoods of millions of people.<sup>6</sup>

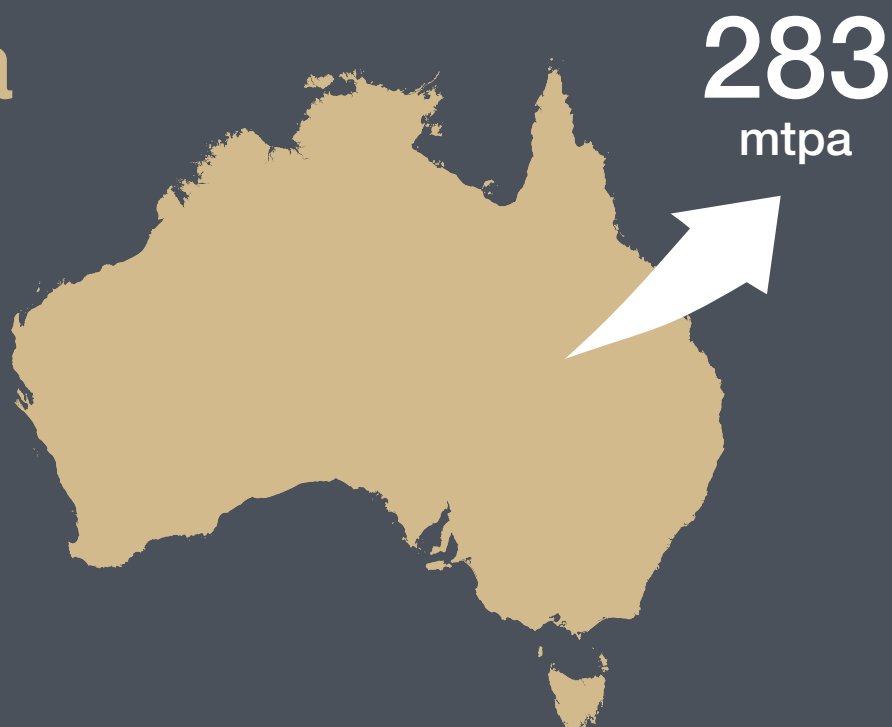
Despite a commitment to limit warming to less than 2°C, greenhouse gas emissions are increasing year on year and we are currently heading towards a global temperature increase of at least 3.5°C and potentially much more.<sup>7</sup> Deep and immediate reductions in greenhouse gas pollution need to be made if we are to avert such a dangerous future.

So what does it mean for climate change if Australia embarks upon unprecedented coal mining in the Galilee Basin?

Current:

# Australia

Coal exports for the whole of Australia in 2010-2011<sup>7</sup>



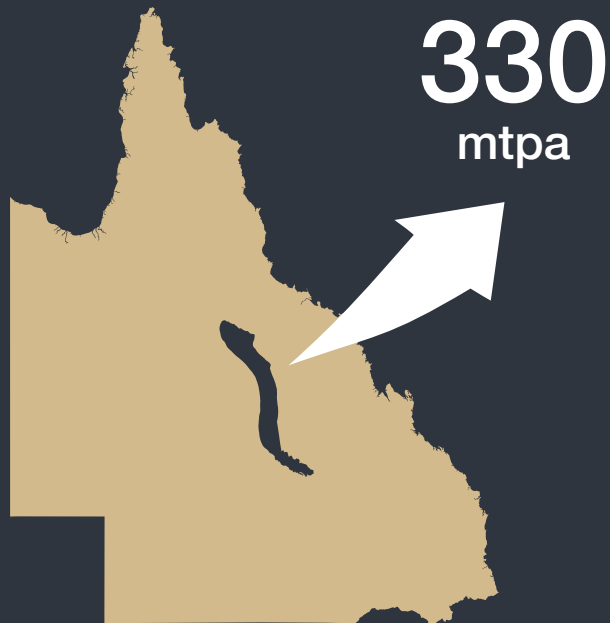
Proposed:

# Galilee Basin

Annual coal production capacity

*Based on proponents' own figures for coal production*

Mine	Full production (saleable coal mtpa)	Estimated CO <sub>2</sub> from combustion (mtpa)
Alpha Coal mine	30	64.7
Alpha North mine	40	85.6
Alpha West mine	24	51.8
Carmichael mine	60	128.4
China First mine	40	85.6
China Stone mine	60	128.4
Degulla Project	35 (est)	74.9
Kevin's Corner mine	27	57.8
South Galilee Coal Project	14	28.2
<b>Total</b>	<b>330</b>	<b>705.4</b>



*Table 1: Estimated maximum CO<sub>2</sub> emissions from combustion of the Galilee Basin mines' coal based on proponent information. See Appendix for details.*



# The climate implications of the Galilee Basin

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There are plans in place to build nine mega mines in Queensland's Galilee Basin. Five of these projects would each be larger than any coal mine currently operating in Australia. The proposed Carmichael and China Stone mines are each expected to produce 60 million tonnes a year at full capacity – roughly twice as much as the largest coal mine currently operating in Australia.

## Impact on global climate commitments

Greenpeace used figures for coal production provided by the mine proponents to estimate the greenhouse gas emissions that would result from burning coal from the proposed mines. Analysing this contribution in the context of global commitments to avoid dangerous levels of global warming, and conservative estimates of how the world might achieve these goals, paints an alarming picture.

Based on the proponents' own figures for coal production, these mines would have a projected combined production capacity of 330 million tonnes of coal per annum (mtpa). This figure is larger than the entire current coal export output of Australia, and would signify an unprecedented increase in the scale of coal mining.

Converting these coal production figures to greenhouse gas emissions, Greenpeace estimates that if all the proposed mines reached their estimated maximum production, the combustion of the coal from the Galilee Basin would result in additional CO<sub>2</sub> emissions of up to 705 million tonnes every year (see methodology in the Appendix).

Excluding emissions from land use, land use change and forestry (LULUCF), in 2010 Australia emitted 401.8 million tonnes of CO<sub>2</sub>.<sup>8</sup> By comparison, annual emissions resulting from burning the coal from Galilee Basin mines at full production would be 176% of this total.

Comparing the potential CO<sub>2</sub> emissions from burning the coal mined from the Galilee Basin with the CO<sub>2</sub> currently produced from burning fossil fuels in countries around the world, reveals that the Galilee Basin would rank as the world's seventh biggest contributor of CO<sub>2</sub> pollution from fossil fuel burning.



# 705

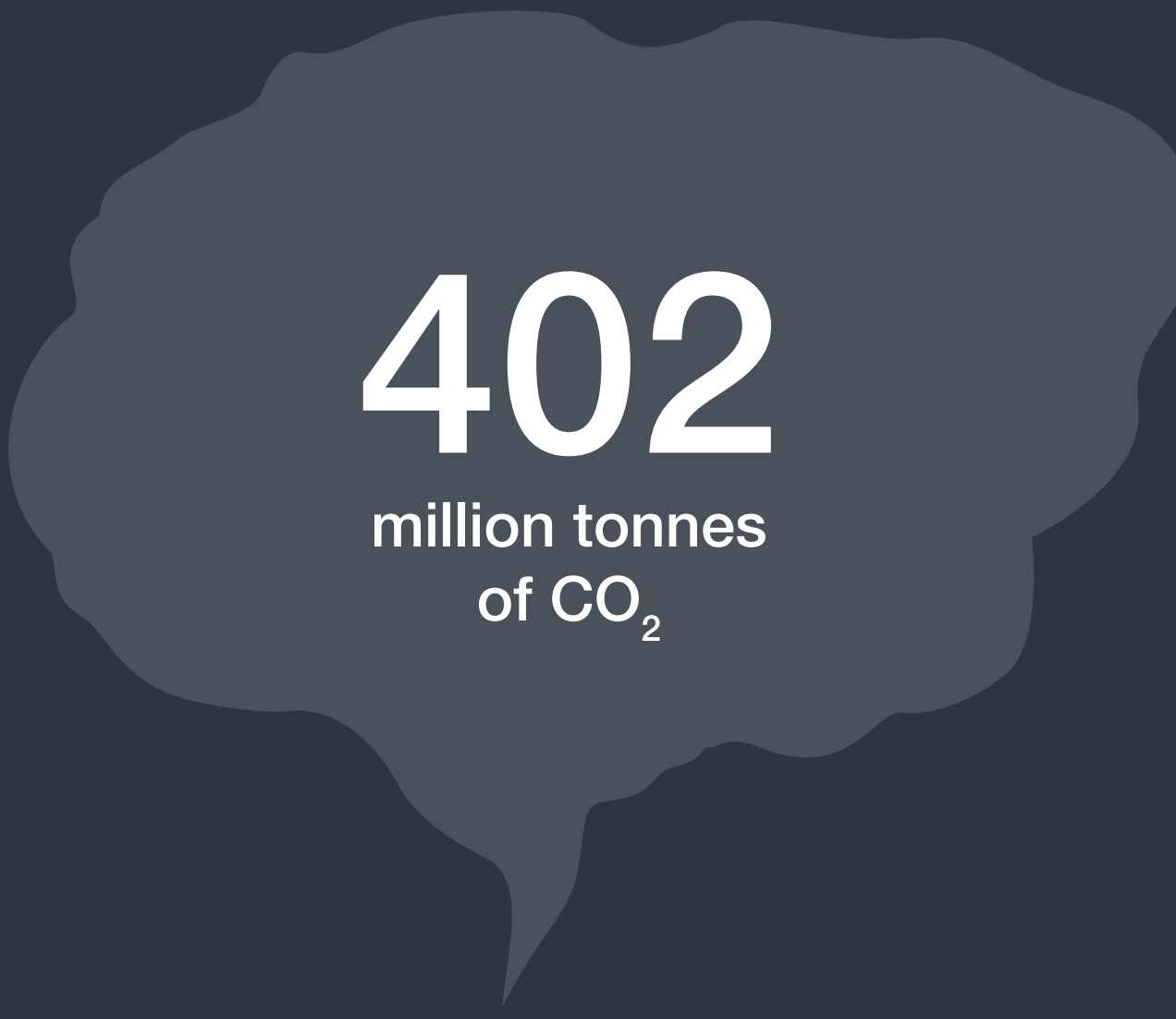
million tonnes  
of CO<sub>2</sub>

Proposed:

## Galilee Basin emissions

Annual emissions from coal combustion if all the  
proposed mines reach their maximum production.



