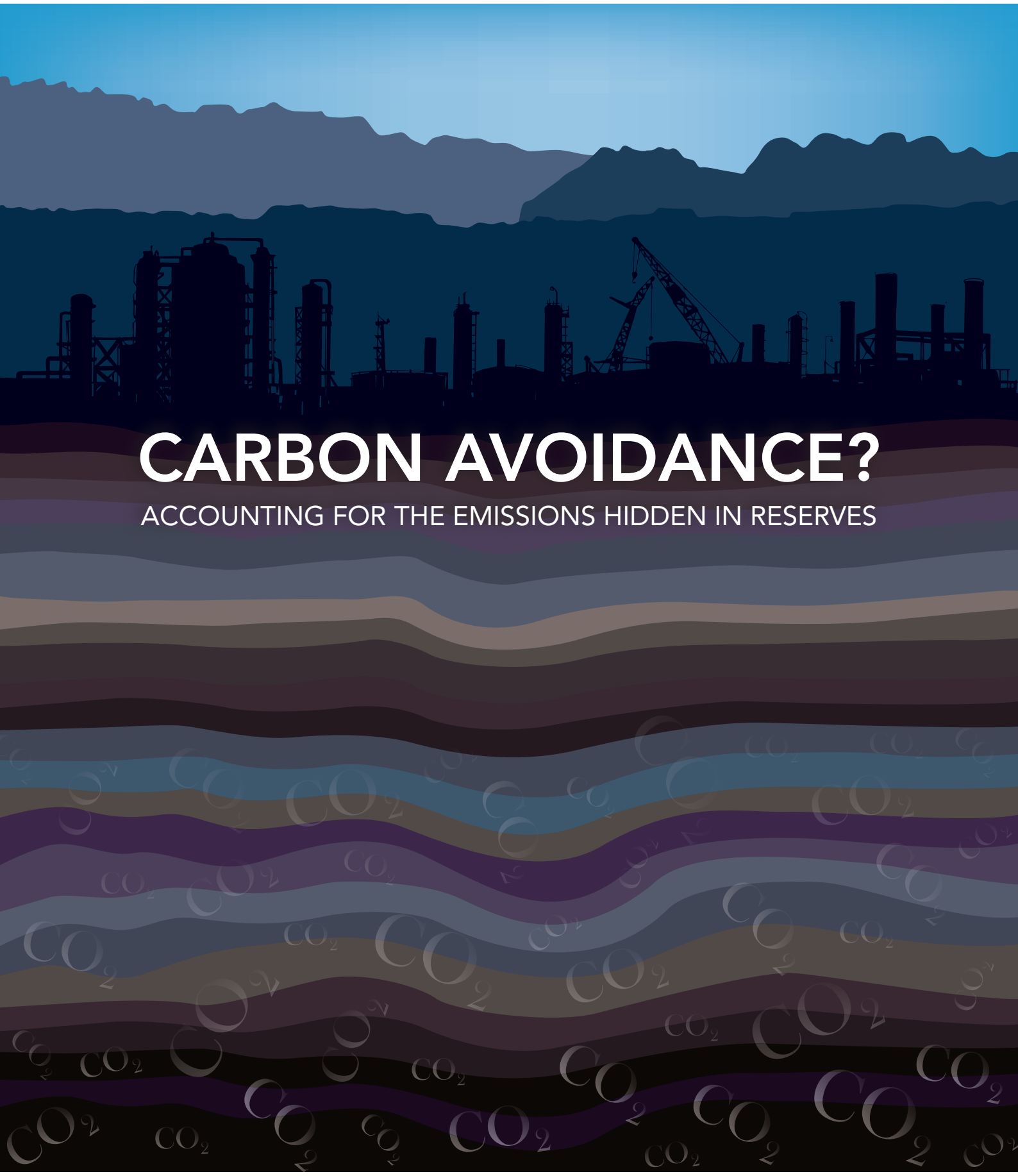

CARBON AVOIDANCE?

ACCOUNTING FOR THE EMISSIONS HIDDEN IN RESERVES

A report from ACCA and Carbon Tracker

About ACCA **www.accaglobal.com**

ACCA (the Association of Chartered Certified Accountants) is the global body for professional accountants, supporting 162,000 members and 426,000 students throughout their careers, and providing services through a network of over 89 offices and centres. ACCA works to strengthen a global profession that is based on the application of consistent standards, which ACCA believes provide the best support for international business and the desire of talented people to have successful, international careers. ACCA champions the needs of small and medium-sized businesses (SMEs) and emerging economies, and promotes the value of sustainable business.

About Carbon Tracker **www.carbontracker.org**

Carbon Tracker is a non-profit organisation working to align the capital markets with the climate change policy agenda. It is applying its thinking on carbon budgets and stranded assets across geographies and assets classes to inform investor thinking and the regulation of capital markets. It is funded by a number of US and UK charitable foundations.

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FOREWORD

This is a valuable and timely thought leadership report on a subject crucial to better business reporting in a carbon-constrained world.

The global accountancy profession has a critical role to play in helping achieve sound and useful business reporting that is comparable across borders, and that contributes to efficient resource management, organizational performance, and market integrity. This is a role we take seriously and it benefits many aspects of the societies the profession serves.

To this end, *Carbon Avoidance, Accounting for the Emissions Hidden in Reserves* provides a relevant and timely spotlight on the uncertainty that global warming and climate change are causing, and the specific issues that need to be considered by standard setters, stock exchanges, investors, and the corporate and accounting communities to help respond to the systemic risks. Ultimately, all these groups have to work collaboratively to put economies on a trajectory of achieving low carbon growth.

The challenge is clear. A majority of greenhouse gases (GHG) come from burning fossil fuels to produce energy. As such, scientists tell us, burning fossil fuels is the main cause of rising global average temperatures near the Earth's surface.

