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Practical Justice Initiative
**Australia's Carbon
Majors Report**



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Acknowledgments

This report has benefitted from the input of a number of people: Philippe Le Billon and Greg Muttitt for detailed expert commentary, Daniel Burkett and Kitty-Jean Laghina for editing and other input, Veronique Lago for the emissions calculations. We would also like to thank Matt Copeland of Copeland Creative for assistance and Ash McCallum for design and layout. We would particularly like to thank Eleanor Buckley for helping to produce the report.

The research was made possible by an Australian Research Council grant, *Ethics, Responsibility and the Carbon Budget*.

The report forms part of the research of the Practical Justice Initiative at UNSW led by Professor Jeremy Moss. For more information on the research program, climate justice, discussion of carbon majors and Australia's fossil fuel exports see:

<https://climatejustice.co/>

<https://pji.arts.unsw.edu.au/>

The report can be cited as: Moss, J and Fraser P, (2019) *Australia's Carbon Majors*, Practical Justice Initiative, UNSW

ISBN: 978-0-7334-3888-2

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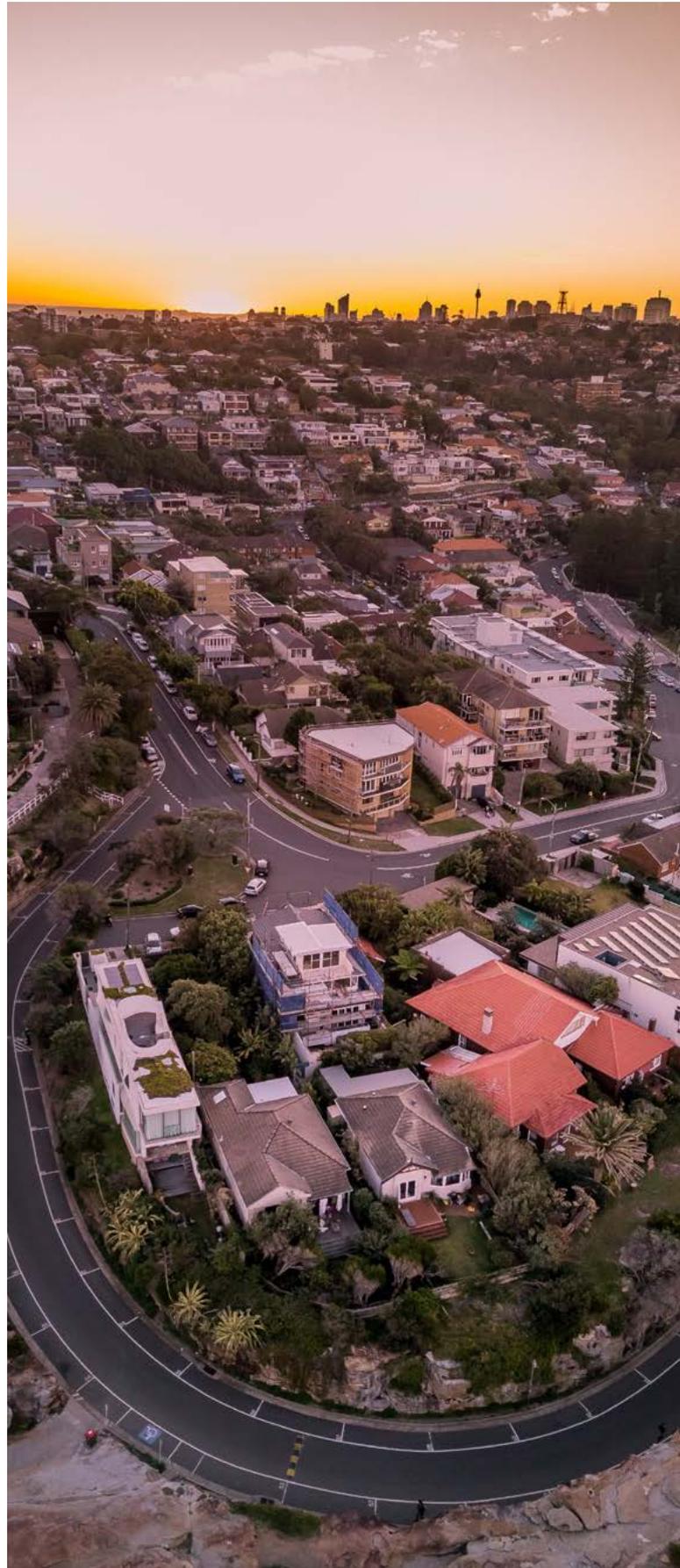
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Glossary of terms

CO ₂	Carbon dioxide
CO ₂ -e	Carbon dioxide equivalent
GHG	Greenhouse gases
Mt	Megatonne (millions of tonnes)
Gt	Gigatonne (billions of tonnes)

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Key findings

Australia is the **world's sixteenth biggest GHG emitting country**. But within Australia's borders there is a larger contributor to climate change: the companies that extract coal, gas and oil and sell them worldwide. These huge companies are the carbon majors.

In 2018 emissions produced from the coal extracted by Australia's top six coal producers (551Mt CO₂-e), were **greater than the whole of Australia's projected domestic emissions** (534Mt CO₂-e) for 2018.

The ten largest Australian carbon majors produced the equivalent of 669.71 Mt CO₂-e in 2018, which is around **75% of the emissions from global air traffic** or around 28 million flights (895Mt CO₂-e 38 million flights).

Together, the top ten Australian carbon majors produce **more GHG emissions than Canada**. If they were a country, they would sit eighth in the world on the list of highest emitters.

In the last 15 years the emissions from BHP's Australian coal, oil and gas have produced the equivalent of 2,361Mt CO₂-e in emissions and just one year the indirect GHG emissions by their global operations produced 596Mt CO₂-e (BHP 2019), **more than the projected emissions of 25 million Australians** for the same period.

The Australian carbon majors are complicit in climate harms and ought to bear some of the liabilities for climate harms.



Key recommendations for carbon majors

1. **No sales of mine assets as going concerns**
 - Fossil fuel mines to be retired not on sold to other companies
2. **Carbon major sites to be restored**
 - Funds to be set aside for site rehabilitation
 - Rehabilitation costs to take precedence over shareholder returns
 - Profit sharing ought to occur from 'clean' parts of the business
3. **Compensation for contribution to past harms**
 - Compensatory mechanisms must address past emissions at least since 1990
 - Affected workers and communities to be assisted
4. **Compensation should not only be domestic**
 - Compensation should address the needs of those harmed globally
5. **No new mines**
 - No new exploration
6. **Political influence**
 - Carbon majors should cease political lobbying
 - Carbon majors should not fund third party campaigns in favour of fossil fuels
7. **Phase outs**
 - Carbon majors should phase out their fossil fuel operations in line with IPCC evidence



Introduction

The emissions produced from the fossil fuels extracted by Australia's major gas, coal and oil producing companies or 'Carbon Majors' are now larger than all of Australia's domestic emissions. Yet, the responsibility for the mitigation of these emissions or addressing the harms they cause, does not primarily fall on the carbon majors themselves.

Why aren't Australian carbon majors considered to be responsible for addressing their product's emissions and their consequences? One reason is that when we think about reducing emissions, we typically focus on the role of nation states. After all, it is states that negotiate climate agreements and their policies on climate change and who are also substantially responsible for the contribution that their citizens make to the problem of climate change. Nation states also have substantial capacity to compel agents such as corporations or individuals to reduce their level of emissions.

But the impact of carbon majors is now so large and their influence so great that the case for holding them responsible for the consequences of their emissions must now be made. This report sets out a framework for determining the degree to which carbon majors ought to be responsible for the emissions and the cost of the harms that they cause. What we will do here is assess carbon majors in terms of whether they have harmed or risked harming others. This is not say that there aren't other relevant factors, but just that violating something so important as the duty not to harm others ought to be a key consideration when we evaluate the actions of carbon majors.

"The impact of carbon majors is now so large and their influence so great that the case for holding them responsible for the consequences of their emissions must now be made."

Given the limited time in which we have to take action — a 45% emission reduction over the next 11 years according to a recent IPCC report — this is an urgent question (IPCC 2018).

The discussion presented here is not intended to be exhaustive, but merely outlines a way of thinking about the moral responsibility of carbon majors and what they ought to do. This is not to say that morality is the only factor, but moral considerations are a crucial first step in determining what they ought to do.