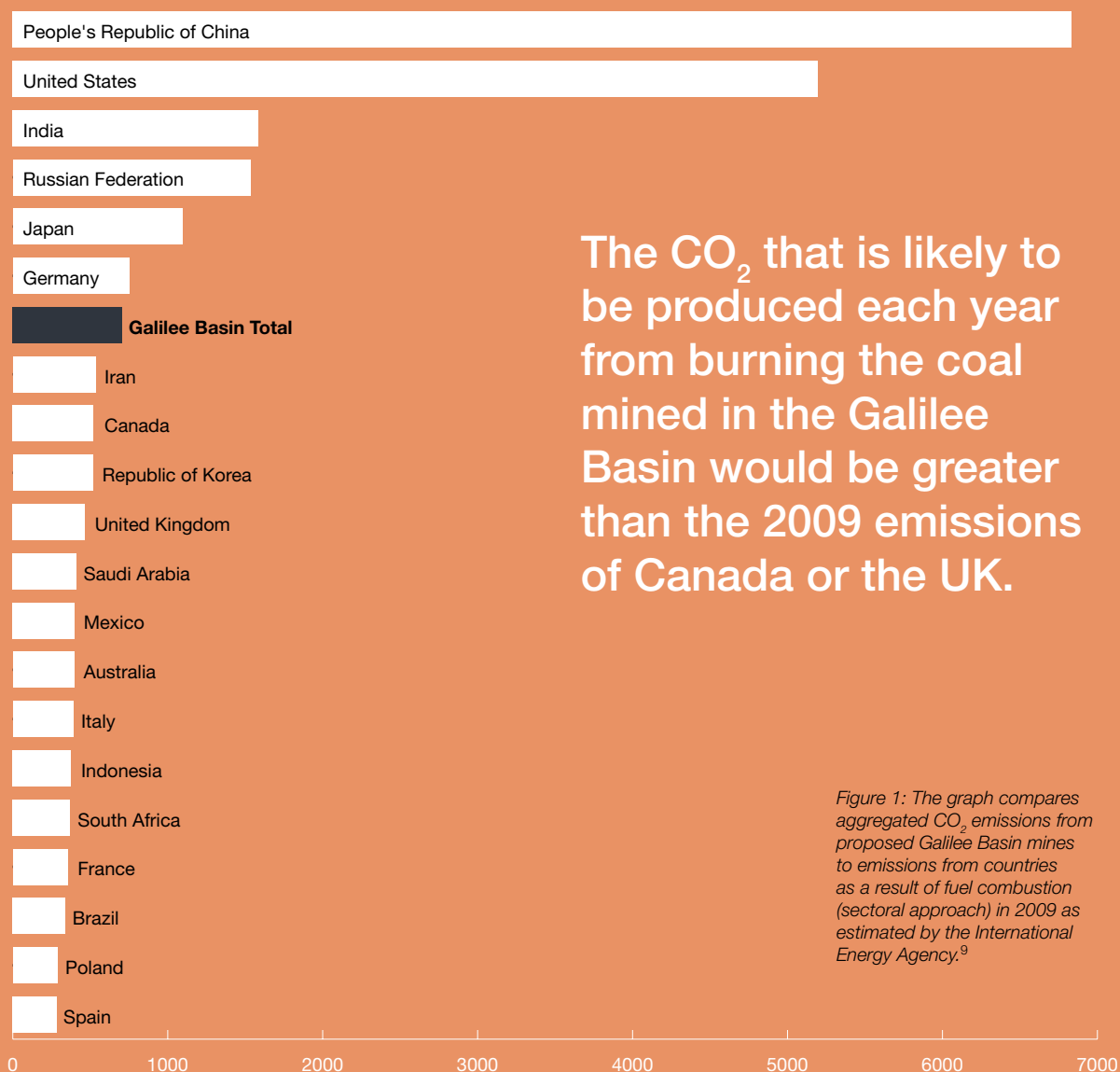


**402**  
million tonnes  
of CO<sub>2</sub>

Current:  
**Australian  
emissions**

In 2010, excluding emissions from land use,  
land use change and forestry (LULUCF).

If the Galilee Basin was fully developed today, it would be the world's seventh biggest contributor of CO<sub>2</sub> pollution from fossil fuel burning.





## Comparison of annual CO<sub>2</sub> emissions from fuel combustion globally with the Galilee Basin mine proposals

*This chart compares CO<sub>2</sub> emissions from burning the coal from individual and aggregated Galilee Basin mines to emissions from countries as a result of fuel combustion (sectoral approach) in 2009 as estimated by the IEA.<sup>10</sup>*

Region/Country/Economy		Region/Country/Economy		Region/Country/Economy	
1 People's Rep. of China	6832	33 Venezuela	155	65 Libyan Arab Jamahiriya	50
2 United States	5195	34 United Arab Emirates	147	66 Turkmenistan	49
3 India	1586	35 Pakistan	137	67 Hungary	48
4 Russian Federation	1533	36 Carmichael Coal Mine	128	68 Denmark	47
5 Japan	1093	37 China Stone Project	128	69 Serbia	46
6 Germany	750	38 Vietnam	114	70 Hong Kong, China	46
7 Galilee Basin Total	705	39 Uzbekistan	112	71 Singapore	45
8 Islamic Rep. of Iran	533	40 Czech Republic	110	72 Switzerland	42
9 Canada	521	41 Belgium	101	73 Bulgaria	42
10 Republic of Korea	515	42 Iraq	99	74 Sweden	42
11 United Kingdom	466	43 Algeria	93	75 Morocco	41
12 Saudi Arabia	410	44 Greece	90	76 Nigeria	41
13 Mexico	400	45 Alpha North	86	77 Trinidad and Tobago	40
14 Australia	395	46 China First	86	78 Ireland	39
15 Italy	389	47 Kuwait	81	79 Oman	39
16 Indonesia	376	48 Romania	78	80 Peru	39
17 South Africa	369	49 Degulla Project	75	81 Norway	37
18 France	354	50 Philippines	71	82 Slovak Republic	33
19 Brazil	338	51 DPR of Korea	66	83 New Zealand	31
20 Poland	287	52 Chile	65	84 Other Africa	29
21 Spain	283	53 Alpha Coal Project	65	85 Ecuador	28
22 Ukraine	256	54 Israel	65	86 South Galilee Coal Project	28
23 Turkey	256	55 Austria	63	87 Cuba	27
24 Chinese Taipei	250	56 Belarus	61	88 Azerbaijan	25
25 Thailand	228	57 Colombia	61	89 Bahrain	23
26 Kazakhstan	190	58 Syrian Arab Republic	60	90 Yemen	22
27 Netherlands	176	59 Kevin's Corner	58	91 Tunisia	21
28 Egypt	175	60 Qatar	57	92 Croatia	20
29 GVK Total	174	61 Finland	55	93 Lebanon	19
30 Waratah Coal Total	171	62 Portugal	53	94 Jordan	19
31 Argentina	167	63 Alpha West	52	95 Bosnia and Herzegovina	19
32 Malaysia	164	64 Bangladesh	51	96 Dominican Republic	18

## The Galilee Basin and global energy scenarios

The chief source of anthropogenic greenhouse gases worldwide is burning fossil fuels for energy. If greenhouse gas emissions are to be curbed and dangerous climate change prevented, wholesale reforms must be made to the energy sector globally. The International Energy Agency (IEA), supported by government bodies, international organisations and energy companies worldwide, produces annual models projecting energy generation and use under three main scenarios.<sup>11</sup>

The three scenarios are:

- **The Current Policies Scenario** charts the energy and emissions trajectory of current government policies – this scenario assumes no additional action on climate change is taken by governments.
- **The New Policies Scenario** charts the situation if recent policy commitments and plans announced by countries around the world to tackle issues such as energy insecurity, climate change and local pollution are implemented.
- **The IEA 450 Scenario** presents a global pathway to keeping long-term greenhouse gas concentrations below 450 parts per million (ppm). A target of 450ppm is often considered to be the threshold for avoiding ‘dangerous climate change’ by keeping average global warming to below 2°C. It is important to keep in mind that the 450ppm scenario provides only a 50% probability of limiting the global increase in average temperatures to 2°C, and that there is growing evidence that 2°C is a dangerous level of warming.

“On planned policies, rising fossil energy use will lead to irreversible and potentially catastrophic climate change.”

IEA World Energy Outlook 2011

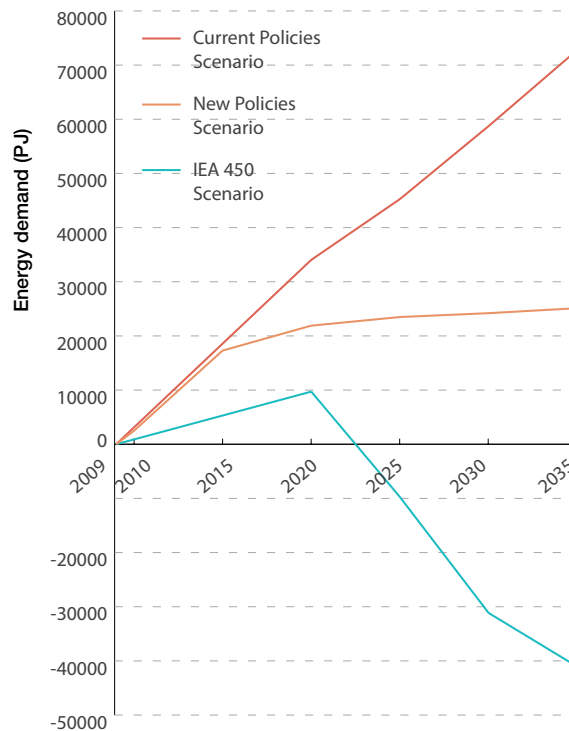


Figure 2: Demand for coal for electricity generation relative to 2009 (in energy units) in projections for the three IEA scenarios.

If the Galilee Basin mines go ahead the coal they produce will be burnt in power stations. Development of the Galilee Basin is dependent upon increasing demand for coal for electricity generation. We have analysed projected coal demand under the IEA scenarios (see Figure 2) and, by doing so, have assessed the compatibility of the Galilee Basin with various levels of international action on climate change.

Preventing global warming of 2°C above pre-industrial temperatures requires a significant reduction in greenhouse gas emissions. The IEA 450 Scenario achieves this through a number of measures including a significant reduction in coal consumption and a large increase in renewable energy use. It requires investments in new fossil fuel fired generation capacity to cease by 2017, and for the amount of electricity produced from coal to have fallen to below 1990 levels

## The Galilee Basin at maximum production would produce more coal than the entire projected global increase in demand for coal for electricity generation until after 2030.

by 2035. The scale of this cut highlights the dramatic reduction in coal burning that is required if we are to prevent dangerous climate change. Development of the Galilee Basin requires precisely the opposite – a substantial growth in coal-fired power generation and, consequently, of coal demand. Clearly, development of the Galilee Basin cannot occur if governments around the world take serious steps to prevent global temperatures rising by more than 2°C.

The IEA's New Policies Scenario charts energy production and consumption based on the energy policy commitments that the world's governments have already made. These are, as yet, insufficient to meet the agreed goal of limiting warming to below 2°C above pre-industrial temperatures. In fact, the IEA considers that these planned energy policies would result in greenhouse gas emission levels consistent with a long-term average temperature increase of more than 3.5°C.

Figure 3 shows the projected global increase in demand for coal for electricity generation under the New Policies Scenario, and the maximum coal production proposed for the Galilee Basin, calculated from information provided by the proponents of the mines. The Galilee Basin at maximum production would produce more coal than the entire projected global increase in demand for coal for electricity generation until after 2030. This raises serious questions about the commercial viability of the mines planned for the Galilee Basin.

