

## Assessing climate change risk in the S&P/ASX 200 index and equity portfolios

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### Insights



The scientific evidence is clear that the world needs to address climate change. For investors, this can create risks and opportunities, and a fiduciary duty to understand the potential nature of the risk over the short, medium and long-term. This paper outlines how AMP Capital has assessed two aspects of this risk to equity portfolios. The first is that a price is placed on greenhouse gas (GHG) emissions, and the second is the potential for a significant decrease in the demand for fossil fuels over the medium to long-term - or the 'unburnable carbon' scenario.

#### Background

Questions have been raised about the exposure of equity portfolios to climate change. This is due to the introduction of the Australian Carbon Price Mechanism (CPM) on 1 July 2012, as well as concern over valuation implications of potentially sterilised reserves and resources on the books of Australian mining companies. The latter is due to the agreed international commitment to limit the temperature increase from man-made climate change.

This paper outlines how AMP Capital has considered climate change on Australian equities over the last five years.

#### The impact of a carbon price

There is now a growing international trend of internalising the environmental costs and externalities of GHG emissions via a price on carbon. Along with the Australian CPM, this trend can be seen in the upcoming emissions trading schemes (ETS) in China, South Korea and California, the existing ETS in Europe and New Zealand and in the carbon tax legislation in South Africa. Therefore, while there may be some uncertainty about the future mechanism for implementing a price on carbon in Australia, there is still a need to understand the potential exposure of companies to a carbon price.

From an investor's perspective, the greenhouse gas exposure of a company depends on its equity share of a project or facility. This is in contrast to the operational control approach adopted by the Australian CPM. The operational control approach does not always reflect the full

GHG emissions portfolio of a company's business activities although it does hold the advantage from an administrative standpoint for government.

While reporting and compliance with regulations in the Australian context, for example NGERs, will most likely continue to be based directly on operational control, the ultimate financial liability associated with greenhouse gas emissions will often rest with the group company that holds an equity share in the operation or has financial control over it. Good examples of this difference in liability from the S&P/ASX 200 index (Index) are companies such as:

**Woodside Petroleum** - Operates the North West liquefied natural gas facility in Western Australia, even though its equity interest is only 16.7%. From an operational perspective, Woodside Petroleum reports on, and has control over, approximately 7.9 million tonnes of CO<sub>2</sub>-e. However, due to its lower equity interest in the north west shelf and other projects, its equity based GHG emissions are approximately 1.9 million tonnes of CO<sub>2</sub>-e. This is a big difference when considering the potential impact on the value of Woodside Petroleum from an investor's perspective.

**BHP Billiton** - Has a 16% equity interest in the North West liquefied natural gas plant and so it also has an equity exposure to the GHG liability even though the facility is operated by Woodside Petroleum. BHP Billiton also has a 50% equity interest in Bass Strait oil and gas facilities even though these are operated by Exxon. Therefore, for assessing risk from an investor's perspective, calculating GHG exposure at an equity level is necessary to get a complete picture of the company's situation. As a result, the Environment Social and Governance team at AMP Capital takes the equity share approach to understanding the GHG exposure of the Index.

To assess potential company level GHG liabilities, the following aspects of a firm's business have been considered:

- Direct carbon costs (Scope 1 emissions)
- Indirect costs of carbon passed down the supply chain (Scope 2 emissions)
- Geographic exposure

- The capacity of firms to pass on any liabilities without materially affecting product demand
- Assistance levels from government

To relate the impact of a company's potential GHG liability to company value, emissions per dollar of market capitalisation is used. The total GHG exposure of the Index or a portfolio is then assessed based on the respective company weights in the Index or portfolio. Interestingly, the emissions intensity of the Index has decreased by approximately 33% since early 2009 to mid-2012. This is due to both a fall in total emissions but also an increase in the value of companies within the Index.

### Geographical exposure

Much of the interest in understanding GHG liability of equity portfolios has been the result of the introduction of the Australian carbon price mechanism. However, only 73% of the Index's emissions are in Australia. As noted above, other developed (or Annex B countries under the old Kyoto Protocol) have or plan to implement an emissions trading scheme. These include the European Union, Japan, and parts of the US, notably California and the north-eastern states. Given the likelihood that all Annex B countries will implement some form of carbon price mechanism, investors may also be interested in the Index and portfolio exposure to Annex B emissions. Annex B emissions account for 82% of the total Index exposure.