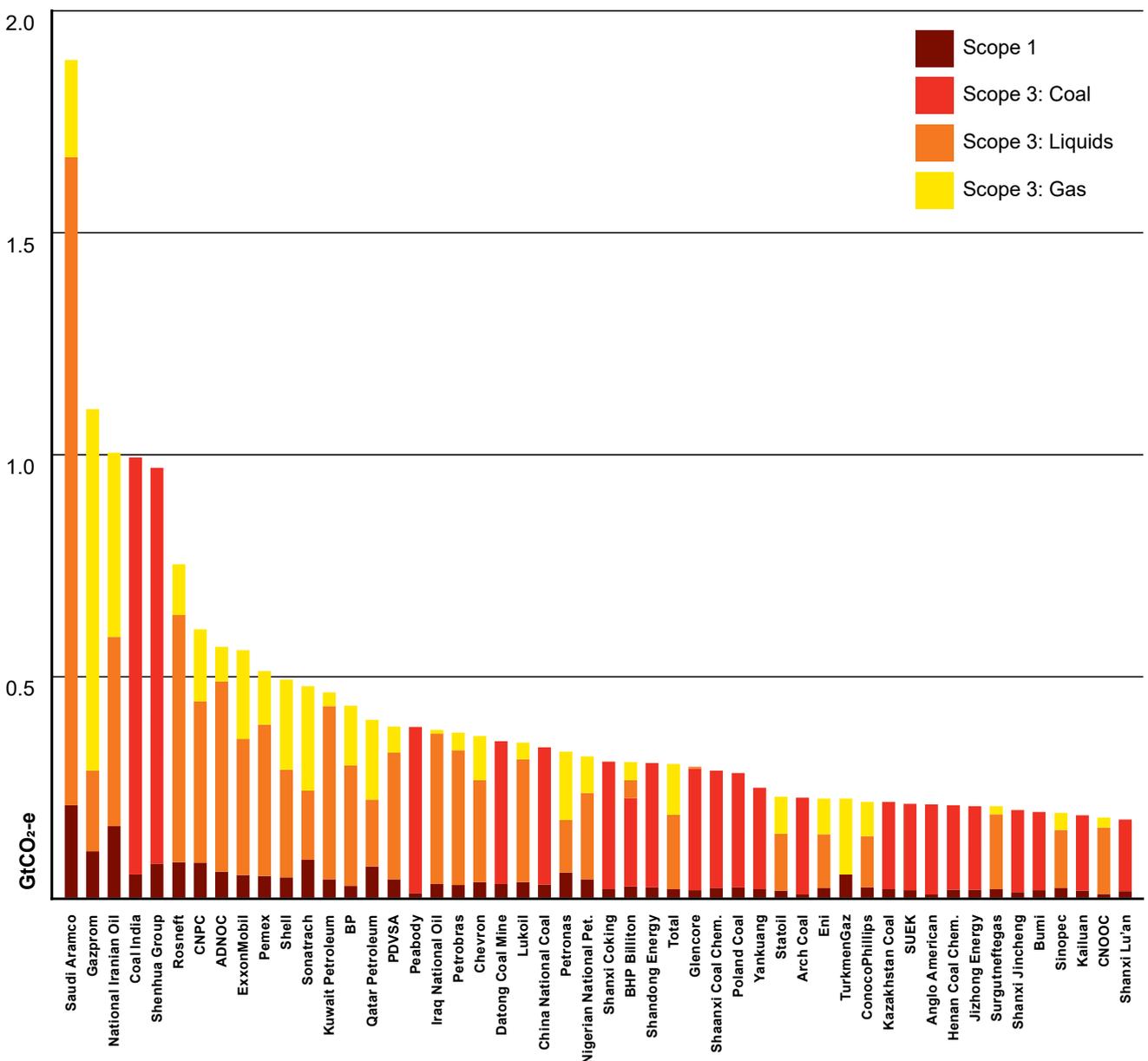
Of course, morality is itself a very controversial area and there are also many different kinds of moral norms on which we could focus. However, the idea that agents — whether they are corporations, individuals or states — should not wrongfully harm others by their actions is a powerful and important idea, especially in the context of climate change where climate harms have a diffuse and global scope.

Who are the carbon majors?

The term 'carbon majors' refers to the large fossil fuel and cement producing corporations. Richard Heede (2014) identifies a total of 90 companies that have produced fuels that have led to 63% of the world's emissions between 1854 and 2010. These corporations consist of investor-owned corporations (50), state-owned (31) and nation state producers of fossil fuels (9).

The three different groups all share roughly one third of the emissions, with the state-owned group accounting for slightly less. The majority of the carbon majors are oil and gas companies (56), coal comes in second with 37 and 7 are cement producers.

Figure 1: Top 50 fossil fuel companies in 2015 by operational (Scope 1) and product (Scope 3) GHG emissions (50% of global industrial GHGs). Source: Griffn 2017



Carbon majors in a global context



Global fossil fuel emissions have **more than doubled** between 1988 (when the Intergovernmental Panel on Climate Change was established) and 2016. That's 833Gt CO₂-e in 28 years, compared to 820Gt CO₂-e in the 237 years before (Griffin, 2017).

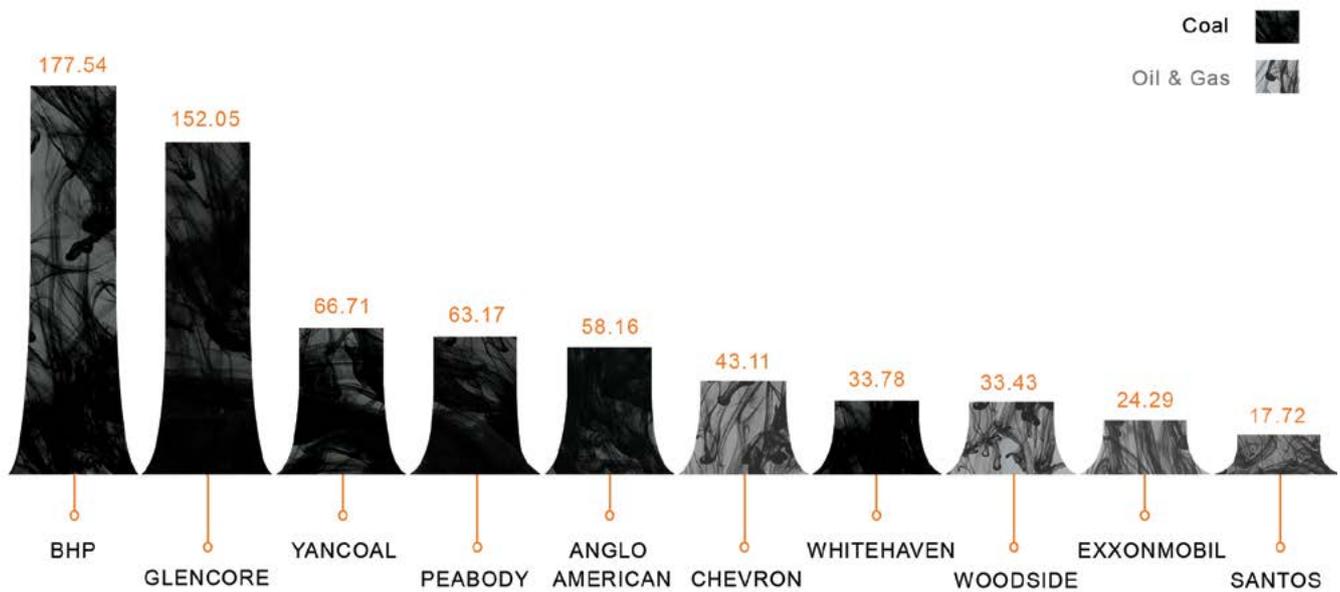
Emissions from the global fossil fuel industry's products accounted for about **70%** of all human GHG emissions in 2015 (Griffin, 2017).

The top 90 global carbon majors are estimated to have contributed about **57%** of the total observed increase in atmospheric CO₂, which has led to 26-32% of global sea level rise (Ekwurzel et. al. 2017).

Australia's carbon majors

Australia has its own carbon majors. The table below shows the emissions produced from the fossil fuels extracted by the top ten carbon producers in Australia.