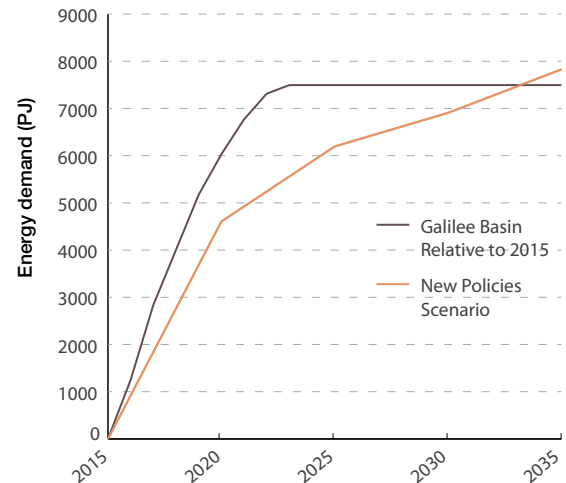


Figure 3: Demand for coal for electricity generation under IEA New Policies Scenario relative to 2015

Measured against the IEA projections of future coal demand, the exploitation of the coal reserves in the Galilee Basin would only be consistent with coal demand modelled by its Current Policies Scenario – a future where governments take no further action to limit greenhouse gas emissions and which the IEA predicts is consistent with an unacceptable 6°C or more of global warming.

The message from the IEA is that meeting the agreed goal of limiting global warming to below 2°C requires an international change in direction for energy production. The burning of coal for electricity generation needs to be substantially reduced. The Galilee Basin mines will only go ahead if world demand for coal continues to grow strongly, a scenario that would make the below 2°C target unattainable. The prospect that the Galilee Basin could go ahead and Australian coal exports could double compared to current levels relies on global coal consumption and greenhouse gas emissions heading in a direction consistent with 6°C of global warming. The exploitation of the coal reserves in the Galilee Basin is incompatible with global efforts and Australia's commitment to prevent dangerous levels of climate change.





## Impact on Australia's climate commitments

The Conference of the Parties  
“....recognizes that deep cuts in global greenhouse gas emissions are required according to science, and as documented in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, with a view to reducing global greenhouse gas emissions so as to hold the increase in global average temperature below 2°C above preindustrial levels;”

Cancun Agreements, 16th Conference of the Parties,  
UN Convention on Climate Change,  
December 2010 (UNFCCC 1/CP.16 (4))

Quantifying the CO<sub>2</sub> pollution of the proposed Galilee Basin coal mines exposes Australia's policy conflict. Having joined world governments in committing to limit global average temperature rise to below 2°C above pre-industrial levels, Australia is now embarking on a course of action that is incompatible with this goal.

By opening up the coal reserves of the Galilee Basin, Australia would unlock hundreds of millions more tonnes of CO<sub>2</sub> pollution. Yet to meet the commitment to keep global warming below a 2°C increase, the world needs to drastically reduce coal use in the coming years. The Galilee Basin mines will only go ahead if world demand for coal continues to grow strongly, which will make the 2°C target unattainable. By approving these mines and associated infrastructure, the Australian Government would be saying that this is acceptable. Far from acting to avoid dangerous climate change by restricting the global supply of coal, Australia may actually approve projects that will contribute to the threshold for dangerous climate change being breached. Against any acceptable scenario, exploiting the Galilee Basin is untenable.



*A Green turtle near Lady Elliot Island, Great Barrier Reef World Heritage Area.*  
©Tourism Queensland/Eddie Safarik

## Impacts on the Great Barrier Reef

One of the many disruptive impacts of climate change is the likely damage to Australia's iconic Great Barrier Reef. Coral is extremely sensitive to even short periods of increased sea temperatures, resulting in coral bleaching. A rise in sea temperature of 2-3°C is predicted by the end of the century under some climate models where greenhouse gas emissions are not tightly controlled.<sup>12</sup>

Meanwhile, ocean acidification, a result of oceans absorbing increasing amounts of carbon dioxide that humans are releasing into the atmosphere, is reducing the ability of corals to produce skeletons. The Great Barrier Reef Marine Park Authority (GBRMPA) predicts that ocean acidification may be the most significant climate factor affecting the Great Barrier Reef ecosystem.<sup>13</sup>

But the threat to the Reef from the Galilee Basin is also more immediate. The Great Barrier Reef stands between the Queensland coal rush and the power stations of Asia. The quantity of coal to be mined from the Galilee Basin requires extensive new infrastructure to be built in the Great Barrier Reef World Heritage Area, including new port terminals at Abbot Point and Hay Point. This

means millions more tonnes of sea floor dredging if the proposed plans proceed.<sup>14</sup> All of these proposals are depicted on the map overleaf. This is in addition to other major new coal ports proposed to be built in the sensitive Fitzroy River Delta, at the southern end of Keppel Bay.

So urgent is the situation for the Reef, that in June 2012 the United Nations World Heritage Committee supported the recommendations of the UNESCO Monitoring Mission in March 2012, which urged Australia to “not permit any new port development or associated infrastructure outside of the existing and long-established major port areas within or adjoining the property, **and to ensure that development is not permitted if it would impact individually or cumulatively on the Outstanding Universal Value of the property.**”<sup>15</sup> (our emphasis)

The Committee also indicated that the Reef could be listed as “World Heritage in Danger” in 2013 if decisive action is not taken to manage unprecedented development pressures. The actions of the Australian and Queensland Governments in the next year may determine the future of this unique and precious ecosystem.



# The Galilee Basin: Frontier of the coal rush

Mega mines in the Galilee Basin would need hundreds of kilometres of new rail lines to transport nearly 330 million tonnes of coal each year to ports in the Great Barrier Reef World Heritage Area. At what cost?



## Adani Enterprises Gautam Adani

Adani is a large Indian conglomerate with vertically integrated plans for coal mines, rail, ports and coal power stations in India.

- Carmichael mine (60 mtpa)
- Dudgeon Point coal terminal (180 mtpa)
- Rail line to Dudgeon Point
- T0 coal terminal at Abbot Point (35 mtpa)
- Existing T1 coal terminal at Abbot Point (50 mtpa)



## Hancock / GVK

### Gina Rinehart & Dr GVK Reddy

The most advanced project in the Galilee Basin is by Indian conglomerate GVK, which bought most of Gina Rinehart's Galilee coal projects in 2011.

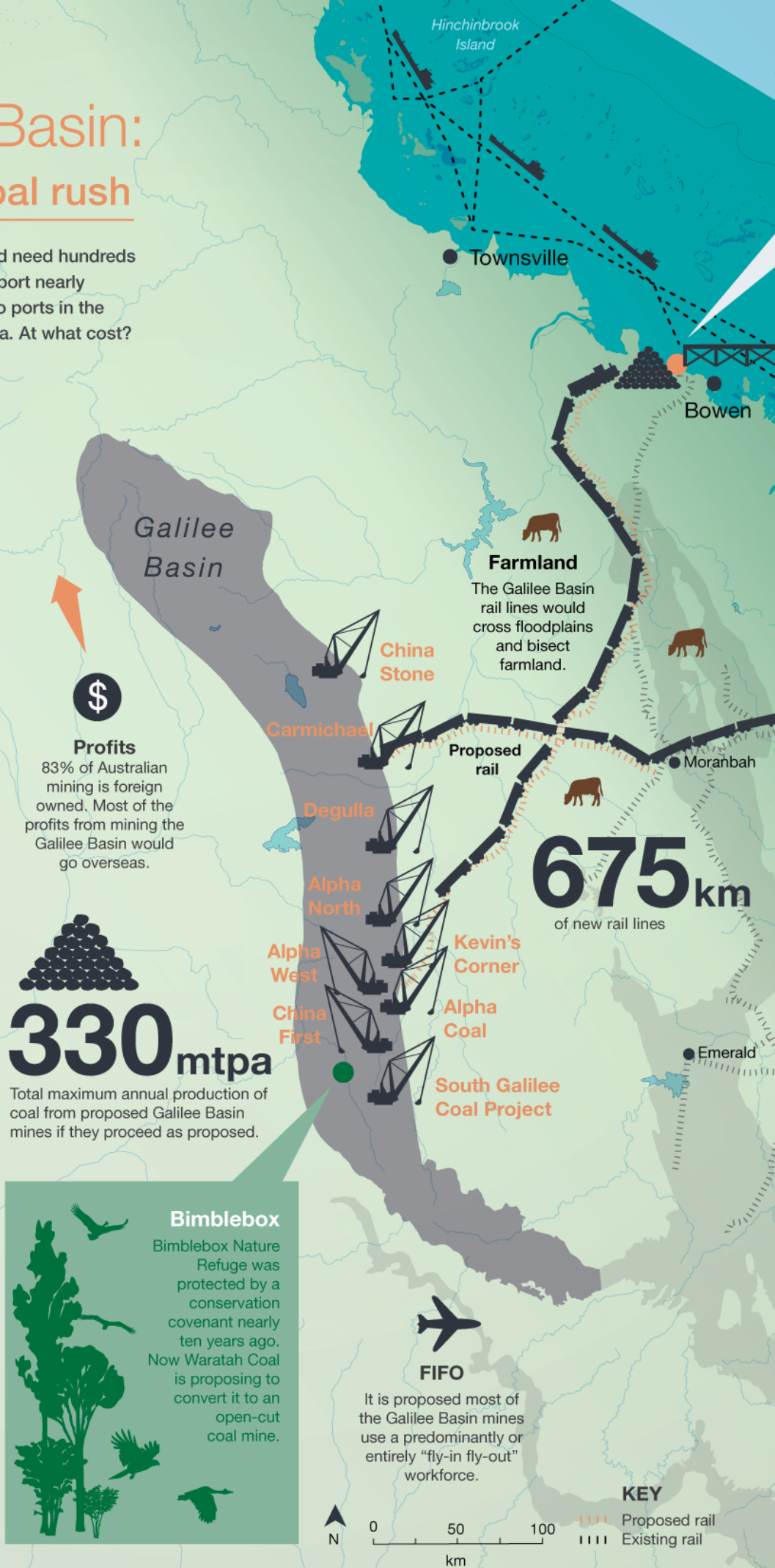
- Alpha coal mine (30 mtpa)
- Kevin's Corner mine (27 mtpa)
- Alpha West mine (24 mtpa)
- Alpha rail line to Abbot Point
- T3 coal terminal at Abbot Point (60 mtpa)



## Waratah Coal Clive Palmer

Waratah Coal is owned by Clive Palmer's company Mineralogy. The controversial China First mine is proposed to be built on top of Bimblebox Nature Refuge.

- China First mine (40 mtpa)
- Alpha North mine (40 mtpa)
- Rail line to Abbot Point
- Coal terminal at Abbot Point (240 mtpa)





### Abbot Point Coal Terminals

There are at least four new coal terminals proposed for Abbot Point that would together multiply its output more than five-fold and would make it one of the biggest coal export ports in the world.

### Humpback whale aggregation area

In the waters from Bowen south to Shoalwater

Whitsunday Islands

### Great Barrier Reef World Heritage Area

The World Heritage Reef is one of the greatest natural treasures on the planet. Its majestic coral reefs support an astounding diversity of marine life, as well as 50,000 jobs.

