Improving Australian greenhouse gas reporting and financial analysis of carbon risk associated with investments

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Climate change policies such as carbon taxes and emissions trading schemes are being developed and implemented in ways which fundamentally transform the profitability of industries and businesses. While mandatory reporting of greenhouse gas emissions by individual Australian companies is now largely standardised, the financial implications of emissions trading and other forms of climate change policy are poorly understood. This is the result of either insufficient information being available to adequately evaluate the risk to business or a lack of understanding about how carbon policies will impact on business. This paper proposes a ‘checklist’ for evaluation of the risks and opportunities created by pricing carbon. Most importantly, like any significant tax reform, we conclude that it is impossible to create simple metrics that can be used across all industries and companies.

1. Introduction

Climate change is one of the most prominent topics of public policy discussion today. National and regional policy responses are being developed to restrict the ability of companies to emit greenhouse gases such as carbon dioxide (CO₂) and methane (CH₄) through carbon taxation and greenhouse gas emissions trading schemes. The long-term financial impacts of such policies are likely to be profound with all businesses potentially affected. Direct emissions in most economies are largely the product of energy production and consumption but all businesses use energy in one form or another. As such, changes to the relative economics of various forms of energy will result in both winners and losers.

In Australia, the NSW Greenhouse Gas Abatement Scheme has been operating since 2003. While a national trading scheme is yet to be implemented, the Rudd Commonwealth Government had developed a detailed emissions trading scheme known as the Carbon Pollution Reduction Scheme (CPRS). This scheme was not implemented as bipartisan political support evaporated in 2008. Surprisingly, options for other carbon pricing measures (i.e. a carbon tax or fixed price emissions trading scheme) are now being actively discussed by politicians and policy-makers. In this context, while a number of studies completed by governments evaluate the impacts of emissions trading policies and the need to compensate industries for reductions in profitability, there has been little focus on developing a standard approach to analysing the impacts of emissions trading on individual companies.

As a result of increased focus on reducing greenhouse gas emissions, investors are starting to become more active in the management of climate risk in the companies that they invest in. As at November 2010, approximately 50% of all funds under the management of Australian asset managers now fall under a United Nations Principles of Responsible Investment (UN PRI) commitment to integrate environmental, social and governance considerations into their analyses.
Approximately $47.6 billion worth of assets held by Australian fund managers and institutional investors already integrate these considerations to a high degree (RIAA, 2010). Furthermore, Australia has a higher proportion of signatories to the UN PRI than any other country (Durkin, 2010).

As more investors become signatories to the UN PRI and new emissions trading schemes and climate change policies are introduced, it is likely that companies will receive greater requests for disclosure of climate change risk and emissions data. What is not clear is whether or not the information that is disclosed by organisations or being requested by investors is ‘fit for purpose’. Research conducted on the sustainability reporting practices of ASX 200 companies has shown that over half do not report sustainability risks or report sustainability risks at a basic level (ACSI, 2010). When reporting specifically related to the carbon risks and opportunities faced by Australian companies is considered, a similar trend is revealed. Of ASX 200 companies, 52% either declined to participate in the voluntary Carbon Disclosure Project or failed to respond to the survey (PWC, 2010). While reports on the impact of a carbon constraint on businesses are being commissioned and released, there has been little scrutiny of whether the information being presented is meaningful and accurate.

The purpose of this paper is to improve the financial analysis of business carbon risk, by providing a ‘checklist’ of key considerations. This paper is structured as follows: Section 2 outlines how emissions trading should be considered from a theoretical perspective utilising microeconomic techniques. Section 3 presents the requirements for public disclosure of emissions in Australia and contrasts this with information which may be more useful for investors. Section 4 provides an overview of some of the existing techniques used by analysts of individual companies to determine the impacts associated with the introduction of an emissions trading scheme. A review of literature released internationally and within Australia by analysts in financial and equity markets is presented. In Section 5, we provide a summary of the most important factors which need to be considered in any analysis of the impact of carbon taxation or emissions trading on an individual company. Policy recommendations and concluding remarks are found in Section 6.

2. The Impact of Emissions Trading: Microeconomic Theory

An emissions trading scheme or carbon tax can be analysed using standard partial equilibrium analysis. The most critical question requiring assessment is who bears the incidence of the tax or tax equivalent (i.e. the cost of buying permits in a trading scheme). If the incidence lies with producers, rather than consumers, there will be a greater impact on profitability within the industry. If the incidence lies with consumers, prices will increase and ceteris paribus, there will be a greater impact on consumer standard of living. While the revenue can be collected at various points in the supply chain, the actual burden of taxation is more dependent upon:

- **The price elasticity of demand.** The price elasticity of demand is largely a function of whether there are substitutes for the product being analysed. Inelastic demand ceteris paribus is likely to see a higher proportion of the incidence of the tax or tax equivalent being borne by consumers as producers raise prices in line with total production costs.