Finally, things have clearly moved on from the Kyoto Protocol. For example, under the Copenhagen Accord, non-Annex B countries have also made carbon reduction commitments. These countries include South Korea and China both of which are implementing emissions trading schemes or carbon taxes. Thus, investors are also interested in the total exposure of both the Index and each portfolio. Based on market capitalisation in November 2012, the total exposure of the Index was calculated as 162 tonnes of CO<sub>2</sub>-e/\$ million in assets under management.

### Assessing the ability to pass through costs or reduce emissions

The above analysis considered both direct and indirect (ie. Scope 1 and Scope 2) emissions for companies in the Index. However this approach has the potential to double or even triple count some emissions. The reason for this is that the direct (Scope 1) emissions from electricity generators or indirect (Scope 2) emissions from gas and electricity distribution and transmission are sometimes also counted as indirect (Scope 2) emissions by other companies. Both generation and distribution companies can pass the majority of their liability through to customers either via the functioning of the wholesale electricity market or because they are regulated utilities. Line losses are not costs that are borne by the utility company. This decreases the Australian exposure of the Index by approximately 8% or 97.1 tonnes of CO<sub>2</sub>-e/\$ million assets under management.

The above approach does not address how a carbon price will impact a particular utility – this requires more detailed analysis of the wholesale electricity market. However, the

approach does give a more realistic assessment of the carbon liability of the Index, or a particular portfolio.

Many companies can pass some or all of their GHG liabilities through to their customers (for example, airlines), while others may have abatement opportunities which will reduce their liability. While this is important when looking at company-specific investment decisions, this has not been considered in higher level analysis.

### Assessing portfolio exposure

The carbon exposure of a particular portfolio can vary significantly from the carbon exposure of the Index. For example, the total exposure of the AMP Capital Sustainable Fund in mid 2012 was two thirds of the Index, as measured by tonnes of CO<sub>2</sub>-e/\$ million of assets under management. However the fund's exposure was also more concentrated with the top five stocks contributing to over 60% of overall exposure and the top ten stocks nearly 80% of the fund's exposure.

In addition, the companies that made up the majority of exposure for the fund were different from the Index due to active positions taken within the fund. This was also reflected in the exposure of the portfolio to Australian emissions and the Australian CPM where the fund's exposure to Australian emissions contributed approximately 60% of total exposure compared to 73% for the Index.

### Value at risk from a carbon price

A couple of questions still remain when considering the impact of the price of carbon on the Index or a particular portfolio. The analysis described above used emissions per million dollar market capitalisation or assets under management to assess exposure. To assess the impact of a carbon price on the value of a portfolio, the price to earnings ratio of each stock could be used to get the effective net present value of the carbon liability. Alternatively, though less accurate, the market or portfolio price to earnings ratio could be used. Using a market price to earnings ratio of 12, and a carbon price of \$ 23 per tonne of CO<sub>2</sub>-e, the carbon liability represents approximately 3.3% of the Index's total value. Using this same approach, AMP Capital's Sustainable Funds' liability was approximately 2.2%. However, the stocks in the fund also had a number of clearly identified low cost abatement opportunities which made the expected liability materially less.

Like the Australian CPM, most carbon taxes and ETSS provide some form of assistance to some industries. This effectively decreases the potential financial implications on the Index or companies in a portfolio. At AMP Capital the impact of this assistance is considered at stock level.

### Assessing 'unburnable carbon'

Governments around the world have committed to limiting the increase in global temperatures due to man-made climate change to less than two degrees celsius. While the policy and regulatory mechanisms are yet to be put in place to achieve this goal, it is increasingly recognised that one of the consequences of achieving the goal is a significant decrease in fossil fuel use. It will not be possible for all the coal or oil and gas currently booked on company resource and reserves statements to be burnt. These stranded

carbon assets are also commonly described as 'unburnable carbon'.

This raises the question of what the level of exposure is of equities to this 'unburnable carbon' risk scenario? The answer to this question may have important implications for long-term universal owners such as institutional investors, as well as for strategic asset allocation.

### **Proceed with care**

There are significant challenges in trying to assess the risk of an 'unburnable carbon' scenario. There is no clear policy or regulatory framework on which to base the risk assessment, and the risk is only likely to manifest in the mid to long-term, ie. more than five years on. Therefore, it is important to recognise some of the limitations of such an analysis and to consider these in assessing any results.