### Hay Point Coal Terminal Dudgeon Point Coal Terminal

The proposed new Dudgeon Point coal terminal could bring an additional 2000 ships through an area recently identified as an important wintering area for humpback whales.

# 705<sub>Mt</sub> CO<sub>2</sub> emissions

total CO<sub>2</sub> emissions from burning coal mined from all proposed Galilee Basin mines at maximum production.

Coral  
Sea

# 11,400

The potential total number of coal ships passing annually through the Reef if the proposed expansions, terminals and ports go ahead.

### Balaclava Island Coal Terminal Fitzroy Coal Terminal

The fragile and pristine Fitzroy Delta at the southern end of Keppel Bay is the site of two proposed new coal export ports – the Fitzroy Terminal project by the Mitchell Group, and Xstrata's Balaclava Island Coal Terminal.

Rockhampton

Heron Island

### Coal dust

There are serious concerns over the health impacts of coal dust on local residents.

Gladstone

Lady Elliot Island

### Gladstone Harbour

The impact of massive LNG developments in and around Gladstone Harbour prompted intervention from UNESCO and the World Heritage Committee. Authorities have yet to identify the cause of widespread disease of fish in the harbour, but local fishermen blame the suspension of sediments from dredging millions of cubic metres of sea floor to make way for the LNG and coal terminals. In addition to LNG developments on Curtis Island, Gladstone Harbour is the site of the 70 mtpa Wiggins Island coal export terminal, approved in 2008, and the proposed Yarwun coal export terminal.





# The Galilee Basin:

## Individual projects and impacts

### The coal mines

The scale of mining proposed in the Galilee Basin is unparalleled in Australia. Five of the nine proposed mines would be bigger than any existing mine in this country. The proposed mines are in various stages of development, and it is conceivable that given their scale and cost, not every mine will be built. Due to the size of each individual mine, however, the impact of even one mine would be considerable. If all nine mines go ahead, the impact on international, national and local environments would be devastating.

With tens of thousands of hectares of regional Australia earmarked for coal mines, habitat for hundreds of species would be permanently wiped out and significant ground and surface water resources altered or damaged.

Much of the Galilee Basin is subject to a native title claim on behalf of the Wangan and Jagalingou people. Given the scale of mining it seems highly likely that there will be significant cultural heritage and other impacts. Some of the companies involved have already entered into or have declared their intention to enter into Indigenous Land Use Agreements or other forms of agreement with traditional owners for mine, rail and port projects.

This section describes the proposed mines, their size, ownership and some of their environmental impacts.

Mine	Full production (saleable coal millions of tonnes pa)	Potential first year of production	Potential full production year
Alpha Coal mine	30	2015 (Q2)	2019
Alpha North mine	40	2016 (Q4)	2021
Alpha West mine	24	2016	2020
Carmichael mine	60	2014 (Q4)	2022
China First mine	40	2015 (Q1)	2017
China Stone mine	60	2016	2023
Degulla Project	35 (est)	2017 (est)	2022
Kevin's Corner mine	27	2015 (Q4)	2019
South Galilee Coal Project	14	2015 (Q1)	2022

Table 2: Mine production capacity and timing. See Appendix for references.



# Carmichael mine

60

Full production  
(saleable coal mtpa)

128.4

Estimated  
max CO<sub>2</sub> from  
combustion (mtpa)

## Adani

Adani is an Indian resources, logistics and energy company with big expansion plans. It is developing coal mining interests in India, Indonesia and Australia and plans to construct a series of massive coal power stations (resulting in 20,000 MW total capacity) in India by 2020.<sup>16</sup> The company also has interests in ports. It owns and runs Mundra, the largest privately owned port in India. In Australia, Adani leases the existing coal terminal at Abbot Point and has expansion plans there and at the port of Hay Point. Adani plans to integrate these business interests: burning Australian coal in its Indian power stations, transported through its Australian ports.<sup>17</sup>

## Carmichael

**Owner:** The Carmichael project was purchased in 2010 by Adani Group in a deal worth up to \$3 billion.<sup>18</sup>

**Description:** Carmichael, comprising both open cut (a third) and longwall operations (two thirds), would be Australia's largest coal mine, producing 60 million tonnes of coal per year during its 90 year lifespan.<sup>19</sup> Most of the mine's workforce would be flown directly to an airstrip at the mine site.<sup>20</sup>

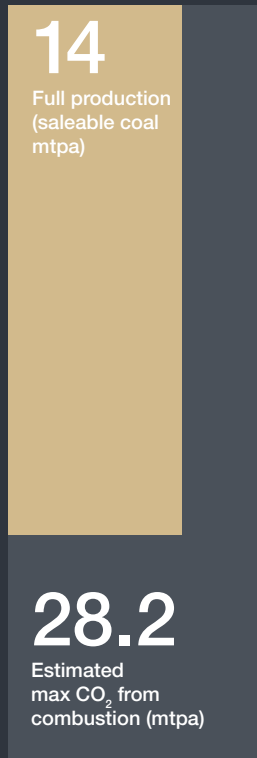
## Global environmental impacts:

The mine would have a maximum production capacity of 60 mtpa. This amount of coal, when burnt for electricity generation, would produce 128.4 million tonnes of CO<sub>2</sub>, greater than the 2009 CO<sub>2</sub> emissions from fuel combustion in Sweden, Norway and Denmark combined.

## Environmental impacts:

The Carmichael project's 40 km long open-cut mine<sup>21</sup> would destroy approximately 10,000 ha of land including most of the Bygana West Nature Refuge (approximately 1,100 ha) – a highly diverse area supporting two endangered regional woodland ecosystems and containing habitat suitable for a variety of animals including koalas.<sup>22</sup>

## South Galilee Coal Project



### AMCI & Bandanna

The exploration company Bandanna Energy owns four exploration permits for coal for the South Galilee Coal Project through subsidiary Alpha Coal Pty Ltd.<sup>23</sup> Through a deal in 2008, AMCI Capital now owns a 50% interest in the project.<sup>24</sup>

#### South Galilee Coal

**Owner:** A joint venture between Australian exploration company Bandanna Energy and private equity firm AMCI Capital.

**Description:** With a planned average production capacity of 13.6 mtpa, the open-cut and underground South Galilee coal project is the smallest advanced mine proposal for the Galilee Basin. The mine is located south of the township of Alpha, would have a lifespan of 30 years and is aiming for first coal in 2015.<sup>25</sup> The project's workforce would be nearly 100% fly-in fly-out.<sup>26</sup>

#### Global environmental impacts:

The mine would have an average production capacity of 14 mtpa over its lifetime. This amount of coal, when burnt for electricity generation, would produce 28.2 million tonnes of CO<sub>2</sub>, equivalent to the 2009 CO<sub>2</sub> emissions from fuel combustion in Cuba.

#### Environmental impacts:

The project's Environmental Impact Statement, detailing its ecological footprint, is yet to be released. It is known that the South Galilee Coal Project mining lease application area contains areas of endangered regional ecosystem and a number of watercourses.<sup>27</sup>







## Alpha Coal mine

30

Full production  
(saleable coal mtpa)

64.7

Estimated  
max CO<sub>2</sub> from  
combustion (mtpa)

### GVK

GVK is a diverse company engaged in bioscience, hotels, road and airport construction as well as oil and gas exploration, coal mining and power generation. Through purchasing a majority share in Hancock Coal's Galilee Basin projects, the company has massively expanded its resource and infrastructure business. It plans to integrate these coal mining assets with its coal power station expansion plans in India and sell the rest of the coal dug from the Galilee mines to electricity generators in other Asian countries.<sup>28</sup> The Native Title Tribunal register lists four Indigenous Land Use Agreements between Hancock Coal and with native title claimants in the areas to be affected by their railway and port.

## GVK & Hancock Prospecting

### Alpha Coal

**Owner:** Following a US\$1.26 billion<sup>29</sup> deal with Gina Rinehart's Hancock Coal in September 2011, Alpha Coal is 79% owned by Indian conglomerate GVK.<sup>30</sup> Rinehart's company retains a 21% stake in the mine.

**Description:** The Alpha Project is the only completely open-cut mine so far proposed for the Galilee Basin. It would produce 30 mtpa of washed coal for export<sup>31</sup> for approximately 30 years. It is the most advanced mine proposal in the Galilee Basin, with Queensland and Federal Government approval secured. However, the Federal Environment Minister has reserved a concurrence power for further plans required prior to construction commencing.<sup>32</sup> First coal is expected in 2015 with the mine reaching full output by 2019.<sup>33</sup>

### Global environmental impacts:

The mine would have a maximum production capacity of 30 mtpa. This amount of coal, when burnt for electricity generation, would produce 64.7 million tonnes of CO<sub>2</sub>, equivalent to the 2009 CO<sub>2</sub> emissions from fuel combustion in Israel.

### Local environmental impacts:

The mine would directly impact 20,618 ha of land, a range of different types of woodland and grazing land.<sup>34</sup> The project would require the clearing of thousands of hectares of high value habitat for important threatened species including the endangered Black-throated Finch, Star Finch, the vulnerable Red Goshawk, Southern Squatter Pigeon, Australian Painted Snipe, Greater Long-eared Bat and Yaka Skink.<sup>35</sup>

The project site is known to be home to over 160 vertebrate fauna species: 94 birds, 36 mammals, 27 reptiles and 10 amphibians.<sup>36</sup> The mammals include three species of wallaby, kangaroos, bettongs, echidnas, koalas and 17 species of bats.<sup>37</sup> The birds include the vulnerable Southern Squatter Pigeon and 24 migratory species.<sup>38</sup> The company has proposed building a tailings storage facility with a footprint covering 10% of the catchment for a regional sandstone aquifer, used by a number of landholders for their water supply.<sup>39</sup>

**Destination for coal:** GVK claims to have secured buyers for 100% of the coal from Alpha,<sup>40</sup> spread across seven countries: Japan, Taiwan, Vietnam, China, Korea, Philippines and India.<sup>41</sup>

# Kevin's Corner mine

27

Full production  
(saleable coal mtpa)

57.8

Estimated  
max CO<sub>2</sub> from  
combustion (mtpa)

## GVK

### Kevin's Corner

**Owner:** The project is 100% owned by GVK.<sup>42</sup>

**Description:** Located adjacent to the Alpha Project, the predominantly underground mine would export coal for at least 30 years. The mine is at an advanced stage of planning having already produced an environmental impact statement (EIS). GVK aims for first coal in 2016 with production ramping up over three years.<sup>43</sup> The EIS includes plans for a 2.5 km runway to provide air access for the mine's predominantly fly-in fly-out work force.<sup>44</sup>

**Global environmental impacts:**

The mine would have a maximum production capacity of 27 mtpa. This amount of coal, when burnt for electricity generation, would produce 57.8 million tonnes of CO<sub>2</sub>, greater than the 2009 CO<sub>2</sub> emissions from fuel combustion in Finland.

**Environmental impacts:**

The proposed mine is located on relatively productive alluvial plains.<sup>45</sup> The Cudmore Resources Reserve is located within the north-eastern section of the site. Part of this reserve is above an area set to be underground mined, threatening it with subsidence and a disrupted water table. The nearby Cudmore National Park is located approximately 700 metres west of the project boundary.