- **Economics of substitutable technologies.** As new technologies enter the market with lower emissions intensities, the ‘pass through’ of the carbon price will be lower. Taking electricity as an example, if ‘pass through’ of the carbon price is based upon a gas-fired electricity generator (0.4 tonnes per MWh¹), the tax paid by consumers will be significantly less than ‘pass through’ based upon a black coal plant (0.8 tonnes per MWh). This has

¹ Combined cycle gas turbine
important implications for the impacts of a tax or tax equivalent on existing investments.

- **Temporal aspects of supply and demand.** Importantly, the incidence of taxation could vary over time as supply and demand elasticities change. For example, if energy efficiency measures are introduced to overcome institutional barriers to adoption, demand for electricity may become more elastic and *ceteris paribus*, shift a greater proportion of the tax incidence back onto producers. Nelson *et al.* (2010b) demonstrates that in the electricity sector that there are likely to be significant temporal aspects in relation to the impact of carbon taxation on electricity generators.

- **Market structure.** The structure of a market is also an important consideration in determining the impact of a carbon tax or a equivalent. Markets characterised by natural monopolies or oligopolies are likely to see greater incidence of taxation being borne by consumers rather than producers. Conversely, highly competitive markets are likely to see a greater incidence of the cost being borne by producers, and in particular, relatively energy inefficient producers.

Let us consider a hypothetical example for two products named A and B to demonstrate these concepts. The market for product A is characterised by highly elastic demand and inelastic supply. The market for product B is characterised by highly inelastic demand and elastic supply. Figure 1 and Figure 2 outline graphically how a carbon tax might affect industries producing these products using partial equilibrium analysis.

As outlined in Figure 1, the introduction of a tax increases the price for product A only marginally from $P_1$ to $P_{T1}$. This is because demand is highly elastic and supply is inelastic. The shaded area represents the incidence borne by producers in such a market. An example of this type of market might be a product that is export competing and capital intensive. Overseas buyers will reduce their demand significantly if they can source alternative goods from another country. This can be contrasted with the example provided for product B in Figure 2. The introduction of the carbon tax (or equivalent) increases the price substantially from $P_2$ to $P_{T2}$. This is because demand is highly inelastic. The shaded area represents the incidence borne by consumers (as opposed to producers in such a market. An example of this type of market might be a product like electricity (in the short-term before new lower emitting technologies can be built and operating).
The demand for electricity is likely to be highly inelastic in the short–term. It is clear from this example that significant analysis would need to go into any conclusion about the impacts of an emissions trading scheme or carbon tax on any particular industry or company.

An added complication to this analysis is that carbon taxes and emissions trading schemes impact on prices of fundamental inputs into most production processes (e.g. electricity, gas, petrol). Accordingly, any analysis on a company must account for changes to pricing in upstream markets relevant to the industry in question. For example, a large retailing entity (such as a supermarket chain) will be impacted through higher fuel, electricity and gas prices. An analysis of the impacts of a carbon tax would therefore need to include an understanding of: the company’s direct liability (emissions produced by the company); the company’s indirect liability (higher input costs passed on from upstream suppliers); and the ability of the company to pass these accumulated costs through to their customers.

In this context, it is worth examining an economy’s greenhouse gas inventory to get a guide on where direct liabilities are likely to occur. In Australia, the National Greenhouse Gas Inventory is produced by the Commonwealth Government and provides an overview of greenhouse gases produced by sector. Table 1 outlines Australia’s inventory as at December 2009.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Emissions (Mt)</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Energy - Electricity</td>
<td>202</td>
<td>38</td>
</tr>
<tr>
<td>Energy - Stationary (excl electricity)</td>
<td>89</td>
<td>17</td>
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<tr>
<td>Energy - Transport</td>
<td>79</td>
<td>15</td>
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<tr>
<td>Energy - Fugitive</td>
<td>41</td>
<td>8</td>
</tr>
<tr>
<td>Industrial Processes</td>
<td>27</td>
<td>5</td>
</tr>
<tr>
<td>Waste</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>Agriculture</td>
<td>84</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>537</strong></td>
<td><strong>100</strong></td>
</tr>
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</table>

Source: Department of Climate Change and Energy Efficiency (2010)

In the Australian context, it is clear that energy production and consumption is the primary way in which greenhouse gases are produced with electricity generation and stationary energy accounting for approximately 55% of emissions. This has significant implications for any analysis of industries and individual companies. With around 77% of all emissions produced by the capital intensive energy sector, most companies impacted by a carbon tax or emissions trading scheme will not actually be ‘significant emitters’. In fact, only 19 Australian companies that reported on emissions in FY09 had emissions greater than 5 million tonnes (GEDO, 2010).

A final important consideration in any theoretical discussion about the incidence of carbon taxation is the treatment of equity and other non-operationally controlled assets. An overarching corporate structure may have very little in the way of a direct or indirect liability as its contributing subsidiaries are the ‘responsible’ entities for these emissions. Accordingly, any comparable analysis of companies needs to consider all emissions from subsidiaries and other corporate structures which may have an impact on the company’s overall profitability.