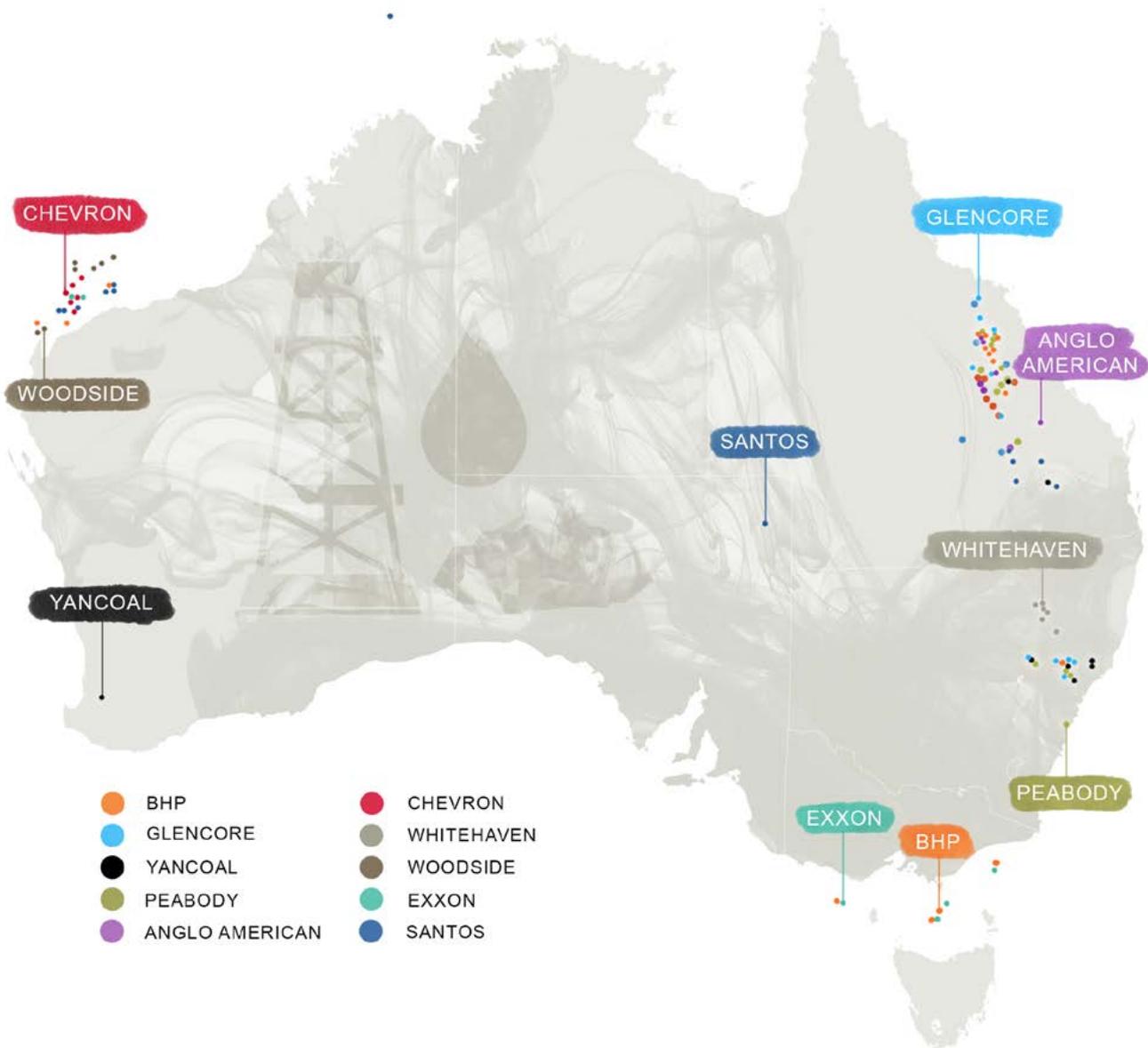
Figure 2: Australia's Carbon Majors and GHG emissions 2018 (Mt CO₂-e)



Rank	Company	Mt CO ₂ -e
1.	BHP	177.54
2.	Glencore	152.05
3.	Yancoal	66.71
4.	Peabody	63.17
5.	Anglo American	58.16
6.	Chevron	43.11
7.	Whitehaven	33.78
8.	Woodside	33.43
9.	ExxonMobil	24.29
10.	Santos	17.72
Total		669.96

Glencore 2019, BHP 2019a, Chevron 2019a, ExxonMobil 2019a, Yancoal 2019a, Peabody 2019, Anglo American 2019a, Whitehaven Coal 2019a, Woodside 2019a, Santos 2019a.

Currently operating Australian fossil fuel project of the Australian carbon majors



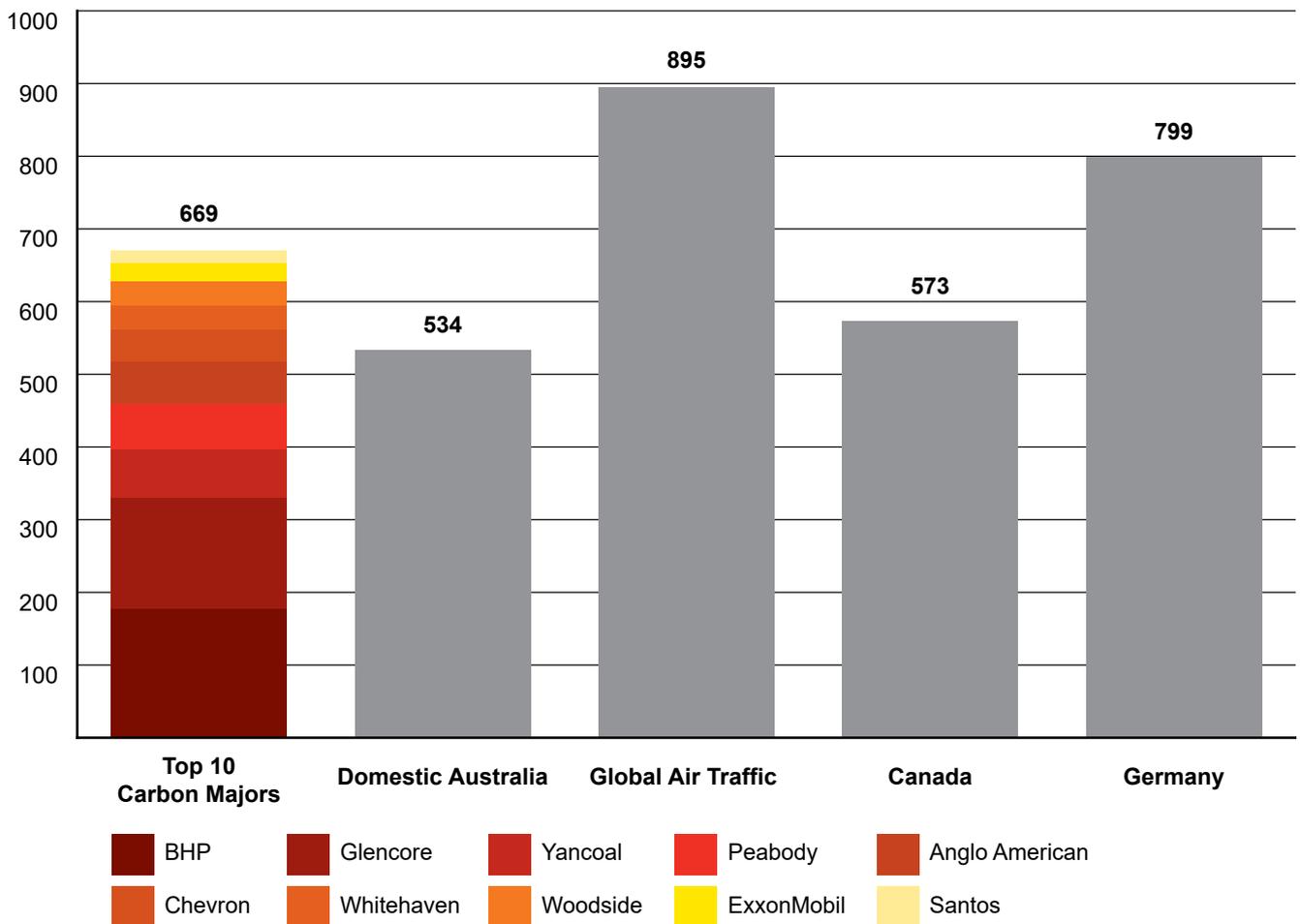
In 2018 emissions produced from the coal, gas and oil extracted by Australia's 6 top coal carbon majors — Glencore, BHP Yancoal, Peabody, Whitehaven and Anglo American (551Mt CO₂-e) — were equivalent to the whole of Australia's projected domestic emissions (534Mt CO₂-e) for 2018 (Department of the Environment and Energy, 2018).