Over 8,000 ha of land would be cleared (including the destruction of 5213 ha of woodland) to make way for the mine and related infrastructure.<sup>46</sup> Vast swathes of additional land (19,507 ha), including 12,560 ha of woodland, could be affected by subsidence and water table disruption resulting from underground mining.<sup>47</sup>

There would also be underground mining beneath 16.7 ha of rare Brigalow Open Woodland, an Endangered Regional Ecosystem of which there is only 800 ha in the bioregion, threatening it with subsidence and a disrupted water table.<sup>48</sup> An endangered ecological community, Bluegrass Grassland, is also located in an area planned to be used as a transport corridor.<sup>49</sup> Over 160 fauna species have been identified on the project area including 92 bird species, 35 mammals, 26 reptiles and 10 different amphibian species.<sup>50</sup> The birds include six types of raptor and the threatened Southern Squatter Pigeon. The mammals include Eastern Grey Kangaroos, Red Kangaroos, wallaroos, bettongs, sugar gliders, dunnarts, echidnas and koalas.

## Alpha West mine

24

Full production  
(saleable coal mtpa)

51.8

Estimated  
max CO<sub>2</sub> from  
combustion (mtpa)

## GVK & Hancock Prospecting

### Alpha West

**Owner:** The project is 79% owned by GVK with Gina Rinehart's Hancock Group retaining the remaining 21%.<sup>51</sup>

**Description:** The proposed 24 mtpa<sup>52</sup> Alpha West mine would be located on part of the mining lease application for the Alpha Coal Project. Essentially it is an underground westerly continuation of the Alpha mine. Mining is planned to begin in 2016.<sup>53</sup>

### Global environmental impacts:

The mine would have a maximum production capacity of 24 mtpa. This amount of coal, when burnt for electricity generation, would produce 51.8 million tonnes of CO<sub>2</sub>, greater than the 2009 CO<sub>2</sub> emissions from fuel combustion in Bangladesh.

**Environmental impacts:** The mine proposal is less developed than the other two GVK proposals with the environmental approval process yet to begin.

## Hancock Prospecting

The Executive Chairperson of Hancock Prospecting (HPPL), Gina Rinehart, marked in 2010 "the historic first mining of the Galilee Basin" when opening the test pit at the Alpha coal mine in the company of Federal Resources Minister Martin Ferguson.<sup>54</sup> In September 2011 Hancock Coal sold the Kevin's Corner Project and "T3" terminal proposal at Abbot Point, along with a majority share (79%) in the Alpha and Alpha West projects to Indian conglomerate GVK for \$1.26 billion.<sup>55</sup>

# China Stone mine

60

Full production  
(saleable coal mtpa)

128.4

Estimated  
max CO<sub>2</sub> from  
combustion (mtpa)

## Macmines Austasia

Macmines Austasia is owned by the Meijin Energy Group, established and run by the Shanxi-based Yao family. The group employs over 14,000 people and is the largest private coke producer in China.<sup>56</sup> The group claims to have access to over 3 billion tonnes of coal reserves in 10 mines, extensive interests in steelmaking, coal, gas and associated coal products.<sup>57</sup>

### China Stone

**Owner:** Chinese-owned Macmines Austasia

**Description:** Four longwall and one open-cut mine would produce 60 mtpa of thermal coal for two of China's largest power groups<sup>58</sup> (each company taking 30 mtpa).

**Global environmental impacts:**

The mine would have a maximum production capacity of 60 mtpa. This amount of coal, when burnt for electricity generation, would produce 128.4 million tonnes of CO<sub>2</sub>, greater than the 2009 CO<sub>2</sub> emissions from fuel combustion in Sweden, Norway and Denmark combined.

**Environmental impacts:**

The mine area is fragmented, as part of the region has been placed off-limits to mining in order to protect the catchment of Lake Buchanan. This saline lake is home to a number of newly discovered and probably endemic species including the Lake Buchanan button grass and the vulnerable Lake Buchanan blue bush. The lake is also a significant refuge of Lake Buchanan's fairy shrimp.<sup>59</sup>



## Alpha North mine

40

Full production  
(saleable coal mtpa)

85.6

Estimated  
max CO<sub>2</sub> from  
combustion (mtpa)

### Waratah Coal

Waratah Coal is owned by Clive Palmer's company Mineralogy. He purchased Waratah Coal in late 2008 and has been seeking to turn its coal resources into a series of mega mines since then. Through Mineralogy, Clive Palmer has a range of other businesses, including a nickel smelter in Townsville and massive iron ore deposits in Western Australia.<sup>60</sup>

#### Alpha North

**Owner:** Clive Palmer's Waratah Coal

**Description:** In addition to the China First coal project, Clive Palmer's Waratah Coal proposes three other mining developments in the Galilee Basin. Of these, Alpha North is the most advanced. The project is located north of the Kevin's Corner mine and combines open-cut and underground mining to produce 40 mtpa of coal – equal to the China First mine. Waratah Coal states the mine would “deliver quality thermal coal to China.”<sup>61</sup>

#### Global environmental impacts:

The mine would have a maximum production capacity of 40 mtpa. This amount of coal, when burnt for electricity generation, would produce 85.6 million tonnes of CO<sub>2</sub>, greater than the 2009 CO<sub>2</sub> emissions from fuel combustion in Kuwait.

#### Environmental impacts:

Part of the project area is located on the Cudmore National Park and the Cudmore Resources Reserve. A recent Waratah Coal publication has shown that the company plans to longwall mine beneath both the national park and the reserve area.<sup>62</sup>



Some of the  
wildlife and  
beauty of the  
Bimblebox  
Nature Refuge.  
©Greenpeace/  
Sonya Duus



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©Greenpeace/Neil Humphries



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## China First mine

40

Full production  
(saleable coal mtpa)

85.6

Estimated  
max CO<sub>2</sub> from  
combustion (mtpa)

**Bimblebox  
Nature Refuge**

Total area: 8,000ha

Half of Bimblebox will be  
threatened by subsidence  
and groundwater impacts  
from underground mining.

Half of Bimblebox will be  
destroyed by open cut  
mining if the China First  
mine goes ahead.

## Waratah Coal

### China First

**Owner:** Clive Palmer's  
Waratah Coal.

**Description:** Aiming for first coal production in early 2015,<sup>63</sup> the China First project includes two open-cut and four underground longwall mines with a combined output of 40 mtpa. Funding for the \$4.0 billion mine<sup>64</sup> is expected to flow from Chinese state-owned banks, the project is to be built by Chinese state-owned companies and its coal is destined for Chinese power stations.<sup>65</sup>

### Global environmental impacts:

The mine would have a maximum production capacity of 40 mtpa. This amount of coal, when burnt for electricity generation, would produce 85.6 million tonnes of CO<sub>2</sub>,<sup>67</sup> greater than the 2009 CO<sub>2</sub> emissions from fuel combustion in Kuwait.

### Environmental impacts:

Half of the 8,000 ha Bimblebox Nature Refuge would be wiped out by open-cut mining and the remainder lies above proposed underground mines, so would be disturbed by subsidence and altered groundwater.<sup>66</sup>

## Bimblebox Nature Refuge

In 2003, the owners of the Bimblebox Nature Refuge signed an agreement with the Queensland Government to permanently protect the conservation values of the property. This biodiversity refuge, located in the Desert Uplands bioregion, is almost entirely covered by remnant woodland.

Currently, half of the 8000 ha Bimblebox Nature Reserve is slated for open-cut coal pits under Waratah Coal's China First mine proposal. The refuge contains a range of ecosystems, supports at least 220 plant species and around 150 bird species. The nationally endangered Black-throated Finch<sup>67</sup> has been recorded on the property, as have the vulnerable Red Goshawk and Squatter Pigeon.



# Degulla Project

35<sub>(est)</sub>

Full production  
(saleable coal mtpa)

74.9

Estimated  
max CO<sub>2</sub> from  
combustion (mtpa)

## Vale

Vale claims that it is the second biggest mining company in the world, operating in 38 countries across five continents and employing over 100,000 people. In Australia, outside of the Galilee Basin, Vale has interests in other coal mines in Queensland and New South Wales.<sup>68</sup>

## Degulla

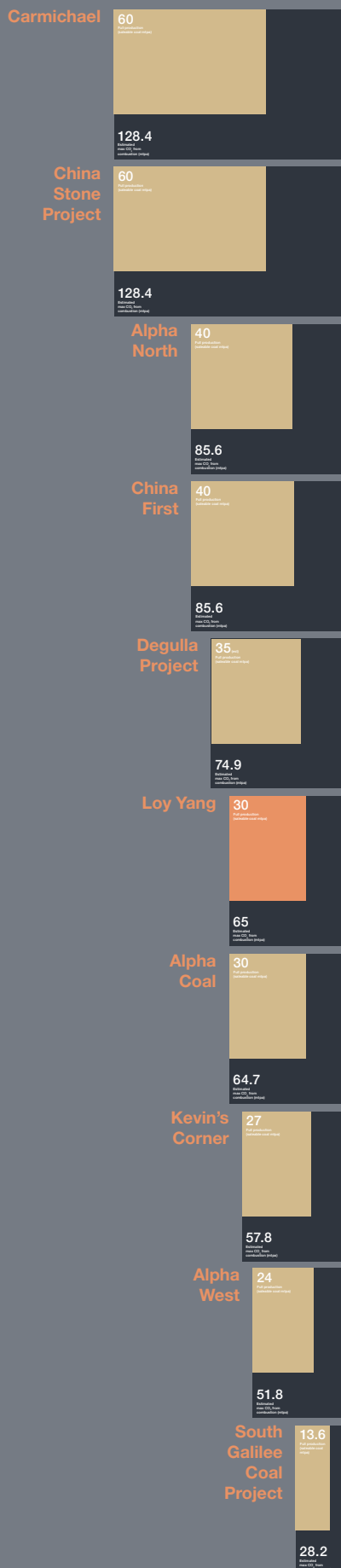
**Owner:** The Brazilian mining giant Vale owns a number of coal exploration permits in the Galilee Basin including the site of the Degulla Project.

**Description:** Vale has stated the mine would have a 20-45 mtpa capacity from four seams, three mined open-cut and one by longwall although the project is still to be properly defined.

**Global environmental impacts:** We have estimated that the mine could have a maximum production capacity of 35 mtpa. This amount of coal, when burnt for electricity generation, would produce 74.9 million tonnes of CO<sub>2</sub>, greater than the 2009 CO<sub>2</sub> emissions from fuel combustion in the Philippines.

## Environmental impacts:

Vale has not begun the formal public environmental approval process for its mine, making it difficult to assess the full environmental impact. However, the three Vale exploration permits in the area all contain endangered regional ecosystems with one containing two nature refuges, although it is unlikely that the coal to be mined by Vale lies directly below these.



Five of these  
projects would  
each be larger  
than any coal  
mine currently  
operating in  
Australia.