Accurate and comparable emissions data is critical in assessing the financial impacts on industries and companies due to the introduction of an emissions trading scheme or carbon tax. Currently, most publically reported greenhouse gas emissions data utilises the Scope 1 and Scope 2 emissions methodology developed under the Greenhouse Gas Protocol (2004). Scope 1 emissions are emissions produced directly by the company in producing its good or services. For example, a power generator produces Scope 1 emissions when it burns coal to create electricity. Scope 1 emissions are also often referred to as ‘direct liability’ emissions. Scope 2 emissions are those emissions associated with consuming energy that has ‘embedded emissions’ (including electricity, steam, heating or cooling). For example, Scope 2 emissions for a supermarket include the emissions associated with electricity used for lighting, heating and cooling. These emissions are classed as ‘indirect liability’ emissions. Together, Scope 1 and Scope 2 represent a gross estimate of the direct and readily identifiable indirect emissions, which would incur a cost in an emissions trading environment. Importantly, this does not take into account the other costs that an entity may face through increases in input costs associated with commodities that are energy intensive. For example, a company that uses significant amounts of cement (an emissions intensive product) is likely to see significant increases in costs but may not have significant Scope 1 or Scope 2 emissions.

In Australia, the National Greenhouse and Energy Reporting (NGER) Act 2007 (the Act) mandates companies to undertake an assessment and report their energy production and consumption and associated emissions where thresholds are reached. Under the Act, corporations must assess the energy and emissions of facilities which fall within their corporate group and for which they have operational control. Facilities are defined under the Act as sites for which: activities must produce greenhouse gas emissions or produce or consume energy; activities are part of a production process; activities occur at a ‘single site’; and activities are attributable to a single industry sector. Energy and emissions are required to be reported for Scope 1 and Scope 2 sources.

Reporting thresholds exist for two levels – facility and corporate levels. Facility level thresholds are 100 TJ of energy either consumed or produced or emissions of 25 ktCO$_2$e of greenhouse gases. This remains unchanged through time. Furthermore, corporations that either consumed or produced 200 TJ of energy or emitted 50 ktCO$_2$e of greenhouse gas emissions are required to register and report. Under section 24 of the Act, the Greenhouse and Energy Data Officer (GEDO) must publicly report the corporate groups whose Scope 1 and 2 greenhouse gas emissions exceed the threshold of 125 ktCO$_2$e. For those corporations, the Scope 1 and 2 greenhouse gas emissions and the total energy consumed are reported. Based upon information published by the GEDO (2010), in the first reporting year (2008/09) a total of 725 corporations registered (with 4 registering reporting transfer certificates). A total of 233 corporations reached the threshold for public reporting of NGER data in 2008/09. Presumably, there were 492 corporations that either operated a facility but did not trigger the corporate threshold or were not required to report for a variety of reasons. Under section 25 of the Act, corporations can apply to have data withheld where public reporting may disclose trade secrets or commercially sensitive information. This information must be published by the GEDO before 28 February in the year following the submission of NGER reports.

It is clear that there is a limitation on using Scope 1 and Scope 2 data to assess a company’s financial performance once an emissions trading scheme or carbon tax is introduced. As the definition used to define a company’s boundaries is often ‘operational control’$^2$, focus on Scope 1 emissions.

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$^2$ Operational control is effectively defined as where an entity has responsibility for Health, Safety and Environment policy.
and Scope 2 alone ignores emissions produced by equity investments where the parent entity does not have operational control. Furthermore, this information does not provide useful data on emissions associated with emissions-intensive input commodities (e.g. cement). Clearly, this represents a deficiency in reporting which could be overcome with amendments to the *National Greenhouse and Energy Reporting Act (2007)*.

A complementary approach is the ‘footprint’ approach used by leading companies and often reported in annual sustainability reporting documentation. The approach used in AGL Energy Limited (2010) provides a useful starting point. Three footprints are defined to provide shareholders and equity analysts with information about the different components of AGL’s emissions inventory:

- **Operational:** The Operational Footprint covers the emissions from activities and assets that a business operates.

- **Equity:** The Equity Footprint sets out a company’s share (by percentage investment level) of the emissions from fully or partially owned entities. The Equity Footprint indicates to shareholders and other investors the greenhouse gas emissions associated with their investment.

- **Supply:** The Supply Footprint estimates the greenhouse gas emissions associated with the consumption of the product by the company’s customers. The Supply Footprint covers greenhouse gas emissions resulting from the production, transportation, distribution and consumption of the product through the supply chain.

By disclosing these emissions, interested parties are better placed to analyse the financial impacts associated with the introduction of an emissions trading scheme or carbon tax. This disclosure overcomes the short-comings identified with the mandatory Scope 1 and Scope 2 approach by providing additional voluntary information in relation to all supply chain emissions (where estimates are possible) and equity investment emissions.