The "carbon bubble" – the stranded assets arising from unburnable carbon in fossil fuel reserves – leads to a reporting challenge for fossil fuel companies and a valuation challenge for the stock exchanges they are listed on. For these companies, it is not only the scale of operational emissions that is the strategic challenge, but the emissions associated with burning their fossil fuel reserves. We need to consider how to better understand and reflect the potential carbon footprints of reserves that are not necessarily transparent with the existing approach to reporting and disclosure.

From an accounting perspective, the historical link between emissions and revenues has not been considered in predicting cash flows or valuing assets. Making the implicit carbon present in financial statements more transparent can help investors assess their exposure to fossil fuels and carbon risk, and invest in companies that are preparing for a low-carbon future.

Higher-quality business reporting and disclosure are needed to better reflect the climate change uncertainties facing companies. This information is required by both companies and their investors in order to take appropriate action. To start improving the current situation, companies need to commit to material climate change-related disclosures. To understand the potential environmental impact of carbon stocks, companies need to measure uncalculated stores of GHG emissions within their fossil fuel reserves and account for them accordingly. As more climate change-related regulation is introduced, and the world's energy mix changes, reporting frameworks, accounting standards, and assurance will also need to encourage companies to reflect how they are adapting.

The accounting profession can and should take the lead in ensuring that the carbon component of reserves can be assessed and reported on. This report shows that where necessary, accounting rules and treatments should be reviewed so that they can support greater transparency and understanding of asset values. One approach that is discussed is stating coal or oil reserves at current values. This can help companies and investors to better respond to climate change uncertainty. Improving this area of disclosure can only be in the public interest. Integrated Reporting, a significant initiative involving the global accounting profession, should also complement accounting standards by providing companies with the structure to highlight relevant and forward-looking information, particularly in making information on climate uncertainty and risk more accessible and understandable, and connected to the company's strategy and business model.

This report is essential reading for standard setters, regulators, investors, and business analysts – and of significant importance to members of the accountancy profession. I commend it to you.

Warren Allen, IFAC President

EXECUTIVE SUMMARY

The financial crisis raised ongoing concerns over whether markets can alert investors to systemic risks. Using the fossil fuel industry as a reference point, we set out to investigate whether current reporting standards would flag up the systemic risks of climate change. Our conclusion is that – for the fossil fuels sector at least – the existing framework as currently applied would struggle to recognise the warning signs. There is a clear need for markets to become more 'climate literate'. Investors need more complete, forward-looking and integrated information on GHG emissions and fossil fuel reserves in order to understand better their exposure to climate change risks.

THREAT TO FINANCIAL AND CLIMATE STABILITY

As highlighted in the International Energy Agency's World Energy Outlook 2012, around two-thirds of the current proven coal, oil and gas reserves must stay in the ground if we are to have any chance of limiting global warming to 2°C. Yet these reserves are currently recognised in the accounts of listed companies and contribute to their stock market valuations. The impact on the key financial markets of New York and London from a sudden revaluation of fossil fuel reserves would be substantial. Such a shock is preventable if the market starts to factor in these limits soon enough. Regulators could take action. The Basel III capital requirements have increased transparency of banks' lending relative to their assets. Similarly, we need to understand how much of the future revenues of companies in the extractives sector are dependent on future GHG emissions and to what extent the values attributed to reserves can be relied upon. Currently it is impossible for regulators to monitor levels of systemic risk without more information.

MATERIAL INFORMATION BEING OMITTED

National and international standards and regulatory requirements cover financial statements, industry reserves reporting and listings rules. Carbon reporting is also developing, though not typically in a systematic, integrated way. The resulting information made available to investors fails to provide the complete story concerning the viability of fossil fuel reserves in a reduced demand scenario. The risk of a 'carbon bubble', as a result of an excess of fossil fuel assets, is substantial. In order to address that risk, reporting frameworks need to become more fully aligned to include material information that is currently missing. Companies are currently failing to provide a balanced view of the range of possible outcomes which could affect their business model going forward.

REGULATING CARBON RISK ON THE WORLD'S STOCK MARKETS

Markets need a better way of dealing with carbon reserves uncertainty. The regulators of the world's stock markets have already established links with reserves reporting bodies, but the disclosure of GHG data and climate risk analysis is not being fully aligned with international frameworks. The reporting of critical data like the GHG potential of reserves should be integrated into listing requirements. Otherwise material information will not be supplied to investors in a timely fashion to prevent the future impairment of assets. Financial regulators have already shown they can respond to emerging issues such as extractives revenues transparency; carbon risk needs to be next on the list.

RESERVES ACCOUNTING: REASONABLE ASSUMPTIONS

Fossil fuel reserves will often be recognised in financial accounts, though typically on the basis of associated costs rather than current value. This approach has some merits, but assumes the future will repeat the past; it does not allow for declining demand for fossil fuel products. Accounting practice does, however, address situations where assets lose value – applying an 'impairment' approach to indicate where the expected value of an asset may not be realised. Guidance exists on how to use reasonable assumptions to assess value. The assumption that there will be no reduction in demand for energy-intensive energy sources does not seem reasonable. The assessment of impairment needs

to be based on prudential analysis of factors such as national and global policies and technology trends. At present, this is not the case.

POTENTIAL FOR IMPROVED INDUSTRY REPORTING

Under oil, gas and mining industry standards, reserves are primarily assessed on geological and economic viability. Other factors such as environmental considerations may also be taken into account. To date, the fundamental question of emissions limits restricting the market for products has not been explicitly included. One avenue for change could come through the 'Competent Persons' engaged by the industry to verify the reserves statements made to the markets. The ability to assess the viability of the reserves in a carbon-constrained world – a 'carbon competency' – would seem a relevant additional requirement for such individuals.

HUGE VARIETY OF REPORTED INFORMATION

Our review of current disclosures made by companies in the extractives industry reveals a big variation in the quality and quantity of information provided on GHG emissions and climate change in annual reports across different geographies. And while some companies are experimenting with integrated reporting – beginning to link current and future company performance with sustainability issues – corporate reporters are not yet pursuing the implications for the reporting and valuation of reserves.