## Loy Yang

### Current largest mine in Australia

The massive Loy Yang mine, feeding Loy Yang Power Station in Victoria's Latrobe Valley, produces 30Mt of brown coal per annum.<sup>69</sup>



*Hundreds of kilometres of dedicated railway will need to be built to take the Galilee Basin coal to port for export.*

*©Greenpeace/Andrew Quilty*

## The rail lines

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**The Galilee Basin lies a long way inland from the existing coal export infrastructure of the Bowen Basin. In order to transport coal from the Galilee to the ports of Abbot Point and Hay Point, hundreds of kilometres of new rail lines will need to be constructed through farmland, woodland and across floodplains.**

Several companies have developed their own competing proposals for rail lines, prompting concerns among graziers that multiple, criss-crossing rail lines would seriously disrupt agricultural production. While originally promising a single rail line from the Galilee Basin, the Queensland LNP Government has put its weight behind two rail proposals: a north/south corridor and an east/west corridor.<sup>70</sup>

The preferred north/south corridor is the proposal by GVK/Hancock to build a 495 km rail line from the southern part of the Galilee Basin (near the town of Alpha) to Abbot Point. The preferred east/west corridor is the proposal by Adani to build a new 180 km rail line from its proposed Carmichael mine site (in the middle of the Galilee Basin) to intersect with the existing Bowen Basin rail network near Moranbah.<sup>71</sup> Adani is collaborating with the existing rail operator, QR National, to integrate with the existing rail network and to enable access to proposed new ports at Abbot Point and Dudgeon Point.

The rail lines from the Galilee Basin would cross the flood plains of Central Queensland on raised tracks, causing considerable local concern that they will act as levies, change the hydrology of the floodplain and expose landowners to increased risk of flood damage and loss of agricultural production.<sup>72</sup> Landowners are also concerned that moving millions of tonnes of coal in open-topped wagons at 80 km/h would result in considerable amounts of coal dust being blown into the air and deposited on grazing land near the rail line.<sup>73</sup>



## The coal ports

The Great Barrier Reef is not only one of the most spectacular and rich ecosystems on earth, it is worth over \$5 billion annually to the Australian economy and supports over 50,000 Australian jobs.<sup>74</sup> Today, the Reef faces a two-pronged assault from the coal industry. In addition to the threat of climate change, the Great Barrier Reef World Heritage Area risks becoming a coal super highway, with a massive proposed expansion of coal ports and a dramatic increase in shipping numbers.

The proposed major ports that will export coal from the Galilee Basin are Abbot Point, near Bowen, and the Port of Hay Point, near Mackay. If expansion plans go ahead as indicated, these two ports, which lie within the Great Barrier Reef World Heritage Area, will become two of the largest coal ports in the world. Such a massive expansion would see thousands of extra coal ships travelling through the Reef each year, millions of tonnes of sea floor dredged and potentially dumped in the Marine Park, and coastal and marine ecosystems and species habitat damaged or destroyed.

The impacts of Liquefied Natural Gas (LNG) developments at the Port of Gladstone paint a picture of the destruction such developments can wreak on the local environment and the economies that depend on it. UNESCO has warned that it may list the Great Barrier

Reef World Heritage Area as "in danger" in 2013 unless Australia acts decisively on a series of recommendations to avert the clear threats to the Reef's "Outstanding Universal Value".<sup>75</sup>

There are nine new coal port or terminal projects currently in the planning system along the Great Barrier Reef coast. These include the proposed Fitzroy and Balaclava Island terminals in the pristine Fitzroy River delta at the southern end of Keppel Bay, and the Yarwun terminal in Gladstone Harbour. A complete list of existing and proposed ports and terminals is included in Appendix 2. All of these new terminal or port proposals have the potential to impact individually and cumulatively on the Outstanding Universal Value of the Great Barrier Reef World Heritage Area. In this report, we concentrate on the Port of Abbot Point and the Dudgeon Point development at the Port of Hay Point, as these will service the Galilee Basin mines, although not all of the additional capacity of these expanding ports will be taken up by coal mined from the Galilee.

Despite inadequate analysis and understanding of the potential cumulative impacts of these developments, and ahead of a planned broad scale Strategic Assessment of the Reef and its management, these expansive and destructive coastal port developments continue to make their way through the approval process.

Current and proposed capacity at Hay Point and Abbot Point		Current capacity (mtpa)	Proposed capacity (mtpa)	FY 2011 vessels	Predicted vessels
Port of Hay Point	Hay Point Coal Terminal	44	75	892	1,625
	Dalrymple Bay Coal Terminal	85	85 +		
	Dudgeon Point Coal Terminals	-	180	-	2,000
	<b>Total</b>	<b>129</b>	<b>340</b>	<b>892</b>	<b>3,625</b>
Abbot Point	Terminal 0	-	35	-	441
	Terminal 1	50	50	190	631
	Terminal 2	-	60	-	574
	Terminal 3	-	60	-	508
	Waratah Coal Terminal	-	240	-	2,667
	<b>Total</b>	<b>50</b>	<b>445</b>	<b>190</b>	<b>4,821</b>

See Appendix for references

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### Abbot Point port

**Owners:** Adani has a 99 year lease on the current terminal. Development proposals for other terminals are in process from Adani, BHP Billiton, GVK and Waratah Coal.

**Description:** The port of Abbot Point has a current capacity of 50 million tonnes of coal a year through a two-berth ship terminal leased by Adani. Three new coal terminals are proposed adjacent to this: a 35 mtpa expansion by Adani (Terminal 0)<sup>76</sup> and two new 60 mtpa terminals to be built by BHP Billiton (Terminal 2)<sup>77</sup> and GVK (Terminal 3).<sup>78</sup> Together these developments would increase the number of ship berths at the port to eight and its coal capacity to 205 mtpa.

Clive Palmer's Waratah Coal plans to build a coal terminal that could be even larger than all the other developments at Abbot Point combined. This mega terminal would be the largest in Australia with a capacity of 240 mtpa<sup>79</sup> (equivalent to 85% of Australia's 2011 coal exports).

**Environmental impact:** Development proposals from GVK, BHP Billiton and Adani would necessitate the dredging of 3,000,000 m<sup>3</sup> of material from the waters around Abbot Point. The dredging waste may then be dumped in the Great Barrier Reef Marine Park. The beach next to Abbot Point is a known nesting site for turtles and the waters form part of a Humpback whale aggregation site. Such sites are described in the Federal Government's Humpback Whale Recovery Plan 2005-2010 as "habitat important (and potentially critical) to the survival of humpback whales."<sup>80</sup>

The dredging operations would destroy seagrass suitable for turtle and dugong foraging, have the potential to injure or kill turtles and other animals and would result in a plume of sediment up to three km<sup>2</sup> in size visible from the air.<sup>81</sup>

On land, the coal terminals proposed by GVK and BHP Billiton would be located close to the beautiful Caley (Kaili) Valley wetlands. High in ecological significance within the Great Barrier Reef catchment, the wetlands are a seasonal home to thousands of birds. Impacts from the coal terminals would primarily

**"We're talking about the Reef. If you can't get your environmental protections and systems in place on this one you may as well give up."**

Federal Environment Minister Tony Burke  
612 ABC Brisbane 6 June 2012

stem from initial clearing and enclosure of parts of the wetland, from runoff laden with coal contaminants, coal dust blowing off the stockpiles and from the light and noise generated by a 24 hours a day industrial site.<sup>82</sup> Trains supplying the terminal would also have an additional impact on the area. The approval of the Alpha Coal Project by the Queensland and Federal Governments means the loss of 16 hectares of the wetland and the enclosure of a further 99 hectares to build a rail loop to GVK's proposed T3 terminal.<sup>83</sup>

The scale and potential impact of the Waratah Coal proposal is huge. It would require a 2.5 km long wharf capable of handling eight coal ships.<sup>84</sup> This would be fed by an 8.5 km long conveyor that would cut across the Caley Valley wetlands. The stockpiles of coal to feed the terminal would cover 320 hectares of land, in addition to the area required for rail loops and other infrastructure.<sup>85</sup>

Waratah Coal has not quantified the volume of dredging required to allow ships to reach the proposed wharf but given the scale of the project this would almost certainly run to millions of cubic metres. If all the proposed developments for Abbot Point currently in the planning system get approval (not including the recently scrapped Multi Cargo Facility), maximum ship numbers for the port would reach an estimated 4800 a year.<sup>86</sup>



*Divers in the Pixies Garden,  
Great Barrier Reef World  
Heritage Area.*  
© Tourism Queensland/Darren Jew

### Hay Point port

In addition to its expansion plans at Abbot Point, Adani is also joint developer of the proposed 180 mtpa Dudgeon Point coal terminals project at the port of Hay Point. It is possible that coal from Adani's and some other Galilee mines would be exported through this additional capacity.<sup>87</sup>

**Owners:** Two coal terminals currently operate at Hay Point. One is leased by Brookfield Infrastructure (a Bermuda-based global infrastructure company)<sup>88</sup> and the other owned by the BHP Billiton Mitsubishi Alliance.<sup>89</sup> The new terminals at Dudgeon Point would be constructed and operated by Adani and Brookfield Infrastructure.<sup>90</sup> North Queensland Bulk Ports (NQBPs) manages the port on behalf of the Queensland Government.

**Description:** The two coal terminals currently operating have a combined capacity of 129 mtpa,

with plans to more than double this by building a 180 mtpa expansion at Dudgeon Point to the north of the existing terminals. The Dudgeon Point proposal consists of two 90 mtpa coal terminals and would require eight ship berths, resulting in up to 2000 extra ships visiting the port each year.<sup>91</sup> If this development proceeds, the maximum number of ships for the whole Hay/Dudgeon Point Port complex would be 3600.<sup>92</sup>

In addition to concerns over the impact on the marine environment, the proposed port expansion at Dudgeon Point is creating serious concern within the local community over the health impacts of coal dust on nearby residents. The Queensland Government's NQBP states that workers may need to be brought in from overseas to meet the labour demand during the terminal's construction.<sup>93</sup>



# The changing economics of coal

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## Global context

**Australia is being asked to accept the loss of fertile agricultural land, clean rivers and aquifers, the Great Barrier Reef and the opportunity to avoid dangerous levels of global warming as the inevitable cost of prosperity. In reality, the era of coal is ending and Australia risks being stranded in the hole it leaves behind.**

Global energy markets are changing. Last year, global investment in renewable energy exceeded investment in fossil fuel energy generation and reached record investment levels, despite difficult global financial circumstances.<sup>94</sup> This is a reflection of a profound and disruptive trend where the long-term costs of fossil fuels are increasing while the costs of renewable energy technologies are falling rapidly.