### 4. Existing Methodologies used by Analysts

To date, equity analysts have used differing analytical techniques to analyse the exposure of very large energy users. For large energy users and energy producers that disclose Scope 1 and Scope 2 emissions, it is relatively easy to determine the major costs likely to be experienced by a company based upon an assumed carbon price. For example, if we assume that a coal-fired generator produces 20 million tonnes of Scope 1 emissions, a carbon price of $10 will result in increased costs of $200 million. Similarly, in the case of a large energy user with 20 million tonnes of Scope 2 emissions, a carbon price of $10 will result in increased energy costs of $200 million.

However, much greater granularity is required in any analysis for companies more broadly. Table 2 presents the results of a literature review completed on briefing notes released by equity and commodity analysts for major financial institutions. We have analysed: the methodology employed; whether compensation (free permits or cash) has been considered; and the extent to which carbon pass-through measures (i.e. the incidence of taxation) have been considered.

Nelson, Orton and Kelley (2010b) provided a literature review of Australian economic modelling studies on the impacts of carbon pricing on electricity markets which we do not intend to reproduce here. The literature review in Nelson *et al* (2010b) reveals that significant and unexplained variations in the results of studies exist. There is an important distinction between the reports summarised in Table 2 and the literature review conducted by Nelson *et al.* (2010b).
Equity market investors may take more guidance from information released by equity analysts than economic modelling studies as the information in such studies is often not specific to listed companies. Therefore, the current study has not considered reports completed by economic modelling companies on the impacts.
Table 2: Literature Review of Analyst Publications on Impact of Emissions Trading and Carbon Taxes