The emissions from those six carbon majors were five times the emissions as all the domestic transport in Australia (102Mt CO₂-e), and about three times all the emissions from electricity generation (182Mt CO₂-e) in Australia in 2018 (Department of the Environment and Energy 2018).

The emissions from the fossil fuels extracted from the top ten carbon majors in Australia created 669.96 Mt CO₂-e, which is around ten times

the emissions produced by the whole Australian agriculture industry (71Mt) (Department of the Environment and Energy, 2018). The ten largest Australian carbon majors produced the equivalent of about 75% of the emissions from global air traffic or around 28 million flights (895Mt CO₂-e, 38 million flights) (Air Transport Action Group, 2018). In fact, the emissions from Australia's largest carbon major alone, BHP, were four times the emissions of the largest domestic emitting company (AGL energy, 43.4Mt CO₂-e) (Clean Energy Regulator, 2019). Together, the top ten Australian carbon majors produce more GHGs than Canada. If they were a country, they would rank eighth in the world on the list of highest emitters (Global Carbon Atlas, 2019).

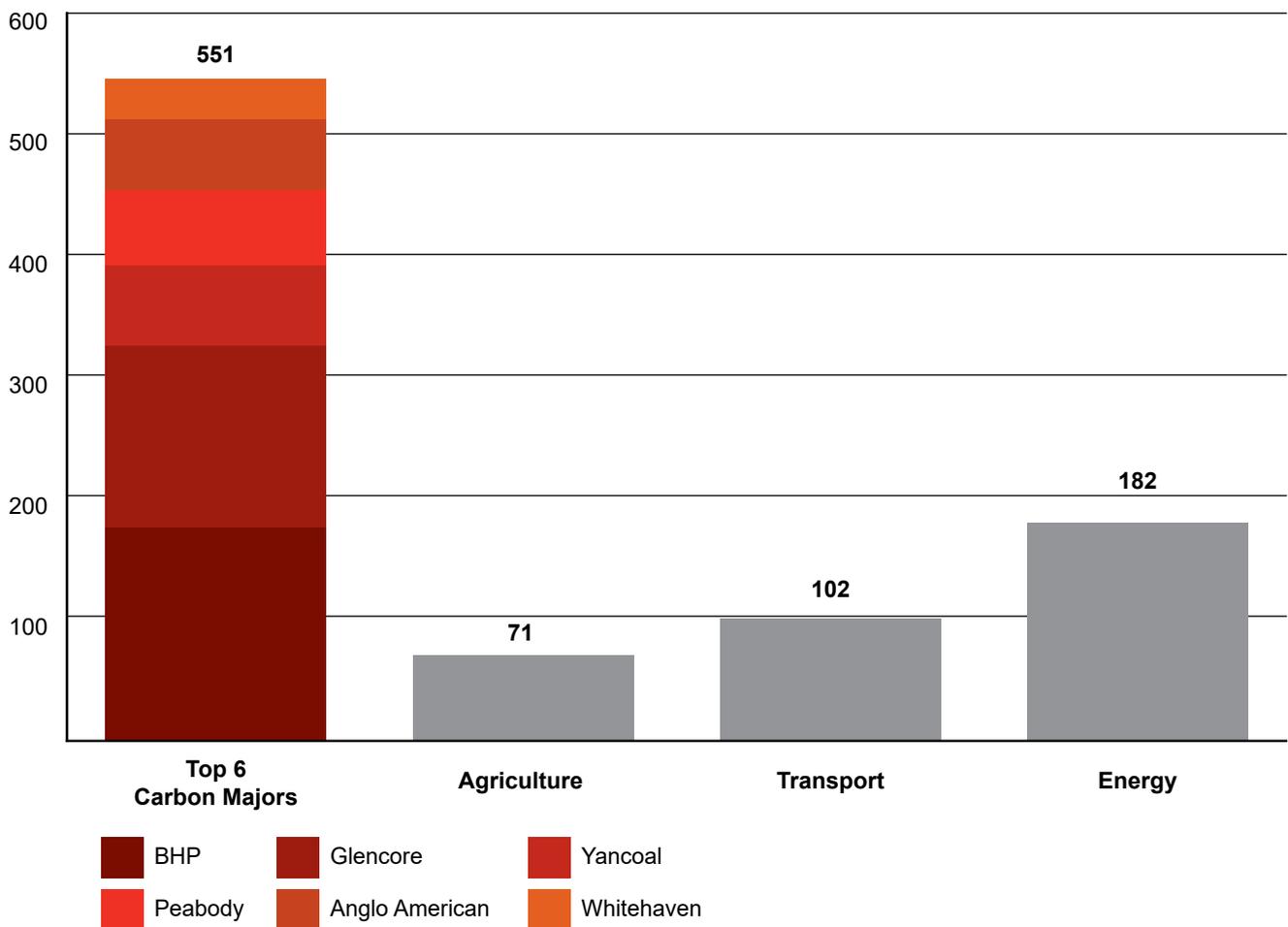
Figure 3: Emissions from the carbon majors' Australian fossil fuel products (Mt CO₂-e)



As well as their current levels of production, many of the carbon majors have long histories as emitters, and continue to hold vast reserves to be extracted in the future, as well as new fossil fuel projects. Glencore, the second largest carbon major in Australia, reported in 2018 that they have 6,765Mt of measured coal resources, and 1,565Mt of proved marketable reserves. Together, that's the equivalent of 15,601.04Mt CO₂-e, more than 29 times Australia's projected 2018 GHG emissions, and that number is growing as inferred reserves become proved.

In the last 15 years (2004-18) BHP's Australian operations have produced the equivalent of 2,361Mt CO₂-e in emissions from their coal, oil and gas, and in 2018 the indirect GHG emissions (scope 3) produced by their global operations produced 596Mt CO₂-e (BHP 2019a). These figures would be significantly higher still if we included the remainder of the emissions since 1990 (the date of the first IPCC report), from when it might be reasonable to assume they were aware of the impacts of their actions. While BHP has been reported to be divesting their thermal coal assets because of external pressure to reduce their emissions, there remains the issue of the harms already caused by their operations (Biesheuvel, 2019).

Figure 4: Emissions from the top 6 coal carbon majors' Australian fossil fuel products compared to domestic emissions, 2018 (Mt CO₂-e)



Many new fossil fuel projects continue to be developed by the carbon majors (Stevens 2019; Biesheuvel, 2019). In coal, Yancoal has been approved to significantly increase its production of thermal coal in the Surat Basin in Queensland, from 2.8Mt to 3.5Mt a year, Anglo America's new metallurgic coal mine has been approved in the Bowen Basin and Whitehaven is awaiting approvals of a new open cut metallurgic coal mine, also in the Bowen Basin (Yancoal 2019, Anglo American 2019, Whitehaven 2019).

In gas, Woodside is awaiting approvals for its Scarborough project (in which BHP owns a stake), Santos is awaiting approvals on its Narrabri project in New South Wales, Chevron is expanding its Gorgon facility with additional wells and trains, and ExxonMobil (with BHP) is developing new gas fields in Bass Strait with their West Barracouta project (Woodside 2019, Santos 2019, Chevron 2019, ExxonMobil 2019a).