MOUNTING PRESSURE ON FOSSIL FUEL INDUSTRIES

Developments outside of a global agreement on GHG emissions reductions are already putting pressure on the market for carbon-intensive fuels. Renewables and natural gas are becoming cheaper, and energy efficiency is tempering demand. Action on air quality in the United States and China could also prove to be much more significant in reducing use of coal than anything labelled 'carbon' or 'climate'. If the market is not ready to pick up this variety of signals that will impact demand and price, it will miss the risk for investors.

CHALLENGING THE FOSSIL FUEL BUSINESS MODEL

Alongside demands for more complete GHG data, investors are beginning to challenge the business models of the fossil fuel companies whose shares they hold. The current strategies laid out in annual reports talk of growth that is incompatible with emissions limits. There often appears to be a lack of balance when considering future corporate viability, with management relying on one extreme of the potential range of outcomes. Even companies that claim to support action on global warming do not always articulate how their business model is adapting to the changes required in the energy sector.

IMPROVEMENTS IN DISCLOSURE

In order to truly integrate climate risk into the fundamentals of the business and the consideration of reserves, companies need to start producing additional information. In particular, they need to:

- Convert reserves into potential carbon dioxide emissions
- Produce sensitivity analysis of reserves levels in different price/demand scenarios
- Publish valuations of reserves using a range of disclosed price/demand scenarios
- Discuss the implications of this data when explaining their capital expenditure strategy and risks to the business model

There is nothing to prevent companies interpreting current guidance to provide this information.

RECOMMENDATIONS

When the world's energy mix gradually becomes significantly altered in response to changing regulation, prices and demand, the impact will drive change across standard setters, stock exchanges and other reporting frameworks. This evolving context will need to be addressed and absorbed into current accounting standards, listing requirements, industry standards and other corporate reporting requirements. Collectively, these developments will fill current gaps in information on the economic viability of fossil fuel reserves. They will help drive companies to disclose (as yet) uncalculated stores of GHG emissions within their reserves. By factoring in this structural change, investors are better informed to make a judgement call on the risks facing companies, based on more comprehensive information.

The following recommendations are made to each of the four facets of the reporting framework, and the companies that apply the standards:

FINANCIAL REPORTING STANDARD-SETTING BODIES

For example, IASB, FASB

- Issue guidance to interpret existing standards (eg IAS 36 impairment of assets; valuation of reserves) so that preparers of reports and accounts consider the need to include information on the carbon viability of reserves.
- Consider how the use of fair value accounting could reflect the potential impact on the value placed on reserves.

STOCK MARKET REGULATORS AND LISTING AUTHORITIES

For example, WFE, IOSCO and their members

- Integrate climate risk into processes considering systemic risks.
- Require information in annual reports and listing prospectuses on the emissions potential of reserves, and the emissions trajectory assumptions of corporate strategy.
- Require sensitivity analysis of how reduced demand and price could affect the fossil fuel reserves of a company.

RESERVES REPORTING STANDARD-SETTERS

For example, CRIRSCO, SPE-PRMS and regional bodies

- Integrate consideration of how emissions regulation and market dynamics could affect demand and price into the methodology for classifying reserves and producing a Competent Persons review.

OTHER INFLUENTIAL REPORTING GUIDELINES

For example, WRI/WBCSD, CDSB, IIRC, GRI

- Develop technical guidance on reporting the greenhouse emissions potential of reserves to provide a forward-looking indicator, ensuring compatibility with financial reporting standards.
- Ensure the CDSB and SASB capture this material issue in their approaches.
- Ensure the IIRC brings together climate risks with how reserves are reported in integrated reporting.

COMPANIES

Companies need to start disclosing the following information in their annual reports:

- Reserves and resources converted into potential carbon dioxide emissions
- Sensitivity analysis of reserves levels in different price/demand scenarios
- Valuations of reserves using a range of disclosed price/demand scenarios
- Discussion of the implications of this data in the explanation of capital expenditure strategy and risks to the business model.

Current reporting frameworks need to become more climate literate in order to help investors make informed decisions and limit the risk of a carbon bubble developing. An additional lens is needed to highlight the economic viability of reserves, taking account of the policy context and technological developments. Realising this goal and achieving meaningful reporting improvements will require all relevant institutions, and accountants in their many roles, to work together.

INTRODUCTION

Following Carbon Tracker's publication of its *Unburnable Carbon* analyses in 2011 and 2013 (Carbon Tracker 2011; 2013), it has become clear that there are more fossil fuels listed on the world's capital markets than can be burnt if dangerous climate change is to be prevented. Yet the way in which fossil fuel reserves are accounted for and reported does not factor in the risk that some current reserves may not be combusted. As a result, stock market valuations of these companies, either currently and/or in future, may not be accurate. The world's stock markets and investors could therefore be facing the risk of a 'carbon bubble'.

ACCA, a leading thinker on carbon accounting and reporting, has previously identified that material emissions associated with fossil fuel reserves are not being recognised (ACCA 2011). Carbon Tracker and ACCA have therefore come together to explore global reporting practices on fossil fuel reserves and the nature of any information gaps. They sought to answer two questions.

1. To what extent do existing reporting standards governing company disclosures to financial markets require or enable the provision of useful information on fossil fuel reserves?

2. What steps are necessary to integrate emerging and future climate change risks into disclosures?

As this report shows, a variety of standards for financial reporting and industry reporting dictate to companies how to provide information about the quantity of hydrocarbon reserves held. This information is disclosed in the annual report, but not typically in the financial statements. Users incorporate this information (along with their own beliefs about, for example, future oil, gas and minerals prices) in their valuation of companies. Information on hydrocarbon reserves is therefore both useful and value-relevant to users of company reports and accounts.