The first challenge is to assess which sectors and companies will be affected. Obviously, companies involved in oil and gas extraction, coal mining, fossil fuel power generation, and transmission of fossil fuels will be impacted. However, it is not clear that within the 'unburnable carbon' scenario metallurgical coal, ie. coal used for steel making (for which there is no alternative) will be impacted in the same way as thermal coal, ie. coal used for power generation. The desire for economic growth and the subsequent need for steel in developing countries, whether for housing, infrastructure, or consumer goods, is unlikely to diminish. Alternatives to steel may be developed. Perhaps these will limit expected steel demand, but there will still be a need for steel and consequently for metallurgical coal.

In addition, many of these companies are not purely fossil fuel companies and the relative exposure to the 'unburnable carbon' scenario can change relatively quickly through divestments, acquisitions, mergers and demergers. For example, BHP Billiton's exposure increased as a result of acquisitions in shale gas while Rio Tinto's decreased as a result of the sale of its US thermal coal assets.

Companies providing services to the fossil fuel industry could also be impacted. These include contract miners, engineering service companies and contractors. There are more challenges in terms of assessing potential value at risk as most of these companies provide services to a range of industries and commodities, and many do not break earnings down by commodities. In part, this reflects the flexibility that most of these companies have, given the industry and commodity mix that they have today is different to what it was five years ago, and will almost certainly be different in another five years. So while a certain amount of value may currently be derived from servicing the fossil fuel sector, it does not necessarily mean that value is at risk under an 'unburnable carbon' scenario. The reason for this is that the value generated by the company is derived from the service they provide rather than the commodity itself.

An additional consideration is the potential impact of the 'unburnable carbon' scenario on sectors or companies that rely on the use of fossil fuels. Examples of these include transport infrastructure, such as tollways, ports, airports, and transport service companies. There is also the energy infrastructure sector, examples of which include electricity transmission and distribution systems. Again, even under an 'unburnable carbon' scenario, the need for personal mobility, the transport of goods or need for energy will remain. While questions about how these companies are

responding to climate change are valid, it is unlikely that the underlying demand for the services they provide, and hence how they generate value, will decrease. Similar considerations factor in for other raw materials, such as iron ore and non-ferrous metals. These generally rely on fossil fuels for transformation into useable metals. While the market forces that drive demand for these commodities will be impacted by the development of alternatives, as well as by costs that reflect the carbon intensity of production, growth in developing countries will still be a large underlying driver for these raw materials.

However, by far the greatest challenge is assessing the timeframe over which the 'unburnable carbon' scenario will play out.

The use of 'full market value' of the companies potentially impacted assumes that fossil fuel use will finish tomorrow, and is clearly a worst case measure. While improbable, this assumption does identify the maximum exposure to the 'unburnable carbon' scenario. An extremely unlikely scenario is that fossil fuel use will be forced to cease, or at least start to be significantly impacted by 2020. It is difficult to see the international community coming to an agreement which would lead to this outcome, even if that is what is required to meet a two degrees celsius temperature increase limit. Despite this, it is considered a reasonable scenario to identify the upper bounds of the potential value at risk.

Finally, one other scenario is that by 2030 fossil fuel use is forced to cease, or is at least starting to be significantly impacted. While complete cessation is unlikely, it is plausible as a significant decrease in fossil fuel use is necessary if the two degrees celsius temperature increase goal is to be met.

In sum, three scenarios have been considered:

1. Worst case scenario based on the current value of stocks impacted
2. Most likely upper bound of potential value at risk based on a 2020 cessation
3. Most probable scenario with a 2030 cessation

Given the underlying assumptions, the analysis of sophisticated transition pathways to low carbon scenarios is not considered to contribute significantly to the understanding of the risks at this stage. Therefore, for the purposes of the assessment, it is assumed that there is effectively a 'cliff' in fossil fuel use in 2020 or 2030.

To assess the value at risk under these 2020 and 2030 'unburnable carbon' scenarios, a discount rate of 9.5% has been assumed. It is recognised that the different companies impacted by the scenario will have different discount rates. Furthermore, the production profiles of some of the companies are far from uniform over the time period under consideration. The consideration of these issues, while important at an individual stock level, is not expected to significantly contribute to understanding the 'unburnable carbon' risk at an asset class level.