Figure 5: Glencore's recent and possible future emissions (Australia), (Mt CO₂-e)

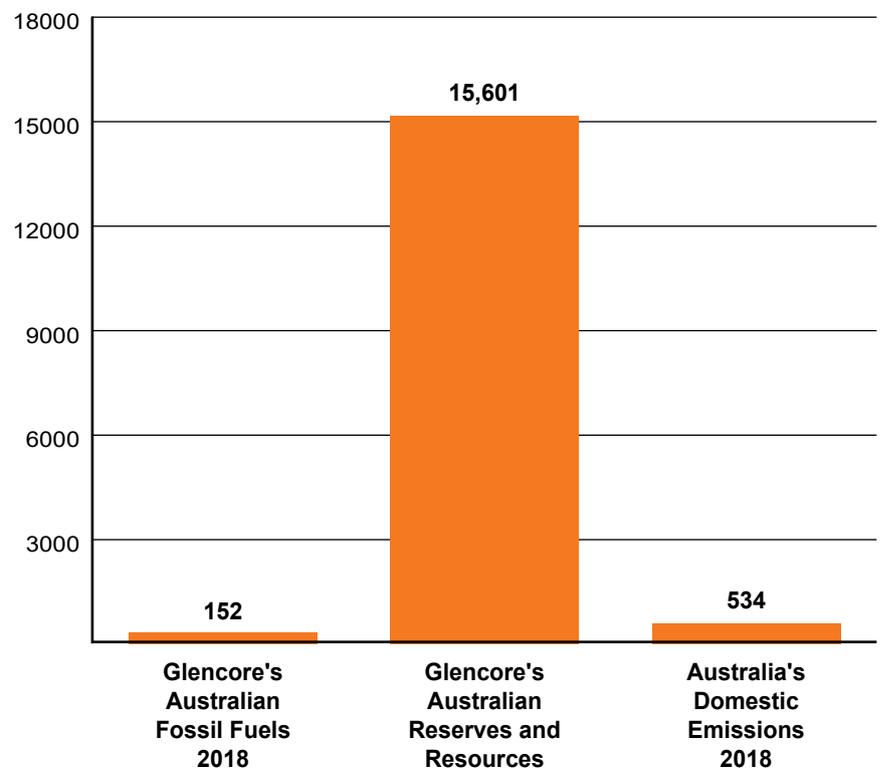
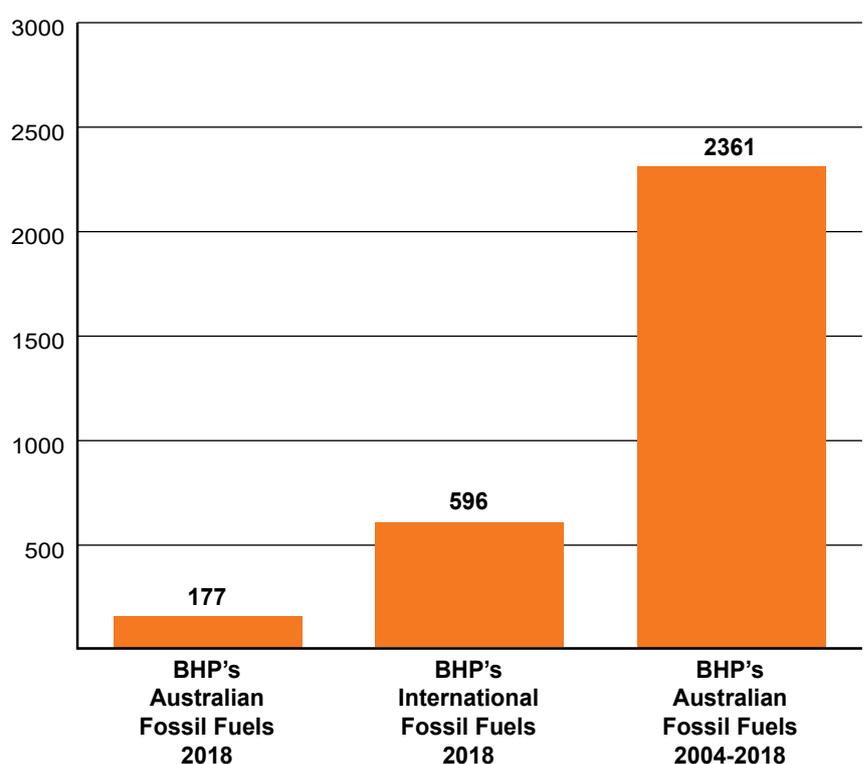


Figure 6: Emissions produced by BHP's Australian fossil fuels 2004-18 (Mt CO₂-e)





The responsibility of carbon majors

Australia's carbon majors produce a huge amount of fossil fuels which in turn lead to state-sized quantities of emissions. But why should we hold the companies themselves responsible for these emissions? After all, except for the emissions produced during extraction, they don't themselves directly produce these emissions. For the most part carbon majors contribute by being producers and suppliers of fossil fuels.

For this reason, carbon majors are seen as having responsibility only for emissions that they have produced directly through their extraction and processing operations (their 'Scope 1 and 2' emissions). Yet there is a good argument to be made that carbon majors are responsible not only for their Scope 1 and 2 emissions, but also for at least some of the emissions from their exports (their Scope 3 emissions) and their consequences.

Scope 1 and 2 emissions are those emissions that are produced by the extraction of the fossil fuels and associated emissions (from related electricity generation for instance). They are counted in the budget of the country in which the extraction is done. In contrast, according to the formula set down by the UNFCCC, Scope 3 emissions from exports are the responsibility of the countries or third parties who consume them. This is the model that nation states use to understand their responsibility and calculate their carbon budgets. So when a carbon major sells coal the emissions produced extracting the coal (Scope 1 and 2) are the responsibility of the carbon major, but the scope 3 emissions are the responsibility of the country or company who consumes them (Eggleston et al. 2006). This is what we might call a 'territorial model' of responsibility.

Yet the responsibility of carbon majors is much greater than this territorial model suggests. To see how this might be the case, it is useful to draw on some basic moral and legal theory. For example, a person who commits a murder or defrauds another is responsible in virtue of the relevant relationship to the victim; it was they, the harmer, who pulled the trigger or absconded with the money of the harmed victim and no one else was involved.

But some harms are more complicated. For example, in the case where a person intends to shoot another person and someone else offers to sell them a gun — knowing full well that what the gun will be used for — the responsibility for the murder no longer falls solely on the person who pulls the trigger. The gun seller is now an accomplice to the crime and should share at least some of the blame because they knew that someone would be harmed.

In this case, there is a relationship between the actions of the gun seller and the murder that ought to make the former at least partially responsible. One way to understand this is to divide the agents into two types. Where a harmful action occurs, the agent(s) who do the actual harming are the principal agents and it is their actions that constitute the wrongful harm. Secondary agents on the other hand, contribute to the harm by somehow being part of the causal chain that leads to the harmful act, but do not constitute it (Gardener 2007; Kadish 1985). In the murder case above, the secondary agent is the gun seller who sold the gun to the principal agent.

In legal and moral theory, a secondary agent becomes an accomplice or accessory and shares some of the liability for the harms inflicted by virtue of assisting or aiding the principal agent in some way. But we should note here that unlike the simple murder case, a carbon major is complicit in not just one harmful activity, but in many. Carbon majors sell their products to many other companies and consumers which, added together, constitute a very harmful practice.

By producing and selling fossil fuels which are, in turn, consumed in another country, a typical carbon major in Australia is complicit as a secondary agent in the harm directly caused by the principal agent via, in this case, the direct releasing of GHGs into the atmosphere. Being complicit might involve a combination of elements such as how much an agent contributed, where they stood in the causal chain, the extent of their foreknowledge of the harm and so on. But the two key features of complicity are that the carbon major knew that their actions would lead to the harm and that their actions made a substantial contribution. So the question we have to ask is: 'Did carbon majors know that their actions were likely to be harmful? And, 'Did they contribute to climate harms?'



When did they know?

Let's take one carbon major, BHP, as an example. BHP has been in operation since 1885. While it is true that they could not have known about the impact of GHGs more than a hundred years ago, knowledge of the impacts of GHGs has been available to them for some time. When did they know? Each carbon major will have its own answer. However, a report by the Centre for International Environmental Law outlines how one oil company in the US – Humble Oil (now ExxonMobil) knew as early as 1957 that CO₂ was likely to affect the climate and the US oil industry peak body (The American Petroleum Institute) knew by 1958 (CIEL, 2017, p.21). By 1968 the oil industry in the US was receiving warnings from its own scientists concerning potential climate risks. The report notes that throughout the 1970s and 80s, oil companies were actively managing their own assets to take into account climate risks (e.g., modifying oil rig design in line with potential sea level rise) while at the same time downplaying those same risks in public (CIEL, pp.21-2).

Yet even allowing for some level of excusable ignorance — given the first synthesis report on climate change was released by the IPCC in 1990 — Australian carbon majors have been emitting state-sized quantities of emissions for nearly 30 years with detailed knowledge of the likely consequences (Moss & Kath, 2019).

Carbon majors contributed to climate harms through producing and selling fossil fuels. In the language of principal and secondary agents, they aided principal agents (e.g. power companies) by supplying fossil fuels. Carbon majors are complicit in harm by virtue of providing an essential element of the harmful action.