On the basis of their research, Carbon Tracker and ACCA have identified a number of opportunities for key stakeholders in the financial and carbon reporting frameworks to work individually and together to encourage reporting that gives a more accurate and complete account of the risks and value associated with the ownership and combustion of fossil fuel reserves.

ABOUT THIS REPORT

This report focuses on the disclosure of information related to fossil fuel reserves and the information required by investors to help them understand the financial viability of those reserves in a carbon-constrained world. It does not discuss physical climate change risks associated with fossil fuel reserves.

Financial reporting standards, industry reporting standards and stock exchange listing requirements were analysed in seven countries: Australia, Canada, China, the UK, Russia, South Africa and the US. Disclosures about fossil fuel reserves in the annual reports and accounts, made by 35 extractive industry companies, were also analysed.

In making their recommendations, the authors recognise that each part of the reporting community has its own due process and operating mandates that need to be taken into account and respected. The key aim is to encourage the provision to financial markets of value-relevant information and the growth of climate literacy, not only among investors but also among accountants in all their many business and professional roles, as well as among other institutions working to support financial market stability.

1: HARNESSING THE POWER OF CORPORATE REPORTING

... regulators and accountants have a key role to play in determining the type of information that financial markets need to evaluate the risk that fossil fuel reserves will become 'stranded'.

... little attention has been paid to disclosing the risks and GHG emissions associated with the ownership and future combustion of fossil fuel reserves.

The way that fossil fuel reserves are currently accounted for and reported does not appear to have any explicit means of taking into account potential climate-change risks. This is a concern, not least in the light of Carbon Tracker's 2011 *Unburnable Carbon* report, which demonstrated that if the world is to achieve its climate change targets, a significant proportion of current coal, oil and gas reserves must not be burnt. If governments impose effective policies and regulations some of these fossil fuel reserves could become redundant and worthless. To enable investors to make informed choices, regulators and accountants have a key role to play in determining the type of information that financial markets need to evaluate the risk that fossil fuel reserves will become 'stranded'.

THE ROLE OF CLIMATE-LITERATE MARKETS

If society is to prevent unacceptable levels of climate change, there is a need for climate-literate capital markets that can redirect capital to deliver an energy transition. This will help ensure that investors not only understand all the risks associated with climate change and associated regulatory responses, but are also provided with the information they need to monitor those risks and assess their likely impact on company performance and valuations.

Since the early 2000's, much progress has been made in climate reporting. Regulators and non-governmental organisations such as the CDP, Global Reporting Initiative (GRI) and World Resources Institute (WRI) have established processes for disclosure of greenhouse gas (GHG) emissions and climate risks and opportunities. Information provided to CDP is fed to investors via a range of market data providers such as Bloomberg and ThomsonReuters. To date, however, little attention has been paid to disclosing the risks and GHG emissions associated with the ownership and future combustion of fossil fuel reserves.

FOSSIL FUELS AND SYSTEMIC RISK

Carbon Tracker's global analysis has demonstrated that companies listed on stock markets already have fossil fuel reserves that, if combusted, would exceed conservative carbon budgets necessary to limit global warming to two degrees centigrade. London and New York emerge as the major global financial centres for oil and gas and coal companies. As illustrated in Box 1.1, there is growing concern about the systemic risk this poses.

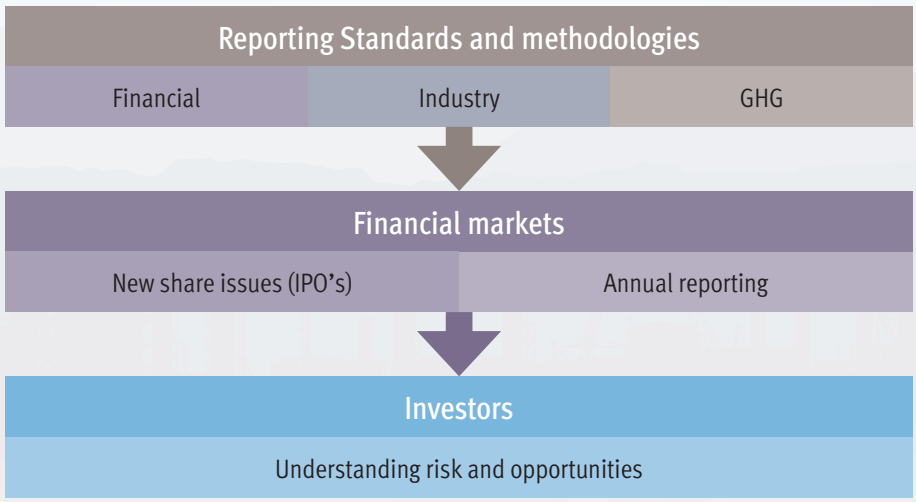
BOX 1.1
THE BANK OF ENGLAND AND FINANCIAL STABILITY

In January 2012, a group of investors, accountants, economists, MPs and NGOs wrote to the Governor of the Bank of England regarding the systemic risk of the fossil fuel intensity of the London Stock Exchange (Carbon Tracker 2012; FPC 2012). They argued that, as individual parts of the financial system, they could not deal with this structural issue.

In response, the bank indicated three criteria that it uses to assess threats to financial stability:

1. whether the exposures of financial institutions to carbon-intensive sectors are large relative to overall assets
2. whether the impact of policy and technology, working to reduce returns in high-carbon areas, is not already being priced into the market
3. whether any subsequent correction would take place over an insufficiently long period of time for the relevant financial institutions to adjust their portfolios in an orderly manner.

BOX 1.2



If the Bank of England is to understand whether the London Stock Exchange has a high exposure, it needs comprehensive data. Similarly, if the market is to price this issue into share valuations, market participants need to understand it. Currently, however, the reporting framework does not facilitate this. If a major correction is to be avoided then the adjustments need to be factored into the accounting system now, before the carbon bubble inflates any further.