The current coal rush can be seen as part of a final push to lock in infrastructure before the inevitable shift towards low-carbon energy sources. It is being driven in large part by optimistic future demand scenarios for coal in India and China which fly in the face of the longer term trends that are redefining global energy markets. This optimism over future coal demand also ignores commitments made by those countries, with the rest of the world, to limit global warming to below 2°C above pre-industrial temperatures. The international coal market is dominated by just six countries, with Australia and Indonesia alone responsible for half the internationally traded thermal coal.<sup>95</sup>

While there are proposals in India for the construction of over 300 new coal plants, as the new energy dynamic unfolds, it is clear that many if not most of these plants are unlikely to be built. This is largely due to the acute shortage of cheap domestic coal, the high cost of imported coal, and plummeting prices for alternative sources of energy.<sup>96</sup> Massive new coal projects such as the 4000MW Tata Mundra and Krishnapatnam “ultra mega power plants” in India are facing financial strain as high coal prices undermine their economic viability. Construction of the Krishnapatnam plant was suspended in mid-2011<sup>97</sup> and Tata Power recently announced that it was putting on hold all new imported-coal based projects.<sup>98</sup>

**The current coal rush can be seen as part of a final push to lock in infrastructure before the inevitable shift towards low-carbon energy sources.**

HSBC has analysed the effect of India's climate change and energy policies, and concludes that the country is moving “decisively in favour of low-carbon growth,” estimating that solar power will reach retail grid parity with coal in India by 2015, and wholesale parity by 2018.<sup>99</sup>

A similar pattern is emerging in China, with record-setting investments in renewable energy, coupled with rising costs and growing health and environmental concerns over coal power. Perhaps the greatest indicator of this trend is the inclusion of a coal consumption cap for the year 2015 in the latest five year plan of the Chinese central government.<sup>100</sup> Along with existing customers like Japan and South Korea, India and China are proposed to be major destinations for much of the coal mined for the Galilee Basin. The rush to massively increase thermal coal exports from the Galilee Basin is part of the last gasp of the old economy, and risks locking in a generation of polluting coal infrastructure.

Contrary to industry claims, if large-scale thermal coal exports from the Galilee Basin do not proceed, it is unlikely that this scale of production could be achieved from other countries in timeframes within which new coal plants would be economically viable.

Energy markets are at a point of flux and Australia's push to radically increase coal exports could have a strong impact in driving more polluting energy investment. The scale of Australia's coal exports are crucial in determining the future of energy investment and the future of the global climate.

## Local context

**The coal boom in Queensland is putting severe strain on the environment, communities and the economy, with growing concern that the sheer scale and speed of the boom is out of balance.<sup>101</sup>**

The social impacts of the fly-in fly-out model, increasing living costs and the emergence of a two-speed economy are putting increasing strain on many families and communities. The manufacturing industry is feeling the pinch through competition for skilled workers and record high exchange rates driven by the mining boom. Other industries such as tourism and agriculture are also feeling the impact of the high Australian dollar, as well as the direct impacts of mining on farmland and the Queensland coastline.

For example, the Environmental Impact Statement for Clive Palmer's China First mine revealed that the mine would result in 3000 jobs lost across Australia in manufacturing, agriculture and tourism.<sup>102</sup> More local impacts of this project on small and medium-sized businesses include higher bills for payroll and rent and a crisis of housing affordability for those who will not be employed in the new mines.<sup>103</sup>

Despite the boom, mining as a whole only employs around 2% of the Australian workforce, with many more people employed in manufacturing, tourism, agriculture and other sectors that are being impacted by mining.<sup>104</sup> Staggeringly, 83% of the mining industry in Australia is foreign-owned.<sup>105</sup> While Australia bears many of the negative impacts of this once-only rush to dig up resources, many of the benefits head offshore.

While the coal industry is quick to trumpet its contribution, nobody is tallying up all of the costs, not least on the World Heritage listed Great Barrier Reef, which is the backbone of a \$5 billion tourism industry employing over 50,000 people.<sup>106</sup> The profound failure of Australia's regulatory system means there is no serious analysis of the combined negative impacts of such a large-scale expansion of mining on communities, the economy, local environments, groundwater, rivers or the global climate.

Alarmingly few elected leaders are even asking the question "can Australia afford to do this?"

**"We must not overlook a fundamental contradiction between the way global fossil fuel reserves are evaluated and long-term policy goals. By ignoring this contradiction, companies and markets, as well as governments, are undermining management of the huge risks that rising levels of greenhouse gases pose to their survival."**

Lord Nicholas Stern  
*Financial Times*, 8 December 2011

# Who decides?

## The politics of regulation

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**For projects with such large-scale and long-term consequences, the decision-making process must be robust if the public interest is to be upheld. In reality, the environmental assessment process in Queensland is geared towards rubber-stamping projects and facilitating development at almost any cost.**

There are so many projects of such a large scale that landowners and community groups simply don't have the resources to scrutinise them.

Concerns have been raised about the independence of the Queensland Government assessment process. A leaked email from a staff member at the Queensland Coordinator General's office on 25 May 2012 revealed the heavy presence and direct line of influence that companies can exert in the regulatory process, in this case, for the controversial Alpha Coal Project in the Galilee Basin:

**“I expect that Hancock will be lobbying heavily to obtain their approval from you once our Report is finalised; they have had a direct line to the new government and the Coordinator-General here. On Tuesday they came in with 22 experts to “discuss” the proposed conditions, 48 hours before the report was supposed to be finished.”**

Anonymous quote in story by Kym Agius,  
“Rumbles over Rinehart linked to \$6.4b Alpha mine”  
*Brisbane Times*, 2 June 2012

This project has now also been given approval by the Federal Government. In reality there is very little oversight of the cumulative environmental impacts of coal mining, rail and port developments in Australia, and no oversight of the greenhouse gas emissions from this coal boom.

At the international level, Australia only needs to report emissions produced on its shores to the UN Framework Convention on Climate Change. With the vast majority of the Galilee Basin's expected coal production likely to be burnt overseas, the emissions from these mines will not count towards Australia's tally. Meanwhile, only one of the major countries that purchases Australian coal, Japan, is subject to the same greenhouse accounting requirements as Australia. The others, like South Korea, China and India, are developing economies, whose greenhouse reporting requirements are less stringent.

Decision makers are not considering the cumulative consequences opening up this region could have on global efforts to reach the goal of limiting warming to below 2°C. Nor do environmental assessment processes at the state and national levels address the question of the greenhouse gas emissions produced from these proposed mines, and the impact this has on Australia's climate commitments.

Instead, each of these mines and ports are subject to individual, ad hoc environmental assessments. Alarming, the T3 coal terminal at Abbot Point, which would export coal from the Alpha and Kevin's Corner mines, has not been subject to an Environmental Impact Statement of any kind at a state level and is only being assessed under the lower standard of 'preliminary documentation' at a Federal level. The terminal will intrude into coastal wetlands, seagrass beds and a Humpback whale aggregation area in the Great Barrier Reef World Heritage site, but no new threatened and migratory species surveys were conducted for the assessment this year, and the Queensland Government hasn't assessed the project at all.<sup>107</sup>

In fact, the Queensland Government has declared its intentions to minimise environmental assessment to expedite coal project approvals. The Queensland Premier declared in June that the state is “in the coal business”<sup>108</sup> and the state Environment Minister has confessed he's not convinced that human-made greenhouse pollution is driving climate change.<sup>109</sup>





Stockpiles of coal at the Hay Point coal terminal are a source of coal dust particulate pollution.  
©Greenpeace/Hamilton

In June this year, Federal Environment Minister, Tony Burke, took the positive step of announcing a separate national environmental assessment for the Alpha Coal Project following the failure of the Queensland system to address the impact of the proposal on matters of national environmental significance. Burke described the Queensland Government's approach to the project as "shambolic".<sup>110</sup> He nevertheless approved the mine himself just three months later.

In the wake of international criticism of the impact of development on the Great Barrier Reef, and Australia's capacity to protect it, there is an urgent need for more scrutiny of the cumulative impact of these proposals.

The report from UNESCO's Monitoring Mission was released in June and warned that "the scale and pace of coastal development appear beyond the capacity for independent, quality and transparent decision making."<sup>111</sup>

The state and federal governments have committed to a Strategic Assessment of the Great Barrier Reef to review the management arrangements of the proposed coastal developments and determine whether the current system is adequately protecting this irreplaceable natural icon. But neither government has committed to implementing a moratorium on approving coal developments that would impact on the Outstanding Universal Value of the Great Barrier Reef World Heritage Area.

**"The scale and pace of coastal development appear beyond the capacity for independent, quality and transparent decision making."**

UNESCO's Monitoring Mission  
June 2012

**"I thought there was no argument about whether the project should go ahead or not."**

Queensland Premier Campbell Newman  
Discussing the Alpha Coal Project,  
612 ABC Brisbane, 6 June 2012







# Conclusion and recommendations

**The proposed development of the Galilee Basin mines, supporting rail infrastructure and coal ports present a clear threat to the global climate, local environments and the Great Barrier Reef. This region is just one example of the expansion plans of the coal industry around Australia.**

Australia has made a commitment, with 193 other countries, including our major trading partners, to limit global warming to below 2°C above pre-industrial temperatures. The credibility of Australia's commitment to that goal is now under question, and the decisions made about the exploitation of the coal resource in the Galilee Basin are at the heart of Australia's climate change dilemma.

This is not a comfortable conversation for Australia, or its coal trading partners, to have. There is no current policy framework to guide the national government to take action to prevent this scale of greenhouse gas emissions from being unlocked by these mines, but that does not mean action should not be taken.

The warnings from scientists and international institutions are unequivocal: the Reef needs urgent and decisive action to stave off the immediate threat of development, and the insidious threat of climate change.

Both threats are bound up with Australia's decisions about the coal resource in the Galilee Basin, the exploitation of which would have the dual outcome of reckless industrialisation of the Great Barrier Reef World Heritage Area and contribution to a degree of coal consumption that could render international climate goals unattainable.

## What the Australian Government needs to do:

- 1 Halt all proposals to expand coal mining and exports, starting with the proposed mega mines in the Galilee Basin.
- 2 Prioritise the protection of the Great Barrier Reef and stop the development of new coal ports and terminals along the coast.
- 3 Immediately embark on an independent analysis of the contribution of Australia's coal exports to climate change, and develop a national policy framework to control it.

One of these mines, the Alpha Coal Project, including its 495km rail line, has already been approved by the Federal and Queensland Governments, but slackening demand for coal internationally gives Australia breathing space to properly consider the consequences of opening up this new frontier for coal mining. The conditions are right for the Australian Government to resist the short-term interests of mining corporations and take strong decisions to safeguard our environment and economy long-term.

With scientists calling for a dramatic reduction in emissions and the UN's World Heritage body, UNESCO, threatening to declare the Great Barrier Reef "in danger" unless Australia changes course, the future of the Galilee Basin is bound up with the most profound environmental and policy challenges this country has ever faced.



*The current coal  
terminals at Hay Point  
in the Great Barrier Reef  
World Heritage Area.*  
©Greenpeace/Tom Jefferson



# Appendix

## Appendix 1:

## Quantifying the climate impact of proposed Galilee Basin mines

### Proposed Galilee Basin coal mines

The coal mines proposed for the Galilee Basin are at different stages of planning and development. For this analysis, nine mine proposals with defined production capacities are considered. Where possible, information about the mines' lifetime, estimated start year, mine ramp up and production capacity have been sourced from proponent information. All sources are detailed in the endnotes provided. Where such information was not available, conservative estimates have been made based on the properties of other comparable mines.