<table>
<thead>
<tr>
<th>Article</th>
<th>Summary</th>
<th>Scope of analysis</th>
<th>Details of Analysis</th>
<th>Compensation Analysed</th>
<th>Carbon Cost Pass Through Examined</th>
<th>Data Source</th>
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</thead>
<tbody>
<tr>
<td>Blackwell, M. (2008) Australia Utilities - Electricity and Emissions. Morgan Stanley Research - Asia Pacific</td>
<td>Provides background information on possible carbon prices, and the impact of a carbon price on the electricity sector and the operation of the National Electricity Market</td>
<td>Company specific - AGK and BBP</td>
<td><strong>Carbon price:</strong> A carbon price of $60/tCO₂ is assumed  <strong>Emissions data:</strong> Analysis considers equity investments  <strong>Other:</strong> Analysis considers generation businesses of utilities</td>
<td>Compensation is acknowledged however not incorporated into analysis</td>
<td>The ability of retailers to pass through carbon costs is discussed in the report however not at a company specific level</td>
<td>Morgan Stanley Research and NEMMCO data</td>
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<tr>
<td>Busuttil, M. (2009) Australian Steel - Sifting through the CPRS. UBS Investment Research</td>
<td>Considers the impact of the proposed CPRS under four different scenarios. The scenarios analyse two different emissions quantities and two different carbon prices</td>
<td>Company specific</td>
<td><strong>Carbon price:</strong> (1) A $10/tCO₂ price in year 1, and $25/tCO₂ in year 2 escalating at CPI until FY20; (2) A $10/tCO₂ price in year 1, $40/tCO₂ in year 2 escalating at CPI until FY20.  <strong>Emissions data:</strong> Direct and indirect emissions data (Scope 1 and Scope 2) used in analysis. Scope 3 emissions used in selected scenarios</td>
<td>Compensation (free permit allocation) is incorporated into analysis, decreasing from 94.5% in FY12 to 81.1% in FY20</td>
<td>Analysis incorporates the impacts of higher coal costs in the two scenarios that include Scope 3 emissions</td>
<td>Company indications of greenhouse gas emissions/financial impact of a CPRS and UBS estimates</td>
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<tr>
<td>Gibson, A. &amp; McCusker, A. (2009) OneSteel Ltd/Bluescope Steel Ltd - Looking at the Potential Impacts of CPRS on Mid-Cycle Earnings. Goldman Sachs JBWere</td>
<td>Considers the impact of the proposed CPRS under 4 different scenarios. The impact on earnings for OST and BSL under the four CPRS scenarios is analysed</td>
<td>Company specific</td>
<td><strong>Carbon price:</strong> A $10/tCO₂ price in year 1, with $25/tCO₂ in year 2.  <strong>Emissions data:</strong> Direct and indirect emissions data (Scope 1 and Scope 2) used in analysis. Estimated Scope 3 emissions (other indirect emissions) are included in analysis</td>
<td>Compensation included in the analysis, with the assumption that BSL and OST will qualify for the maximum level of assistance (94.5%)</td>
<td>The extent to which upstream, suppliers are expected to pass through costs to BSL and OST is discussed but not incorporated into analysis due to a lack of information</td>
<td>Company data and Goldman Sachs JBWere research estimates</td>
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<tr>
<td>King, T. &amp; Fitzpatrick, B. (2009) Australian Carbon Pollution Reduction Scheme: De-carbonising the CPRS. Deutsche Bank Global Markets Research.</td>
<td>Examines the impact on valuation of the proposed CPRS, with consideration for the expected allocation of compensation and the ability of industries and companies to pass through carbon costs</td>
<td>Other: the report covers all the main sectors, however the valuation analysis compares companies within sectors</td>
<td><strong>Carbon price:</strong> A carbon price of $10/tCO₂ in year 1 (FY12), increasing to $30/tCO₂ in year 2 (FY13), and to over $60/tCO₂ in FY25.  <strong>Emissions data:</strong> Direct and indirect emissions data (Scope 1 and Scope 2) used in analysis  <strong>Other:</strong> The analysis also uses unique emissions forecasts for each company based on production and opportunities for abatement</td>
<td>The level of compensation for each industry is incorporated into analysis</td>
<td>Specific carbon cost pass through assumptions for sectors and companies are applied in the analysis</td>
<td>Company data, Deutsche Bank and Carbon Disclosure Project</td>
</tr>
<tr>
<td>Leitch, D. &amp; Woolley, A. (2009) Electricity: A Generational change. UBS - Global Equity Research</td>
<td>Examines the implications of a carbon price for the value of AGK’s and ORG’s generation assets</td>
<td>Company specific - AGK and ORG</td>
<td><strong>Carbon price:</strong> A carbon price of $25/tCO₂ is assumed for 2010/11, increasing incrementally to $35.4/tCO₂ in 2014/15  <strong>Emissions data:</strong> Equity assets incorporated in analysis</td>
<td>Compensation is discussed and included in analysis</td>
<td>The report quotes ACIL figures which state a carbon pass through of between 50% and 80%</td>
<td>Company data and UBS estimates</td>
</tr>
<tr>
<td>Maher, G. &amp; Evans, J. (2009) Utilities snapshot - AGK, ORG and the underlying businesses. Macquarie Research: Equities</td>
<td>Provides an overview of the Australian energy sector, including retail, generation and upstream gas. A detailed analysis of the two major energy sector participants: AGL and ORG</td>
<td>Company specific</td>
<td><strong>Carbon price:</strong> $25/tCO₂ carbon price, however the impact of a carbon cost between $10/tCO₂ and $40/tCO₂ is considered in broader analysis.  <strong>Emissions data:</strong> - The carbon intensity of generation assets is used to calculate the impact of a carbon price  - Equity assets incorporated in analysis  <strong>Other:</strong> - The exposure of AGL and ORG to renewables and low-emission generation is considered - Regional differences in carbon emissions intensities incorporated into analysis together with geographic spread of retail customers</td>
<td>Compensation (free permits for generators) under an ETS included in analysis</td>
<td>- Assumptions on carbon price pass through provided - Analysis incorporates different levels of carbon pass through for different retail markets (states)</td>
<td>Company data and Macquarie Research</td>
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<td>McDonald, C., Ahmed, R. &amp; Lewandowski, A. (2009) Transport and Infrastructure - It won't be easy being green. FITT Research - Deutsche Bank</td>
<td>Reviews the potential impact of a ETS on the transport and infrastructure sectors</td>
<td>Company specific</td>
<td>Carbon price: A $10/tCO₂ carbon price is assumed for 2012, increasing to almost $30/tCO₂ in 2013. Emissions data: Direct and indirect emissions data (Scope 1 and Scope 2) used in analysis. Emissions are projected for each company up until FY25. Other: The analysis explicitly considers the elasticity of consumer demand</td>
<td>Under the CPRS arrangements proposed at the time of writing, no compensation was proposed for the sector</td>
<td>The ability of companies to pass through costs is estimated and assumptions for carbon pass through are disclosed. The assumed carbon pass through rates vary from 0% to 100% dependant on mode and the price elasticity of demand</td>
<td>Company data and Deutsche Bank</td>
</tr>
<tr>
<td>Myles, I. &amp; Kaye, A. (2009) ESG exploration - Carbon emissions. Macquarie Equities Research</td>
<td>Looks at the value impact of the proposed CPRS for selected Australian and New Zealand stocks. For utilities (AGK and ORG) the report analyses the impact of carbon pricing on retail markets and on the value of each power generation asset</td>
<td>Sector level - except for AGK and ORG</td>
<td>Carbon price: - A carbon price of $25/tCO₂ is assumed. -Further analysis is conducted using a changing carbon price. Emissions data: - The carbon intensity of generation assets is used to calculate the impact of a carbon price - Equity assets incorporated in analysis Other: - The exposure of AGL and ORG to renewables and low-emission generation is considered - Regional differences in carbon emissions intensities incorporated into analysis together with geographic spread of retail customers</td>
<td>Compensation (free permits allocations) under the CPRS included in analysis</td>
<td>The ability of companies to pass through costs is estimated and assumptions for price pass through are disclosed</td>