INFORMATION FLOWS

Information is shaped by financial reporting standards, industry-specific reserves reporting and GHG methodologies. The information which flows from companies to potential and current investors through financial market processes, as presented in Box 1.2.

REPORTING STANDARDS AND METHODOLOGIES

At present, a mix of reporting standards and methodologies apply to corporate reporting, notably the following three.

1. **Financial reporting standards.** These determine the approach taken in companies' annual reports and accounts, including disclosure of assets and liabilities.

2. **Industry reporting standards for coal, oil and gas reserves.** Typically these are based on two main aspects: the certainty that can be attached to the physical presence of reserves of a particular quality and quantity; and the economic viability of their extraction estimated on the basis of extraction costs and market factors. Essentially, reporting of reserves reflects a combination of a geological and financial assessment.

3. **GHG reporting methodologies.** These have been applied to measuring corporate performance, monitoring country-level activities, and designing mitigation measures and carbon trading schemes.

In practice, financial markets often fail to incorporate externalities into asset pricing and have a short-term outlook (Haldane 2011).

FINANCIAL MARKETS: INFORMING INVESTMENT DECISIONS

Reporting standards have a critical role in ensuring the dissemination to financial markets of high-quality information on corporate performance. When companies raise capital through an initial public offering (IPO) and list their shares on a stock market for the first time, specific reporting requirements must be met. Once listed, companies disclose specified information through their annual reports and accounts.

Information on fossil fuel reserves is relevant to both internal and external stakeholders, in multiple situations. Such situations include:

- when making internal planning and capital investment decisions
- when calculating business valuations
- when raising debt and equity
- when reporting on financial accounting and performance.

INVESTORS: ASSESSING RISKS AND OPPORTUNITIES

Investors are the primary end-users of the information produced according to financial reporting standards and financial regulation. They require data in a format that is easily understandable, readily available and prepared in a consistent manner, to enable them to assess risks and opportunities. Investors have already collaborated on a number of initiatives to standardise carbon-related data and improve its availability. Examples of investor involvement include the CDP annual survey, and the research of the Investor Network on Climate Risk (Ceres 2013), which identifies the financial risks and opportunities arising from climate change and tackles policy and governance issues that impede investor progress towards more sustainable capital markets.

THE ROLE OF REGULATORS

Financial regulators, including stock market listing authorities, are charged with ensuring market integrity and stability. One key role is that of identifying systemic risks – such as those associated with climate change – that are beyond the power of individual companies or investors to address, and then requiring consistent disclosures to enable investors to understand these risks. Stock exchange listing bodies are the 'gatekeepers to international sources of finance' – if investors require information companies should provide it.

Ideally, markets should anticipate future change, and price investments accordingly. In practice, financial markets often fail to incorporate externalities into asset pricing and have a short-term outlook (Haldane 2011).

THE ROLE OF ACCOUNTANTS

Accountants have important roles to play in developing the climate literacy of financial markets:

- as financial directors in reporting entities, integrating an understanding of climate-change risk throughout the business
- through accountancy firms' help for their clients in producing relevant financial, reserves and GHG data
- as analysts for institutional investors, explaining the impact of market dynamics on the position and performance of a business
- through standard-setting bodies, in developing standards that reflect the evolving needs of the investor audience, and
- through accountancy bodies, in building the capacity of their members to apply these standards.

THE CHALLENGE: MAKING CORPORATE REPORTING ADDRESS CARBON BUDGET VIABILITY

This report reviews the extent to which existing corporate reporting standards currently require or enable the dissemination of all value-relevant reserves information to financial markets. It explores the potential for developing existing standards so that they adequately address the viability of reserves under a given carbon budget.[1] It considers how they could be enhanced or interpreted so as to provide better information to financial markets about the risk that some reserves will be unburnable owing to forthcoming legislative or regulatory constraints, or loss of markets due to competition from alternative energy sources.

As the following sections show, a clear gap exists in the current corporate reporting framework. Investors are not currently receiving adequate information on the carbon budget viability of fossil fuel reserves. Updated standards and guidance could be developed to require companies to disclose the potential for any unburnable carbon. At present, there is no requirement to link hydrocarbon reserves explicitly with GHG emissions and financial performance: companies do not have to assess specifically the implications of limiting use of fossil fuels for the way that their reserves are reported. As standards are currently applied, companies are not obliged to provide information on the potential GHG emissions associated with current reserves.

This report outlines how that gap could be filled to serve investor needs.

KEY MESSAGES

- Capital markets have huge importance for the global economy and if they are to function effectively, they need to integrate material short-term and long-term climate-change risks.
- Given the impact that an energy transition could have on the sector, we need to encourage the development of 'climate literate' financial markets.
- Corporate reporting standards cover financial statements reporting, industry reserves reporting and GHG emissions reporting – but do not tell the complete story in relation to the carbon budget viability of fossil fuel reserves and the risks associated with fossil fuel markets.
- Regulators have important roles to play in monitoring systemic risks and encouraging flows of value-relevant information.
- Accountants can use their influence through multiple channels to stimulate the enhanced climate literacy of financial markets.

1 **What are carbon budgets?**
Global warming is driven by increases in atmospheric levels of greenhouse gases, primarily carbon dioxide from the burning of fossil fuels. To a first approximation, the cumulative annual emissions over any particular period will determine the change in concentration, and therefore the amount of warming. This means that for any particular rise in temperature, there is a budget for emissions of greenhouse gases, including carbon dioxide, which cannot be exceeded if a temperature rise above a target threshold is to be avoided. The higher the budget, the lower the likelihood that warming can be restricted to a particular level. Each carbon budget is associated with a probability of not exceeding a particular temperature threshold. This reflects the degree of uncertainty that is inevitable when projecting such complex systems decades into the future.

2: FINANCIAL REPORTING STANDARDS

Financial reporting standards set out the required content and form of financial statements – they do not affect other components of corporate reporting (for example, a business review or management discussion and analysis (MD&A)). Increasing internationalisation of standards through adoption of International Financial Reporting Standards (IFRS) has enhanced comparability of financial information around the world.