The information upon which the calculations of CO<sub>2</sub> emissions from burning the coal mined in the Galilee

Basin are based is presented in Table 3. Coal from all of these mines will be of a thermal grade. Based on proponent information, it has reasonably been assumed that the coal is all destined for use in power stations generating electricity. Mine proponents have published the properties of the preferred coal product from five of the proposed Galilee Basin mines. The Alpha west mine is essentially a western continuation of the Alpha Coal Project and so its coal product has been estimated to be of the same quality. An estimate of the quality of coal from the remaining three proposed mines has been calculated as a weighted average of the product from the other six mines.

### Greenhouse gas emission methodology

The greenhouse gas emissions resulting from combustion of Galilee Basin coal have been estimated using Australian Government Department of Climate Change and Energy Efficiency emission factors and the estimated or stated energy content of the coal to be produced from each Galilee mine as listed in Table 3.

In Australia, emissions from the combustion of coal for electricity generation are measured directly at source rather than estimated. However, the National Greenhouse Accounts Factors do provide accounts factors for estimating the emissions resulting from the combustion of black coal. It is

these factors that Greenpeace has used to estimate the emissions from burning the coal proposed to be mined from the Galilee Basin. These emissions factors are 88.2 kg CO<sub>2</sub> /GJ and 88.43 kg CO<sub>2</sub>-e/ GJ. The Australian National Inventory Report 2010 presents the emission factors of Australian black coal power stations based on the measurement of emissions reported there. The National Greenhouse Accounts Factors estimated value falls within the greatest frequency and median emission factor range (87.0 – 88.9 kg CO<sub>2</sub> /GJ), indicating that it is a valid approximation for the emissions resulting from coal combustion in power stations.

Mine	Full production (saleable coal)	Start year (production)	Ramp up (years)	Assumed full production year	GAR CV (kcal/kg)
Alpha Coal mine	30 <sup>112</sup>	2015 (Q2) <sup>113</sup>	4	2019 <sup>114</sup>	5847 <sup>115</sup>
Alpha North mine	40 <sup>116</sup>	2016 (Q4) <sup>117</sup>	4 (est)	2021 (est)	5798 <sup>118</sup>
Alpha West mine	24 <sup>119</sup>	2016 <sup>120</sup>	4 (est)	2020 (est)	5847 <sup>121</sup>
Carmichael mine	60 <sup>122</sup>	2014 (Q4) <sup>123</sup>	7 <sup>124</sup>	2022	5799 <sup>125</sup>
China First mine	40 <sup>126</sup>	2015 (Q1) <sup>127</sup>	2 <sup>128</sup>	2017 <sup>129</sup>	5798 <sup>130</sup>
China Stone mine	60 <sup>131</sup>	2016 <sup>132</sup>	7 (est)	2023	5799 <sup>133</sup>
Degulla Project	35 (est) <sup>134</sup>	2017 (est)	5 (est)	2022	5799 <sup>135</sup>
Kevin's Corner mine	27 <sup>136</sup>	2015 (Q4) <sup>137</sup>	3	2019 <sup>138</sup>	5800 <sup>139</sup>
South Galilee Coal Project	13.6 <sup>140</sup>	2015 (Q1) <sup>141</sup>	7	2022 <sup>142</sup>	5615 <sup>143</sup>

Table 3: Mine production capacity, timing and product quality

## Greenhouse gas potential of the Galilee Basin

When determining the potential climate impact of the combustion of coal from the Galilee Basin, it is necessary to consider the maximum possible production from the proposed mines. From a commercial perspective, the huge costs associated with their construction mean that operation at such levels may well be necessary to make the mines commercially viable. From a precautionary perspective, when quantifying an environmental threat, the worst case scenario must be determined.

Modelling based on the construction and production timeframes listed in Table 3 reveals that the Galilee could reach peak production by 2023 with capacity to produce 330 mtpa of saleable thermal coal (million tonnes per annum). In 2020, production of some mines would still be ramping up and maximum production could reach 269 mtpa.

Coal from the Galilee Basin is intended for burning in power stations overseas (predominantly in China and India) to generate electricity. If all the proposed mines reach maximum production, based on the emissions factors set out above, this combustion would result in emissions of up to 705 million tonnes of CO<sub>2</sub> (or 707 million tonnes of CO<sub>2</sub> equivalent per year).

Emissions from the combustion of the estimated capacity by 2020 would result in emissions of 576 million tonnes of CO<sub>2</sub> (or 577 million tonnes of CO<sub>2</sub> equivalent per year) in that year.

Activities necessary to get the coal to the power station, such as land clearing, mine construction, mining, rail transportation and overseas shipping, also result in the release of greenhouse gases.

For example, Waratah Coal estimates that the China First mine, when operating at maximum capacity, will generate 2.3 million tonnes CO<sub>2</sub> –e per annum of Scope 1 and 2 emissions, primarily due to fugitive methane emissions from mining, diesel consumption and offsite generation of electricity consumed during operations.<sup>144</sup> Based on the company's estimates, transportation of the China First mines' coal by rail to Abbot Point will result in an additional 0.292 Mt CO<sub>2</sub> –e per annum. Therefore, onshore activities associated with the China First mine will result in 2.592 Mt CO<sub>2</sub> –e per annum.<sup>145</sup> These emissions are not inconsiderable.

Mine	Estimated maximum CO <sub>2</sub> emissions from coal combustion (million tonnes per annum)
Alpha Coal mine	64.7
Alpha North mine	85.6
Alpha West mine	51.8
Carmichael mine	128.4
China First mine	85.6
China Stone Project	128.4
Degulla mine	74.9
Kevin's Corner mine	57.8
South Galilee Coal Project	28.2
<b>Total</b>	<b>705.4</b>

Table 4: Estimated maximum CO<sub>2</sub> emissions combustion of Galilee Basin mine's coal

The China First emissions are equivalent to emissions from 734,000 cars or 209,000 Australian households. Yet they are equivalent to only 3% of the emissions that will be released by burning the mined coal, further indicating the scale of emissions that will result from Galilee Basin mines. This report *Cooking the Climate, Wrecking the Reef* discusses the climate impact only of the Scope 3 emissions from the proposed Galilee Basin mines, that is, the emissions produced when the exported coal is burnt to produce energy.

Given that the China First mine represents only 12% of proposed mining capacity in the Galilee, total onshore emissions associated with the mines are likely to be considerably larger. Some mine proposals are currently not developed enough to permit an estimation of their onshore emissions. Similarly, shipping the coal overseas would result in further release of greenhouse gases. Full information about the likely export destinations for coal from some proposed mines is not available. Therefore only emissions associated with coal combustion have been modelled in this analysis.



## Appendix 2: Current and proposed coal ports in the Great Barrier Reef World Heritage Area

The table below summarises the current capacity and throughput, and the number of vessels currently visiting coal export ports along the Great Barrier Reef coast between Gladstone and Cape York, and the predicted capacity and predicted total vessels based on the expansion plans currently being proposed.

		Throughput 2011 (tonnes)	Current capacity (mtpa)	Proposed capacity (mtpa)	FY 2011 vessels	Predicted vessels
<b>Gladstone Area</b>	Barney Point Coal Terminal	4 <sup>146</sup>	8 <sup>147</sup>	8	64 <sup>148</sup>	129 <sup>149</sup>
	RG Tanna Coal Terminal	49 <sup>150</sup>	70 <sup>151</sup>	70	576 <sup>152</sup>	818 <sup>153</sup>
	Wiggins Island Coal Export Terminal	-	-	84 <sup>154</sup>	-	935 <sup>155</sup>
	Yarwun Coal Terminal	-	-	50 <sup>156</sup>	-	500 <sup>157</sup>
	<b>Total</b>	53	78	212	640	2,382
<b>Fitzroy Delta</b>	Fitzroy Terminal	-	-	22 <sup>158</sup>	-	245 <sup>159</sup>
	Balaclava Island	-	-	35 <sup>160</sup>	-	318 <sup>161</sup>
	<b>Total</b>			57		563
<b>Port of Hay Point</b>	Hay Point Coal terminal	33 <sup>162</sup>	44 <sup>163</sup>	75 <sup>164</sup>	892 <sup>165</sup>	1,625 <sup>166</sup>
	Dalrymple Bay Coal Terminal	55 <sup>167</sup>	85 <sup>168</sup>	85 <sup>169</sup>		
	Dudgeon Point Coal Terminals	-	-	180 <sup>170</sup>	-	2,000 <sup>171</sup>
	<b>Total</b>	88	129	340	892	3,625
<b>Abbot Point</b>	Terminal 0	-	-	35 <sup>172</sup>	-	441 <sup>173</sup>
	Terminal 1	15 <sup>174</sup>	50 <sup>175</sup>	50	190 <sup>176</sup>	631 <sup>177</sup>
	Terminal 2	-	-	60 <sup>178</sup>	-	574 <sup>179</sup>
	Terminal 3	-	-	60 <sup>180</sup>	-	508 <sup>181</sup>
	Waratah Coal Terminal	-	-	240 <sup>182</sup>	-	2,667 <sup>183</sup>
	<b>Total</b>	15	50	445	190	4,821
<b>Cape York</b>	Wongai	-	-	1.5 <sup>184</sup>	-	10 <sup>185</sup>
<b>GBR Coal Ports Total</b>		<b>156</b>	<b>257</b>	<b>1,055.5</b>	<b>1,722</b>	<b>11,401</b>

Table 5: Current and proposed coal export ports and terminals in the Great Barrier Reef World Heritage Area

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*Balaclava Island, in the  
pristine Fitzroy River delta at  
the southern end of Keppel  
Bay, where a new coal port  
is proposed to be built.*  
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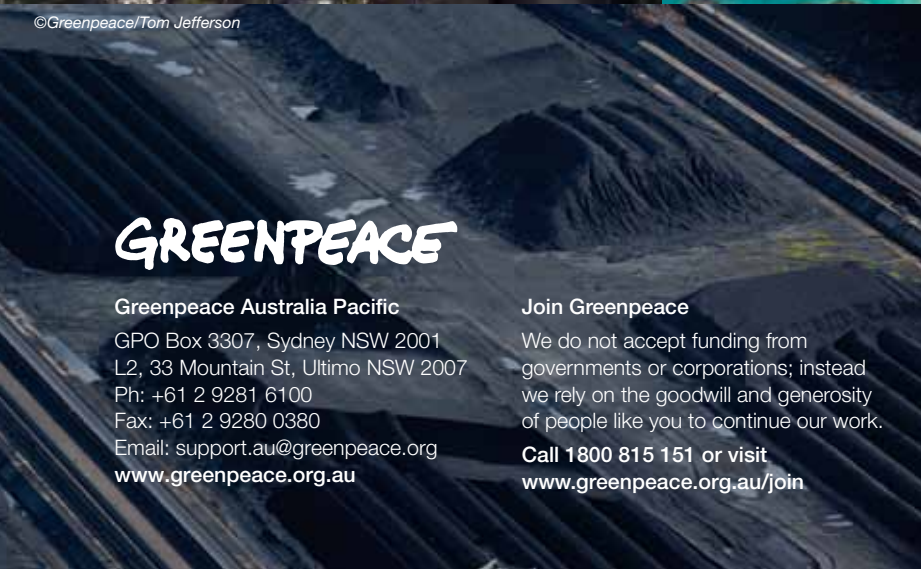
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