We should note here that not all cases of complicity are so clear cut. One agent encouraging another to, say, cheat on their tax or engage in lewd behavior might fall into a moral grey area due to uncertainty over how much the secondary agent contributed to the final outcome. But the cases of complicity above are at the other end of the spectrum. The complicity of carbon majors is far more clear cut, given their explicit knowledge of the crucial role producing and selling fossil fuels plays in the production of GHGs. What does this mean in practice? Carbon majors are not always wholly responsible. After all, other companies and individuals actually consume the fossil fuels.

"Australian carbon majors have been emitting state-sized quantities of emissions for nearly 30 years."

Yet even accepting a proportion of the responsibility for the effects of exports — say 50% — a carbon major ought to still receive a huge increase in its moral responsibility for the consequences of its emissions.

However, the impact and contribution of the Australian carbon majors is not only limited to producing fossil fuels — there is another dimension to consider. While we cannot discuss this issue here in any detail, the Australian carbon majors have been able to exert a considerable influence over climate policy in Australia. In many cases, the carbon majors' actions have helped thwart robust action on climate change through their watering down or forcing the abandonment of effective climate policies, as well as through lobbying for subsidies that make their business more competitive (Rich 2018).

Carbon majors benefit from the tax subsidies that encourage fossil fuel production and consumption (they do not necessarily receive these subsidies directly). In the 2018-2019 financial year these subsidies are estimated by Market Forces to have been worth A\$11.69 billion (Market Forces, 2019b). Even more remarkable is the IMF's Fiscal Affairs Department report that US\$29 billion of energy subsidies were provided in Australia in 2015 through the pricing of commodities prior to factoring in the full cost of their production (IMF Working Papers, 2019). The carbon majors also seek to exert political influence through lobbying, political donations, relationships with policy makers and public advertising campaigns.

Collectively, the fossil fuel industry donated \$1,277,933 to the major parties in 2017-2018, including \$237,300, \$182,083 and \$121,879 respectively from Woodside, Santos and Chevron (Market Forces, 2019b). The peak body of the minerals industry, the Minerals Council of Australia (MCA), which counts many of Australia's largest carbon majors' representatives as board members, explicitly said in a senate submission that they make contributions to the major political parties because it "provides additional opportunities for the MCA to meet with members of parliament" (Karp, 2018). In the 2017-2018 financial year, the MCA donated \$94,900 to the major parties for that access (Market Forces, 2019b).



The lobbying activities of carbon majors are often directed not just at sustaining the use of fossil fuels and making them profitable, but also in actively delaying the take-up of renewable alternatives. The MCA provided Scott Morrison with the lump of coal he took into parliament to argue against moving away from coal and to emphasise the unreliability of the increase in renewable energy in the South Australian energy grid (Renew Economy, 2019). The lobbyist who gave it to him received a job in his office as a senior advisor in 2019 (Renew Economy, 2019).

The MCA's and other groups' connections with the government go further. A recent Greenpeace report documents how former coal lobbyists now occupy positions of influence within the current federal government. For instance, Prime Minister Scott Morrison's Chief of Staff, John Kunkle, was a deputy CEO of the MCA and a lobbyist for former coal mining giant Rio Tinto. Former MCA staffers also worked for former Prime Minister Malcolm Turnbull and former Environment Minister Greg Hunt (Greenpeace, 2019).

The carbon majors and the bodies that represent them also use public advertising campaigns to influence opinion on their activities and to apply pressure to policy makers. A widely reported and successful example of the impact the Minerals Council of Australia and its allies were able to have over policy discussion was their \$22 million campaign against the Resource Super Profits Tax or 'the mining tax', which successfully undermined the policy (Wood & Griffiths, 2018, pp. 48, 72). More recently COAL21, whose chief executive officer Mark McCallum is also the general manager of climate and energy at the MCA, is spending \$4-5 million on a campaign intended to make 'people feel good about continued use of coal' (Long, 2019). While COAL21 was originally developed by coal producers as a research group for carbon capture and storage, but its mandate has been expanded to include this kind of coal promotion which is intended to sway public opinion. These various activities help the carbon majors to have a powerful voice in the discussion of policies that impact the use and profitability of fossil fuels.



“Collectively, the fossil fuel industry donated **\$1,277,933** to the major parties in 2017.”

Note that by actively planning and cooperating with other principal agents, carbon majors are more than just secondary agents, they are co-principals. Co-principals do more than just contribute to a harm, what they do constitutes the harm. Where carbon majors act together to influence government decisions or alter public understandings of climate issues, they are co-operating (planning and executing a wrongdoing together). In these cases, in addition to supplying fossil fuels in a way that is complicit with the actions of a principal agent, they are also co-principals in virtue of their actions in cooperating or colluding to bring about a harmful act.

Through influencing government policy and public debate, carbon majors are able to act to ensure that the production and sale of fossil fuels is more profitable and necessary than it otherwise would be, thereby contributing to its continuation. If this is the case, then their responsibility is arguably greater than just as a supplier of fossil fuels.

What should carbon majors do?

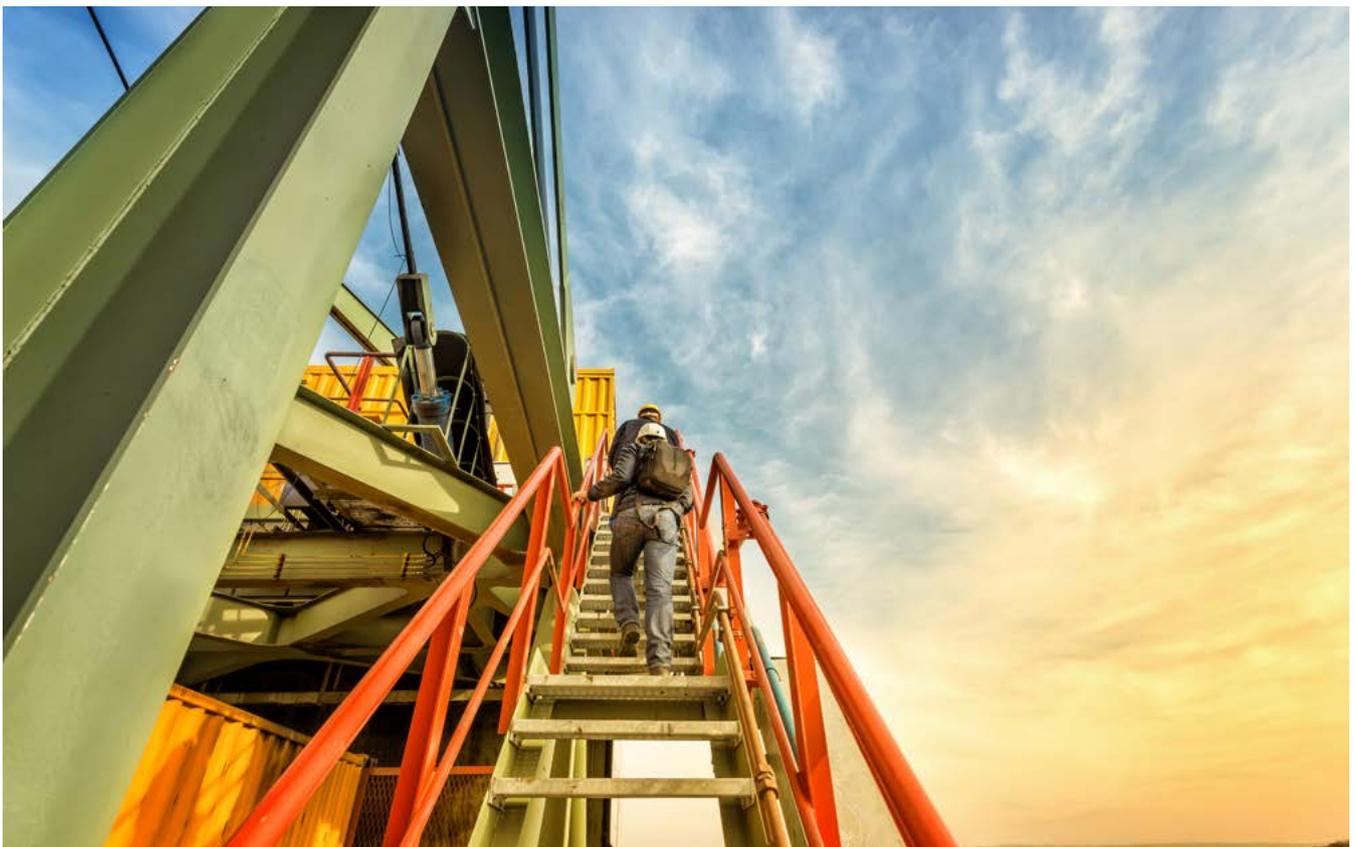
BHP recently announced that it will establish a US\$400M Climate Investment Program to address its carbon liabilities (BHP, 2019b). Leaving aside whether the funds it has committed are adequate, the commitment prompts a question: what kinds of activities ought carbon majors like BHP undertake to address their climate liabilities? Where should their focus be in addressing their responsibility for climate harms? Should they transform their operations to be carbon neutral, compensate those harmed, or cease their fossil fuel operations altogether?