<td>Company data and Macquarie Research</td>
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<td>Preston, I. &amp; Quail, A. (2009) Alumina Limited - Looking at the Potential Impact of CPRS on Earnings and Valuation. Goldman Sachs JBWere</td>
<td>Looks at the impact of a carbon price on Alumina on the basis of the maximum, minimum and FY09E revenues for 3 different carbon permit prices</td>
<td>Company specific</td>
<td><strong>Carbon price:</strong> Carbon prices of $10/tCO₂, $25/tCO₂ and $40/tCO₂ are assumed. <strong>Emissions data:</strong> Direct and indirect emissions data (Scope 1 and Scope 2) used in analysis</td>
<td>Different compensation scenarios are incorporated into analysis</td>
<td>Carbon cost pass through discussed.</td>
<td>Company data and Goldman Sachs JBWere research estimates</td>
</tr>
<tr>
<td>Prior, E. (2009). BlueScope Street, OneSteel and CPRS - Quantifying Carbon Pollution Reduction Scheme Impacts. Thematic Investing (Citi)</td>
<td>Examines the potential implications of a CPRS and the Renewable Energy Target on BlueScope and OneSteel under various assumptions and scenarios</td>
<td>Company specific - BlueScope and OneSteel.</td>
<td><strong>Carbon price:</strong> A carbon price $20/tCO₂ is assumed in year 1 (FY11), with $40/tCO₂ in 2020. <strong>Emissions data:</strong> Direct and indirect emissions data (Scope 1 and Scope 2) used in analysis Scope 3 (fugitive) emissions are estimated</td>
<td>Compensation incorporated into analysis.</td>
<td>The ability for OST and BSL to pass through some carbon costs to customers is incorporated into analysis. Conversely, the analysis also considers the ability for electricity suppliers to pass through the costs of carbon to BSL and OST (under three different scenarios)</td>
<td>Company data and Citi Investment Research and Analysis</td>
</tr>
<tr>
<td>Shaw, R. (2009) Road transport sector: Managing the carbon footprint. Macquarie Equities Research</td>
<td>Analyses the implications of carbon trading for some of the larger Australian road transport/ commercial services companies, including Brambles and Toll Holdings</td>
<td>Company specific - Toll and Brambles</td>
<td><strong>Carbon price:</strong> Carbon prices of $10/tCO₂, $20/tCO₂, $30/tCO₂ and $40/tCO₂ are assumed <strong>Emissions data:</strong> The report states that ‘all’ emissions are assumed to require a permit, and therefore all emissions have been included</td>
<td>Not considered in analysis.</td>
<td>The ability for companies to pass through additional costs to customers is discussed, but not incorporated in analysis</td>
<td>Macquarie Research</td>
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<td>Article</td>
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| Prior, E. (2009) Carbon Pollution Reduction Scheme. Financial Impact on ASX100 Companies and More. Thematic Investing (Citi) | Analyses the implications of carbon trading for the ASX 100, and reviews in detail some of the most significantly impacted companies. The paper presents emissions data for ASX100 companies, illustrating “hypothetical exposure across the broad market” | Other - ASX 100 | Carbon price: $20/tCO₂ or $50/tCO₂  
Emissions data:  
- Direct and indirect emissions data (Scope 1 and Scope 2) used in analysis  
- Equity share data has been used for selected companies, or adjustments have been made to reported “operated data” (AGK, BHP, CSR, IPL, RIO, WES and WPL). This may make conclusions for individual businesses not comparable | Compensation under an ETS discussed however only incorporated into analysis for emissions intensive trade exposed companies | Carbon pass through is discussed for some companies (e.g. Qantas), but not discussed for others (e.g. utilities) | Company data. The authors have adjusted company reported data to better reflect equity share of emissions where possible, in some cases adding in equity interests in emissions for non-operated assets. Data for some companies has been estimated completely as no emissions are reported |
| VicSuper, (2009) Carbon Count 2009. VicSuper, Melbourne | Examines the greenhouse gas emissions from ASX200 companies. The report ‘normalises’ emissions using financial metrics to compare companies of different sizes and industries. The financial implications of a carbon price are assessed under different pricing scenarios | Other - ASX 200 | Carbon price:  
(1) A fixed 2011 price of $10/tCO₂,  
(2) an assumed 2012 global carbon price of $26/tCO₂  
Emissions data:  
Direct and indirect emissions data (Scope 1 and Scope 2) used in analysis.  
Other:  
The analysis includes emissions from global operations, not Australian only emissions. | Compensation under a CPRS discussed, however not considered in analysis | Carbon pass through discussed but not considered in analysis | Data publically disclosed by companies. Where data does not exist or is incomplete a model has been used to estimate emissions |
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<td>Haddad et al (2010) Coal Initiations: The Next Generation (and a couple of Coalden oldies). Metals and Mining (Citi)</td>
<td>Examines the outlook for independent Australian coal producers, and global coal companies. The general conditions and impacts of a possible carbon tax are considered</td>
<td>Company specific</td>
<td><strong>Carbon price:</strong> Carbon prices of $20/tCO₂ and $40/tCO₂ are considered. <strong>Emissions data:</strong> Operational and fugitive emissions are used in analysis. <strong>Other:</strong> The future possibilities for power generation projects from coal mine methane are briefly discussed</td>
<td>Not applicable as CPRS did not specify assistance for coal miners</td>
<td>Carbon pass through is discussed however not included in analysis</td>
<td>Company data and Citi Investment Research and Analysis</td>
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<td>Jordan, T., King, T. &amp; Behncke, E. (2010) ESG in the Australian building materials sector: carbon is key. Deutsche Bank Global Markets Research.</td>
<td>Presents a range of key ESG indicators and identifies key risks for the sector. Companies analysed are: Adelaide Brighton, Boral, CSR, Fletcher Building and James Hardie Industries</td>
<td>Company specific</td>
<td><strong>Carbon price:</strong> Not applicable <strong>Emissions data:</strong> Direct and indirect emissions data (Scope 1 and Scope 2) used in analysis Where possible, emissions from JV’s and equity interests are reported. <strong>Other:</strong> The emissions produced intensity and energy consumed by various processes (including cement manufacturing) are disclosed</td>
<td>Discussed but not explicitly incorporated into analysis given the design of a carbon price remained uncertain in 2010. Carbon intensities of operations discussed as least carbon intensive operations/products to benefit if compensation allocated on a per-unit-of-output basis</td>
<td>Carbon pass through discussed and carbon intensity of operations incorporated into analysis as building sector will be subject to carbon pass through from electricity companies if a carbon price is implemented</td>
<td>Company data and Deutsche Bank</td>
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<td>Prior, E., Faria, F. &amp; Wilkins, C. (2010) ESG Snapshots for ASX100 Companies - Series Launch with BHP, RIO, WPL, BSL and OST. Thematic Investing (Citi)</td>
<td>Presents snapshots for five ASX 100 companies: BHP, RIO, WPL, BSL and OST. The snapshots cover a range of sustainability issues including board representation, remuneration, greenhouse gas emissions, water use and safety performance</td>
<td>Company specific</td>
<td><strong>Carbon price:</strong> $20/tCO₂ or $50/tCO₂ <strong>Emissions data:</strong> - Direct and indirect emissions data (Scope 1 and Scope 2) used in analysis on an Australian and worldwide basis - Carbon emissions are disclosed in selected instances on an equity basis</td>
<td>Analysis excludes the impact of compensation</td>
<td>The likelihood that upstream suppliers will pass through carbon costs that they incur for shipping etc is discussed but not included in analysis</td>
<td>Company data and Citi Investment Research and Analysis. Selected emissions data (e.g. BHP) has been adjusted by authors to reflect an equity basis</td>
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## Table of Analysis