### **Value at risk from unburnable carbon**

The maximum value at risk for the Index, taking into consideration all companies that produce fossil fuels,

service providers to fossil fuel industries, and transport or transport infrastructure that rely on fossil fuels, is approximately 15%. Of this exposure, approximately 1% is associated with thermal coal, 1% metallurgical coal, 10% oil and gas companies, and the remainder with service providers/contractors to the fossil fuel industry. Fortunately, the overall exposure is relatively insensitive to assumptions about service providers to the industry. In addition, the majority of the exposure is attributable to a small number of companies, with BHP Billiton, Santos, Woodside Petroleum, Oil Search, Origin Energy, and AGL Energy representing nearly 60% of the total exposure. It must be stressed that these numbers represent a worst case scenario with exposure decreasing to 8% in the 2020 scenario, and 2.3% in the 2030 scenario. The exposure is less if one considers metallurgical coal and fossil fuel service companies differently.

### So what?

As noted above, it is the exposure of the Index which is the focus of this analysis. Given the timeframe over which the risk may materialise, active equity managers can significantly adjust their portfolios so the current exposure of any one portfolio at this point in time is of little relevance.

Given the overall risk to the Index posed by unburnable carbon over the time frames considered, it would appear that, while not significant compared with more immediate risks, it does require at least a watching brief, as well as the identification and assessment of potential risk mitigation options. Based on a preliminary review of potentially exposed sectors in other developed countries or areas, the exposure of the Index is likely to be higher than other countries or areas. As a result, AMP Capital is starting to consider climate change in its strategic asset allocation in diversified funds, ie. its long-term allocation between asset classes for diversified funds. It is still early days and further work needs to be done to fully assess the risk and potential risk mitigation options.

The other conclusion from the risk analysis is that it is in Australian investor interests to have a smooth transition to a low carbon economy and certainly not a 'cliff' transition, or anything remotely like it. Significant value could be at risk if there is a sudden and unexpected change in fossil fuel use. As this is in the interest of all investors, AMP Capital is working with other investors to encourage the Australian government and other countries to develop policy and regulation which will transition the local and global economy smoothly. AMP Capital set up the Australia/New Zealand Investor Group on Climate Change (IGCC) in 2007, and has been active in the management, research, and policy committees of the IGCC.

The IGCC's aims are to:

- Raise awareness of the potential impacts, both positive and negative, resulting from climate change to the investment industry, corporate, government and community sectors
- Encourage best practice approaches to facilitate the inclusion of the impacts of climate change in investment analysis by the investment industry
- Provide information to assist the investment industry in understanding and incorporating climate change into investment decisions.

More recently the IGCC has worked with sister organisations the Institutional Investor Group on Climate Change, Asia Investor Group on Climate Change and Investor Network on Climate Risk to form the Global Investor Coalition on Climate Change which has a more global focus in trying to create agreements and international markets which will enable efficient and effective emission reductions.

### Final thoughts

The scientific evidence is clear. The world needs to address climate change. For investors this can create risks and opportunities, and a fiduciary duty to understand the potential nature of the risk over the short, medium and long-term.

In the short term, an increasing number of jurisdictions are putting a price on carbon. The analysis of potential value at risk of the Index and any individual portfolio indicates that some of the key issues to consider are equity emissions exposure, geographic exposure, the potential for companies to pass through costs, and the avoidance of double counting emissions. The initial analysis indicates that value at risk for the Index with a carbon price of \$23 per tonne of CO<sub>2</sub>-e is relatively small - approximately 3.3%, and concentrated on a relatively few number of companies, most of which will be given some form of transitional assistance under the existing carbon tax/emissions trading scheme. The analysis indicated that individual portfolios can have significantly different exposures to that of the Index depending on the relative weighting of companies within the portfolio. In the case of the AMP Capital Sustainable Fund, this exposure is typically a third less than the Index.

Over the longer-term, the concept of unburnable carbon poses potentially bigger issues for investors in the Index. It is for this reason that AMP Capital has started to incorporate climate change in its strategic asset allocation process for diversified funds, and has been active in trying to develop both local and global policy and regulation that facilitates a smooth transition to a low carbon economy.

## Contact us

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**Financial Planners**  
AMP Capital's Client Service Team on 1300 139 267

**Personal Investors**  
Adviser or Financial Planner

**Wholesale Investors**  
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