WHO SETS THE STANDARDS?

Efforts to standardise the definitions for oil and gas resources and reserves go back over 80 years, with international activity taking place alongside the work of national bodies created to set financial reporting standards. Countries such as the US, Canada and the UK all developed their own form of generally accepted accounting practice or principles (GAAP) before the evolution of IFRS. Unlisted mining and oil and gas companies in the UK, for example, can choose whether to apply IFRS or UK GAAP in their financial statements.

A significant majority of countries around the world have now adopted IFRS, which are set by the International Accounting Standards Board (IASB) (IFRS 2013). Many mining and oil and gas companies are therefore required to apply IFRS. For example, companies incorporated in and listed in the European Union must all apply IFRS.

Of the seven countries covered by the research for this report (Australia, Canada, China, Russia, South Africa, the UK and the US), six are already using IFRS or in the process of adopting it for listed companies. The US, which remains the largest capital market in the world, has its own GAAP set by the Financial Accounting Standards Board (FASB).

Appendix I summarises the national oil and gas financial reporting standards in the seven countries reviewed in this research.

WHAT PARTS OF COMPANIES' ANNUAL REPORTS DO IFRS AFFECT?

Annual reports consist of distinct elements:

- the financial statements – these include the balance sheet and income statement, and must comply with the financial reporting standards appropriate to the reporting entity, such as IFRS
- narrative reporting – this will include the directors' report or MD&A and provides non-financial information in compliance with local company law and applicable listing rules.

This chapter focuses on the financial reporting standards with which financial statements must comply.

BOX 2.1
ACCOUNTING DEFINITIONS

An **asset** is 'a resource controlled by the entity as a result of past events and from which future economic benefits are expected to flow to the entity' (IFRS 2010a).

Depreciation and amortisation: Depreciation is the systematic allocation of the cost of an asset over its useful economic life (UEL). Amortisation is the term generally used in the case of an intangible asset, but the two terms have the same meaning.

Impairment: 'an asset is impaired when its carrying amount (sometimes called 'book value') exceeds its recoverable amount. The **recoverable amount** is the higher of value-in-use and fair value less the cost of selling. The **value-in-use** is the net present value of future cash flows associated with the asset. [Source: IAS 36]

ACCOUNTING TREATMENT

Under IFRS and US GAAP, fossil fuel reserves appear in accounts, along with licences and the mines and extraction infrastructure, as mining/oil and gas properties.

The exploration, evaluation and development values of the properties (including the reserves) are recognised on the balance sheet if these activities have been carried out by the company, but are also included in the accounts if acquired from another company either as an asset purchase or as part of a business merger or

acquisition. Sometimes the exploration and evaluation costs are shown as intangible assets, sometimes they are included with the development costs as tangible assets.

A key issue concerns how such properties should be valued. Currently, value is most commonly based on cost, subject to amortisation and impairment. This is in line with the valuation of most other assets and is considered to be more straightforward than alternative approaches. 'Cost' does not relate directly to the current value of the reserves and will often be significantly less than current value.

The treatment of exploration costs is addressed in IFRS 6, *Exploration for and Evaluation of Mineral Resources* (see Box 2.2). Other costs of the mining/oil and gas properties or reserves are covered by IAS 16, *Property, Plant and Equipment.*

IFRS6 was developed as a temporary partial standard and does not explain how to determine which costs should be capitalised. Both UK and US GAAP allow either the 'successful efforts' form of accounting or full cost accounting for oil and gas exploration expenditures. Under 'successful efforts' accounting, only costs that relate directly to the discovery and development of specific commercial oil and gas reserves are capitalised, and are depreciated over the lives of these reserves. Costs associated with unsuccessful activity are written off. Under full cost accounting, all operating expenses related to locating new oil and gas reserves – regardless of the outcome – can be capitalised. As the full market value of reserves is not likely to be included as a tangible asset, this can lead to adjustments during acquisitions. The extra value attributed to the company will then be recorded under goodwill.

Common practice is then for the accumulated costs of the fossil fuel properties to be depreciated on the basis of the production so far, compared with the total production expected. Clearly, if expectations of total expected production were to fall because of future restrictions on fossil fuel consumption, then the basis of depreciation would have to change and the cost per unit of production would have to increase.

BOX 2.2
NATIONAL ACCOUNTING TREATMENTS

IFRS 6

Mineral resources: IFRS 6 defines mineral resources as 'minerals, oil, natural gas and similar non-regenerative resources' (IASB 2004, Appendix A) having regard to the technical feasibility and commercial viability of extracting the mineral resource.

Disclosures: IFRS 6 requires the disclosure of the accounting policy and '...the amounts of assets, liabilities, income and expense and operating and investing cash flows arising from the exploration for and evaluation of mineral resources'.

UK and US GAAP

US: FASB 930 and 932

In the US in 2010, the Financial Accounting Standards Board (FASB) launched its FASB *Accounting Standards Codification*™ project, which resulted in all the existing relevant US standards being superseded by Topic 930 Extractive Activities – Mining and Topic 932 *Extractive Activities – Oil and Gas Reserve Estimation and Disclosures* (2010).

Topic 932 seeks to align FASB's accounting disclosure requirements with those of the Securities Exchange Commission, specifically the Commission's Final Rule *Modernization of the Oil and Gas Reporting Requirements*, issued December 2008.

UK: SORP

The UK has a Statement of Recommended Practice (SORP) that regulates accounting for oil and gas activities. This SORP (*Accounting for Oil and Gas Exploration, Development, Production and Decommissioning Activities*) was produced by the Oil Industry Accounting Committee in 2001. Note that this SORP is likely to be withdrawn in the near future.