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<td>Worthington et al (2010) Asia-Pacific Utilities: Get ready to be electrified. Macquarie Equities Research</td>
<td>Analyses Asia Pacific Utilities performance in relation to five themes: - Growth, - Clean and green, - Regulatory restructuring, - Security of energy and pricing risk, - Balance sheet strength plays</td>
<td>Sector level</td>
<td><strong>Carbon price:</strong> No carbon price is applied in this analysis, as it covers the Asia-Pacific region <strong>Emissions data:</strong> The average emissions intensity is used in the analysis to compare utilities</td>
<td>Not considered in analysis</td>
<td>Not considered in analysis</td>
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Some limitations were identified from a number of the analyses compiled by equity and commodity analysts (Table 2). Most notably:

- Some of the analyses present simplistic measures that are at best not useful and at worst potentially misleading. We define ‘simplistic measures’ as those that do not meaningfully consider the business impact from the introduction of an emissions trading scheme or carbon tax. An example of such a measure would be emissions per million dollars of turnover or emissions per EBITDA (VicSuper Carbon Count (2009)). These types of arbitrary measures do not provide investors with information about the actual change in a company’s expected profitability as a result of the introduction of a carbon price. They ignore the fundamental concepts presented in Section 2 in relation to analysing the impacts and the incidence of taxation on a business.

- Emissions data is often not consistently presented. As the National Greenhouse and Energy Reporting Act (2007) only requires Scope 1 and Scope 2 emissions, entities that provide additional information (such as equity emissions) are sometimes reported negatively when compared with entities that do not provide this information voluntarily. Additionally, no information is provided on exposure to supply chain carbon costs.

- The concept of carbon pass through (reflecting the incidence of taxation) is often discussed but not included in the actual financial analysis. This is probably the most important aspect in assessing the impacts of emissions trading or a carbon tax on an individual business as outlined in Section 2.

- Statutory compensation is often ignored in the analysis.