The range of actions open to carbon majors is of course complex and there are obviously many different issues to consider. Here we will focus in general terms on how any potential response can meet the moral constraint not to cause wrongful harm. This is not to say that this moral constraint is the only factor that matters, but it is a powerful and important constraint on what companies ought to be able to do. Being aware of the moral complexities is the first step in deciding what ought to be done. There are three broad types of action a carbon major could take; transforming their current and future operations to be carbon neutral, sharing profits or phasing out their operations altogether.

Transforming: Carbon neutrality

The most obvious type of action open to carbon majors involves transforming their activities in one or more ways such that they are no longer a substantial net emitter of GHGs (decarbonisation). For instance, a carbon major could continue to extract fossil fuels but offset any or all of its Scope 1, 2 and 3 emissions via planting trees or preserving forests. Or, it could go further, choosing divestment — for example, closing down all GHG emitting parts of its operations and instead investing in new, less-polluting enterprises. For instance, instead of drilling for oil, a carbon major might sell solar panels and wind turbines — thereby continuing to exist and operate as an energy company — but via renewable technologies. It could also keep its fossil fuel assets but ‘retire’ them.

Should carbon majors transform their operations in these kind of ways? Take the option of offsetting. It is good for a company’s operations to be carbon neutral for the obvious reason that it reduces a source of emissions. If avoiding harm is our focus, this measure avoids future harms. Yet if avoiding harm is the goal, there are several criteria that a carbon major’s activities should satisfy.



The first and most obvious criteria when considering offsetting is that these offsets (including potential carbon capture and storage techniques) are effective, reliable and long term. Poorly chosen offsets may not meet the goal of avoiding harm. For example: creating carbon-absorbing forests in high bushfire-risk areas, or in countries subject to uncontrolled land-clearing, are offsets that are likely to fail.

Next, we should consider how likely it is that an offsetting measure will eliminate the risk of harm. One potential risk of offsetting is that it could lead to 'lock-in' effects for the energy sector, meaning that the continued use, development and support of fossil fuels leads to their continuing to be the dominant energy source. For example, a risk with this strategy is that offsetting may still produce lock-in effects for the energy sector.

Lock in effects occur, in this kind of case, where the continued use, development and support of fossil fuels leads to their continuing to be the dominant energy source. For example, developing new gas fields will likely promote the development of resources that depend on gas, e.g., new power plants that are designed to run on gas, and so on. Development of gas infrastructure may then also lead to attempts to lengthen the life of the infrastructure for economic reasons, which will then create a competition for resources that may reduce the possibility of developing renewable technologies (Caldecott et al., 2016). To the extent that these resources are invested in, the opportunity to invest in the development of renewable energy sources may be lessened. In this way, fossil fuel infrastructure can lock in the risks of climate change.

A further risk with this strategy is that a carbon major will continue to support campaigns in favour of the continued use of fossil fuels. Even where a carbon major is carbon neutral, if they continue to fund lobby groups or advertise the benefits of fossil fuels they will still be contributing to the likelihood of climate change. Such activities have a negative impact on public debate and policy.

When considering these actions, we are assessing how likely they are to stop carbon majors contributing to harm. It is apparent that decarbonisation by offsetting is less effective in reducing harm than phasing out the activity entirely. So offsetting, other than as a temporary measure, may not reduce risk of harm to a sufficient degree. If a carbon major is contributing to causing harm, it is preferable to take actions that remove the harm being done rather than taking actions that offer just a reduction in harm.

A more radical dimension of transformation is the divestment of the parts of a carbon major which produce fossil fuels. The campaign to divest — to withdraw investment, funds and other financial support — from carbon majors and related companies has been hugely popular and relatively successful (Bratman et al, 2016); indeed, the divestment movement has succeeded in removing substantial funds from GHG-intensive companies. At issue here is whether carbon majors ought to divest themselves of their fossil fuel assets as part — or all — of their response to their duties not to harm.

How ought we evaluate divestment as a remedial action for carbon majors? In 2017, Rio Tinto sold its Coal & Allied Industries Limited to Yancoal, and in 2018 completed the sale of its final Australian coal assets, with the divestment raising a total of \$5.39 billion (Rio Tinto 2017; Chalmers 2018). On face value, this might appear to be the right thing to do as Rio Tinto in effect ceases contributing to the risk of climate harms from coal. But simply selling fossil fuel assets to another company who will continue to exploit those assets does not diminish climate risk, for the simple reason that the contribution to harm will continue via the operations of another company. By selling a coal mine or a gas field as a going concern, a carbon major does not reduce the harms such an asset creates, it merely transfers the operation to some other company where the harms can continue to be generated. It is true that selling fossil fuel assets means that a carbon major is no longer complicit in the production and sale of the fossil fuels generated by these assets. However, that sale does render the carbon major complicit in another way: it has provided a working fossil fuel business for others to use.



Retiring assets in a safe and sustainable way, on the other hand, avoids contributing substantially to climate harms and is therefore the preferred type of divestment.

No doubt carbon majors will respond that they have duties to their shareholders to return a profit on their investments. Even if that is true, such a duty does not override a duty not to harm others by contributing to climate change in a substantial way. One final point regarding transformation. If carbon majors are to avoid harming others not only should they stop selling fossil fuels, but they should also cease their attempts to secure fossil fuel friendly policies. Transforming their operations must also mean ceasing their lobbying or funding of think tanks and so on.

Profit sharing

A different way of addressing the consequent harms of carbon majors' actions is by disgorging their profits, which would see their accumulated profit — which might otherwise be paid out to shareholders, management or reinvested in their operations — transferred to those harmed or to climate change mitigation.

There are distinct types of profit sharing. For instance, a carbon major could continue to operate its fossil fuel businesses and use the proceeds to compensate or mitigate to the appropriate degree. The benefits of this option are that it at least might be able to compensate those who have been harmed and assist its employees and the communities that depend on them to transition. However, the sharing of profits for compensation needs to be carefully thought through. For example: suppose that a factory owner pollutes the land of his neighbour while he produces goods.

Suppose further that he agrees that he has harmed his neighbour and that he should stop the harmful activity and pay compensation. Yet, the only way he can do so is by continuing to operate his factory as that is the only means by which he can generate revenue from which the compensation can be paid.

The harmed neighbour might think it acceptable to put up with a little more pollution to receive the compensation that he needs. Yet, what is not acceptable is the situation where the factory owner continues to operate and harm third parties to earn the money to pay the compensation. This is exactly the situation of the carbon majors. If they keep profiting from the sale of fossil fuels, then they are harming others to meet their obligations. Moreover, there could also be perverse incentives to increase production (and therefore more GHGs) and profitability to meet any compensatory requirements.

Compensating for past emissions

The issue of paying victims of climate harms before distributing profits to shareholders is compounded by the long history of past emissions. As we noted, the Australian carbon majors have been emitting very large quantities of emissions for decades or longer. Addressing the harms that these emissions may have caused should also form part of our assessment of the moral duties of carbon majors. Each of the carbon majors, of course, has a different profile of past emissions. But taking BHP as a case study, we can see how some of the issues arise.

BHP is an appropriate case study as they have recently announced that they will establish a US\$400M Climate Investment Program to address the huge amount of emissions associated with their operations. While the announcement sounds good, is it enough to address an emissions profile bigger than Australia's (BHP 2018)?

Let's start with the numbers. BHP was not called the 'Big Australian' without reason. They are big GHG emitters as extractors of fossil fuels. In 2018 BHP emitted about 16.5 Mt CO₂-e directly from its mining operations, its Scope 1 and 2 emissions. But their emissions profile is much larger when we include the emissions from the fossil fuels that they extract and export (Scope 3 emissions). The emissions from its global operations in 2018 were 596 Mt CO₂-e (BHP 2018). To put that in perspective, the latter figure is more than Australia's entire total projected domestic emissions for 2018 (533.7 Mt CO₂-e). If BHP were a country the emissions from its products would be larger than those of 25 million Australians.