IMPAIRED ASSETS

Impairment can apply to exploration and evaluation costs, but also to developed and producing properties, including reserves. Certain events or conditions trigger

The assumption that there will be no reduction in demand for carbon-intensive energy sources does not seem reasonable.

an impairment test, at which point reporting entities must check whether assets have become impaired. The accounting rules on impairment should ensure that the cost of fossil fuel reserves never exceeds their current value. Examples of impaired assets could include plant and facilities that already exist to extract fossil fuels when further extraction is halted, or power stations that might become redundant or have a shorter life than previously expected.

BOX 2.3
EXAMPLES OF IMPAIRMENT OF POWER GENERATION PLANTS

- The introduction of new emissions controls by the US Environmental Protection Agency (EPA) has led accountants to raise this issue as being likely to give rise to impaired assets in the power generation sector (Deloitte 2012).
- In Germany, the post-Fukushima energy policy saw impairment of nuclear power plants that were retired earlier than expected (Ernst & Young 2012).

The IASB introduced IAS 36 – *Impairment of Assets* to ensure that assets are carried at no more than their recoverable amount, and to define how that recoverable amount is determined. It is worth noting that this standard is based on reasonable assumptions. The assumption that there will be no reduction in demand for carbon-intensive energy sources does not seem reasonable. It would be useful for the IASB to consider how IAS 36 can be applied to inform the market of the impact of updated assumptions around emissions constraints.

HOW DO STRANDED ASSETS AFFECT ACCOUNTING?

The term 'stranded assets' is commonly used in relation to unburnable carbon, but it is not an accounting term. It can be applied to fossil fuel reserves that may never be able to be sold because of possible future climate change/GHG policies of governments that would restrict the consumption of fossil fuels by end users. If this is or may become a significant effect, it would reduce the current value of the projected future cash flows generated from exploiting the reserves. This reduction might just erode the margin between the cost and current value, in which case it will not appear in the financial statements. Alternatively, the reduction might be sufficiently large to require a write-down of the cost on the balance sheet and would then be shown as an impairment charge against profits.

What is clear is that the stranded asset issue needs to be considered. If markets plan to substantially reduce consumption of fossil fuels, with the resulting impact on prices, an impairment test is needed to estimate the reduction in future cashflows.

HOW MIGHT FINANCIAL REPORTING STANDARDS DEVELOP?

In 2010 the IASB issued a *Discussion Paper: Extractive Activities* (EADP), which compared the cost basis currently used with the alternative measure – fair value (IFRS 2010b).

Cost is seen as more straightforward to calculate and report than fair value, but it is less relevant because:

- it does not provide information about future cash flows
- in general, the value of the reserves should be greater than the costs of exploration and development
- the costs are unrelated to the value of the reserves (unless they become impaired)
- cost will not always reflect changes in expectations, such as higher or lower prices, increased estimation of accessible reserves, etc.

Fair value accounting would reflect directly the current value of fossil fuel reserves and so would need to reflect the prospects of being able to sell the reserves profitably. This would therefore address the stranded asset issue, ie the risk that some fossil fuel reserves could become unusable owing to the imposition of regulatory restrictions or reduced demand.

... continuing with the cost-based approach will not fully reflect market shifts.

Nonetheless, fair value accounting in this context would involve considerable subjectivity in the assumptions made and the degrees of estimation involved, including:

- the recoverable quantity of coal/oil/gas, taking into account geological factors and involving assumptions about extraction
- production profile over time
- future commodity prices, exchange rates, development and production costs, taxes, royalties, and so on
- discount rate applied – the perceived time value of money, taking into account assessments of risk.

Given the many assumptions and estimates involved, there is reluctance by some to use fair values methodologies. However continuing with the cost-based approach will not fully reflect market shifts.

The SEC requires US listed companies in oil and gas to disclose values of proven reserves in line with US standard FASB 932. The figure is derived using standardised values for key variables such as commodity prices and discount rates and as such may not represent current values. For example, Shell's 2011 accounts show its cost-based measure of its exploration and production properties at $104bn, whereas the net present value disclosed in line with SEC requirements is $86bn.

It is critical that the assumptions underlying any discounted cash flow model are transparent. Arguably, they should also take into account the potential risk that future revenue streams will not be realised owing to reduced demand. Perhaps most importantly, this shows that despite some reluctance to place a clear value on these assets in financial reports, US listed companies already have to provide such a value. The challenge now is to make sure the numbers that are provided are useful ones for the investor audience.

Although the IASB paused its work on extractive activities, comments received as part of the standard-setter's Agenda Consultation in 2011 have encouraged it to extend the project into a broader consideration of intangible assets and research and development activities (IFRS 2012). The new research – identified as a priority project – will assess the feasibility of developing one set of financial reporting requirements for investigative, exploratory and developmental activities across a wide range of activities. This is an opportunity to include in this project a consideration of how carbon viability could be factored into the valuation of fossil fuel reserves that have been identified as assets.

KEY MESSAGES

- Fossil fuel reserves will often be recognised in financial accounts, although neither at their current value nor as a specific asset.
- Under existing financial reporting standards, fossil fuel reserves are recognised on the balance sheet at amortised cost derived from their costs of acquisition; alternatively, the value used may be based on the exploration, evaluation and development cost of reserves, if the reserves have been developed by the company, or they may appear under goodwill.
- The implications of changes in regulations or demand should be considered as impairment triggers and in the depreciation of these cost-based values reported in accounts.
- The cost basis of reporting reserves offers a standardised measure for the market, but it assumes the future will repeat the past, which is not compatible with reducing emissions.

3: INDUSTRY STANDARDS FOR RESERVES REPORTING

An array of reporting requirements produced by the mining, oil and gas sectors exist in various countries. There have also been some efforts to coordinate them internationally to make their methodologies compatible. Listing authorities typically refer to these national and/or international codes when specifying the reporting requirements for companies listing on their stock exchanges.

The criteria for reporting reserves are mainly:

- geological: the physical characteristics of the materials that exist, and
- economic: the financial viability of extracting the material.