Importantly, a number of the research notes surveyed did not provide an actual forecast of the impacts on profitability (reflected in a valuation of the equity price). Maher (2009) on the other hand is a good example of a research note that is focused on the forecast impacts on profitability associated with the introduction of emissions trading. Generally, the distinction between the research notes that provide a useful profitability forecast and the notes that use more simplistic measures is the scope of the research. The more specific the note in relation to the sector and businesses being covered, the more specific the conclusion on profitability and therefore the more useful the metric. The application of metrics across all sectors (inter-sector metrics) is not valid for forecasting the impacts on profitability arising from the introduction of carbon price given the different cost structures and markets of different sectors. Metrics that are specific to a sector (intra-sector metrics) have the potential to be useful, however caution must still be exercised given the unique characteristics that companies within the same sector can possess.

5. Checklist for Analysts

The literature review completed in Section 4 outlines some of the deficiencies in current reporting practices. Based upon our theoretical examination of carbon taxation (or a tax equivalent) in Section 2, we have established a methodology which could be used by analysts to provide more robust conclusions:

- **What is the carbon price?** As the carbon price is essentially the tax being considered, it is necessary to outline assumptions in relation to this basic assumption.

- **What are the businesses’ Scope 1, Scope 2, supply footprint and equity emissions?** Scope 1 and Scope 2 emissions will provide an estimate of the businesses direct liability (taxation or permit acquisition costs) and indirect liability (energy price increases) while equity
emissions provides an assessment of the potential liability associated with equity investments. Supply footprint emissions allow efficiency comparisons of businesses within an industry.

- What is the assumed rate of carbon-pass through for energy products? An assessment of this variable will allow assumptions to be made in relation to the proportion of higher costs incurred by energy producers that will be passed through in energy procurement costs.

- Are there technologies available which would reduce Scope 1 emissions? Assumptions in relation to this will have significant implications for how costs are passed through. If new lower emitting technologies are available, the rate of pass through is likely to be significantly lower. In turn, this issue when considered in the energy sector will impact on the pass through of Scope 2 related costs for other businesses.

- What is the domestic elasticity of demand for the product? An assumption made in relation to the domestic elasticity of demand for a product allows an estimate of the incidence of the tax (or tax equivalent) to be made in relation to consumers and producers.

- Is the business import-export competing? Export-import competing businesses are generally price-takers and as such the incidence of taxation is likely to almost solely sit with producers (unless competitor countries implement the same taxation regime).

- Will the business receive some form of compensation? Most emissions trading schemes propose some form of transitional assistance (such as the provision of free permits). The value and duration of such assistance needs to be considered in any analysis.

- Does the business use carbon-intensive goods? While Scope 2 emissions provide a useful guide to the additional costs likely in relation to energy procurement, it is necessary to consider how the costs of other carbon-intensive input products (e.g. cement) may change for businesses that use significant quantities.

- Does the business have any upside value? A company that has already invested in lower emitting production equipment will experience a cost advantage relative to its competitors. As prices rise to reflect the costs of its competitors, the company will increase its profit as revenues increase by more than costs. This needs to be considered in any analysis.

The answers to these questions will differ across industries and specific companies. However, it is clear that without considering these issues, analysis is at best partially complete and at worst misleading to stakeholders. A company with significant emissions operating in a non-trade exposed market where demand is highly inelastic may actually not be impacted at all by an emissions trading scheme or direct action policy. A simplistic measure such as emissions per EBITDA or million dollars turnover would fail to consider these issues and cannot be relied upon when considering the financial impacts of climate change policy.
6. Conclusion and Recommendations

This article has outlined how policies designed to price greenhouse gas emissions as a negative externality should be considered in any analysis of individual business profitability. This article has also outlined some of the deficiencies in existing research and provided a checklist for analysts based upon taxation in the context of microeconomic theory. The application of such a checklist would provide investors with more useful information to guide decision making in relation to the profitability of companies within an emissions trading environment.

We have identified one area where amendments to existing practices could provide more useful information for investors. The National Greenhouse and Energy Reporting Act (2007) could be amended to require corporations to disclose: supply chain emissions for individual products; and equity-related emissions for entities that they do not have operational control for. This would overcome the current problem associated with analysts comparing companies that provide different amounts of information in relation to these emissions.

7. References


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Department of Climate Change and Energy Efficiency, (2010), Australian National Greenhouse Accounts: National Greenhouse Gas Inventory, Department of Climate Change and Energy Efficiency, Canberra


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McDonald, C., Ahmed, R. & Lewandowski, A. (2009) Transport and Infrastructure - It won't be easy being green. FITT Research - Deutsche Bank


Prior, E. (2009). BlueScope Street, OneSteel and CPRS - Quantifying Carbon Pollution Reduction Scheme Impacts. Thematic Investing (Citi)


Prior, E., Faria, F. & Wilkins, C. (2010) ESG Snapshots for ASX100 Companies - Series Launch with BHP, RIO, WPL, BSL and OST. Thematic Investing (Citi)