So how does BHP's proposal to spend US\$400M stack up against its emissions budget? Not very well. CEO Andrew Mackenzie said that the initiative would operate over five years. A quick back-of-the-envelope calculation reveals a commitment of about US\$80M pa for reducing an annual emissions burden that is larger than Australia's is clearly inadequate.

The US\$400M commitment has been proposed to cover future emissions. Yet as we noted, there is good reason to hold them responsible for at least part of their emissions since 1990. Moreover, it would seem that BHP could afford it. BHP's profits over a similar period indicate that this is a very small percentage of their overall profit. In 2019 BHP announced that its annual profit would be A\$12.2 billion (US\$8.3B). BHP has also paid out over \$20 billion dollars to shareholders over the last year (McKinnon, 2019). Moreover, we might also question whether a carbon major such as BHP should decide how much is required to address its contribution to climate change. Ultimately, this should be decided by an independent body and by reference to those affected.

The cost of carbon

So how do we estimate what BHP ought to set aside for past emissions? A typical method used by governments and economists for estimating the costs of carbon is what is called the 'social cost of carbon'. The social cost of carbon is a way of calculating the costs of each tonne of CO₂-e. Recent Nobel laureate William Nordhaus (2017), estimates the cost of carbon at US\$31 (at the 2010 value of the US dollar) per tonne. Others value it much higher at US\$220 per tonne (Moore and Diaz, 2015). But taking this low estimate we can at least get a rough idea of what it might cost to remediate the harms of GHG emissions. Multiplying BHP's emissions from Scope 1,2 and 3 for 2018 we get a figure of around US\$18.5 billion, just under what it paid out to shareholders. Even if one thinks that BHP is not responsible for all the costs of what it emits, the figure will be substantial.

"If they keep profiting from the sale of fossil fuels, then they are harming others to meet their obligations."

Transforming: Phasing out

If not contributing to harm ought to be the goal of carbon majors, then the most obvious response available to them is to phase out the operations that lead to the problematic contribution to climate harms. Phase outs involve ending —over time or immediately— the production and sale of fossil fuels and those activities that support them. These activities include: lobbying for financial subsidies for production; the exploration for new resources; seeking support for fossil fuels through the funding of lobbyists, politicians, 'think tanks', industry groups and other kinds of activities designed to achieve favourable outcomes for carbon majors.

As the name suggests, a phase out can occur over time and need not be immediate — indeed, they are highly unlikely to be in many cases. To prevent further climate harms the quicker a phase out is the better. However, many countries cannot stop using fossil fuels overnight. Lest this be taken as a kind of back door policy for business-as-usual, it is important to be clear that any phase out policy has to be a real and urgent goal. Adopting phase out targets that stretch far into the future and relegate emissions cuts to the end of a phase out plan likely reflect dubious commitment (Victor et al 2017).

Measured against the goal of not contributing to climate harms, a phase out is a better response than either profit sharing or transformation. A phase out is better than a transformation because it has less risk of harm. Stopping the production and sale of fossil fuels means no emissions are generated, whereas offsetting offers more risk that emissions will continue.

A phase out of the operations of carbon majors will mean taking different actions for different companies. While we can't go into all of the details here, a framework would have to be established that ranked their operations in terms of identifying the worst emitters, which of the operations was really necessary for meeting basic energy needs, whether a particular country had more need for allowing production to continue, whether some carbon majors are extracting unfairly large shares of fossil fuel resources, and so on. Some particularly polluting carbon major operations might be phased out immediately, while others might be among the last to be shutdown (LeBillon and Kristofferson, 2019).

Note that the option of a phase out of operations is a more comprehensive demand than the demand for 'no new mines'. Not developing new mines is of course required if future harms are to be avoided. But, by itself, it is not enough as it is the output of current mines that are contributing to harm.

There are likely to be objections that the kind of action carbon majors ought to take are far too demanding. In particular, phasing out their operations may be seen as too harsh a consequence, given that in many cases an individual carbon major is 'merely' complicit in causing a harm and therefore shares responsibility for the harm with a principal agent.

This argument raises an important point: that the actions of a carbon major ought to be in proportion to their contribution to a harm. In the case of profit sharing for the purposes of compensation, there is no reason why a proportionate response would not be appropriate. For example, in the case where liability was incurred because a carbon major supplied coal to a power station, it is complicit in the harmful actions of the power station but not wholly responsible for compensating victims.



Conclusion: A hybrid response

Where the activities of carbon majors contribute to climate harms, the actions undertaken should involve an immediate phase out of operations. For operations that are phased out immediately, retiring those assets is preferable to selling them, as we have seen. Yet there will be instances where fossil fuel extraction will not stop immediately because operations are on-going in line with appropriate climate targets or because an immediate phase out is not feasible. Where this is the case a mixed or hybrid approach is required. So in the case where operations continue in the short term, there are nonetheless clear pathways that carbon majors ought to follow if they are to avoid or minimise creating climate harms. The first is, as we saw above, that operations have minimal impact via ensuring that they are carbon neutral as far as possible. This means putting carbon neutrality before the payout of bonuses to executives or profits to shareholders, changing the priorities of resource allocation for carbon majors.

The second feature of a hybrid response also concerns how resources are allocated. After ensuring that operations do not emit GHGs, carbon majors ought to prioritise compensating for past harms over bonuses or shareholder distribution. We saw above, the cost of past harms was likely to be substantial. But compensation should not be the only focus. Carbon majors should also ensure that future risks — such as mine rehabilitation or well sealing — are provided for. Anticipation and remediation of these harms should also be a priority over distributing profits. Nor should carbon majors ignore the responsibilities that they have to the communities in which they operate and the people that they employ. What is also crucial is that carbon majors do this without selling their fossil fuel assets so that other companies can continue to use them.

“For operations that are phased out immediately, retiring those assets is preferable to selling them.”

The third component of a hybrid response concerns the other dimension of the contribution of carbon majors to climate harms, which is their influence on climate policy. Just as reducing emissions during a phase out is necessary to avoid climate harms, so too is not contributing to harm through having a negative impact on climate policies. As we saw above, funding think tanks or lobbying also plays a substantial role in the continuation of fossil fuel friendly policies. Carbon majors should also cease these and related activities as part of their phase outs.

Lastly, carbon majors should of course not seek to expand their operations or look for new resource extraction opportunities.

These restrictions would make a huge difference to how carbon majors operate. Not only will it leave less or no money for shareholders, but it will mean those parts of their businesses that are causing climate harms must stop. For some companies this will impact their ability to operate. Yet if the climate harms that are caused by the emissions and lobbying of carbon majors are to be avoided, then meeting liabilities and avoiding harms must come before profit sharing.



Methodology: Calculation of fossil fuel emissions

Data from various sources is used to calculate the emissions associated with the combustion of the fossil fuel. The source data for oil, liquid natural gas and natural gas is commonly given in imperial units, which are converted to standard units using conversion factors to Million British thermal units (MBtu) (U.S. Energy Information Administration, 2019), which in turn is converted to Megajoules (MJ) (U.S. Energy Information Administration, 2019).

This implies an approximation where the heat content within a barrel of oil equivalent is assumed constant. The conversion factor for 2018 is used, whilst the conversions given by the U.S. Energy Information Administration for the heat content per barrel vary through years by 1-2%. Likewise, the heat content in cubic feet of natural gas is estimated using the marketed rate for 2018 and is assumed constant through the years, whilst the conversion factors change by 1-5%.

The source data for coal is converted from Mt into energy units (Terajoules, TJ) using the calorific value as specified by the IPCC guidelines for national greenhouse gas inventories (Garg, IPCC, 2006). The carbon data are separated into two main categories, thermal and metallurgical coal. When the type of coal is ambiguous (e.g. semi-soft coal or the weight given as a whole for coal), the total is converted using the highest energy content to assume the lowest emission per Mt of coal.

The standard energy units are then converted into Mt of CO₂ equivalent emission (MtCO₂-e). The emission factor as specified by the IPCC (2006) guidelines for national greenhouse gas inventories are used to calculate the emissions.

The list of the Australian carbon majors selected here was compiled to reflect the emission contribution of the coal sector and the oil and gas sector. The carbon majors on the list are the top 6 coal producers and the top five oil and gas producers.

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