The standards then take a view of the certainty to be ascribed to these two factors – the probability of existence of the reserves and the economic viability of extraction.

Separate approaches are taken for reporting oil and gas reserves, and for mineral reserves – in this case coal. These will therefore be discussed separately in this chapter.

RESOURCES AND RESERVES – WHAT'S THE DIFFERENCE?

For both minerals and oil/gas, the distinction made between a resource and a reserve is the extent to which the material identified is judged to be currently economically recoverable.

For minerals, resources are the minerals in the earth's crust, while a reserve is that which is considered economically recoverable under a given set of assumptions.

In the area of petroleum resources and reserves, more complexity is introduced but the same basic distinction is made between resources (those things that exist) and reserves (the proportion of the resources likely to be recovered).

MINERAL RESERVES REPORTING REQUIREMENTS

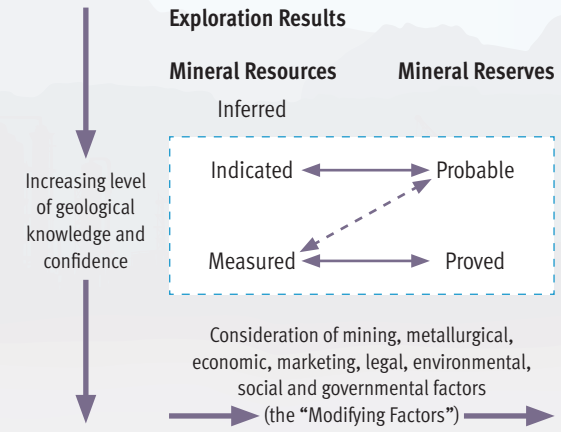
INTERNATIONAL COORDINATION

Recently there have been increased efforts to coordinate mineral reserves requirements under the Combined Reserves International Reporting Standards Committee (CRIRSCO). The only jurisdiction considered in this report that is not included under this approach is China.

CRIRSCO's framework for classifying mineral resources and reserves takes into account different levels of geological confidence and different degrees of technical and economic evaluation. Mineral resources can be estimated mainly on the basis of geological information, while estimations of reserves need to take into account other 'modifying factors', including economic and environmental ones. Measured mineral resources may convert to either proved or probable mineral reserves, depending on the extent of uncertainties associated with the modifying factors.

A summary of the CRIRSCO approach to classification of reserves and resources is illustrated in Box 3.1.

BOX 3.1
CLASSIFICATION OF RESERVES AND RESOURCES



(Source: CRIRSCO 2006)

CRIRSCO: consider environmental factors in their justification of whether or not mineral reserves can be extracted from the Earth's crust

NATIONAL REQUIREMENTS FOR REPORTING MINERAL RESERVES AND RESOURCES

There are many different codes covering different countries or regions. The diagram in Box 3.2 identifies the national codes for the seven countries included in this research study that have significant activities in the mining sector. (The one exception is China, which is not included in the CRIRSCO initiative.) More details on the codes can be found in Appendix II.

ENVIRONMENTAL ASPECTS

There are some mentions of environmental factors in the various codes. These relate either to the potential for the environment to affect physical project feasibility (US) or to potential impacts on the economic viability of extraction (Europe and Australia). This latter approach assumes demand at a certain price, which provides an opportunity to consider potential restrictions on GHG emissions.

Overall, there is no clear reference to potential climate change considerations in assessing the viability of reserves. As this is a new way of thinking, there is no great surprise in the finding. In practice, the flexibility built into some of the environmental, social and regulatory references in some codes leaves the door open to add in any relevant factor. In particular, the CRIRSCO requirement for *'subscribing companies to consider environmental factors in their justification of whether or not mineral reserves can be extracted from the Earth's crust'* certainly could be translated as requiring an assessment of the carbon budget viability of the reserves.

EXAMPLES OF ENVIRONMENTAL REFERENCES IN NATIONAL CODES

Australia

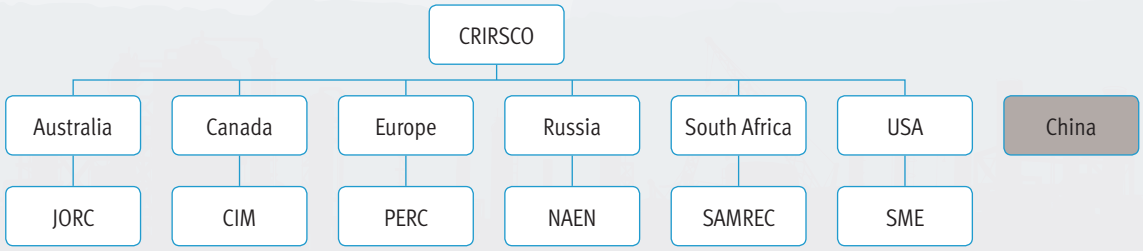
'The effect, if any, of natural risk, infrastructure, environmental, legal, marketing, social or governmental factors on the likely viability of a project' (JORC 2004: 18).

The very general nature of the JORC reference to environmental factors along with a list of 'other' potential issues provides a flexible approach that is open to interpretation.

Russia

In contrast, the recently issued Russian code, the NAEN (2011), requires Russian companies to make disclosures that cover *'significant sources of environmental impact [to] production and social infrastructure of the planned enterprise.* [For example*] types and nature of their impact on atmosphere, water bodies, soils, plant and animal life, ecosystems, micro-climate, landscapes, natural protected and recreation zones, historical and cultural sites'* (NAEN 2011: 47).

BOX 3.2
NATIONAL CODES FOR MINERAL RESERVES REPORTING



None of the SPE-PRMS definitions for petroleum reserves and resources make any reference to environmental factors that might ultimately affect resource extraction.

Although the disclosure requirements were probably not intended to include consideration of lifecycle emissions, the Russian code could be interpreted more broadly to mean *'the impact of the planned enterprise on the atmosphere'*.

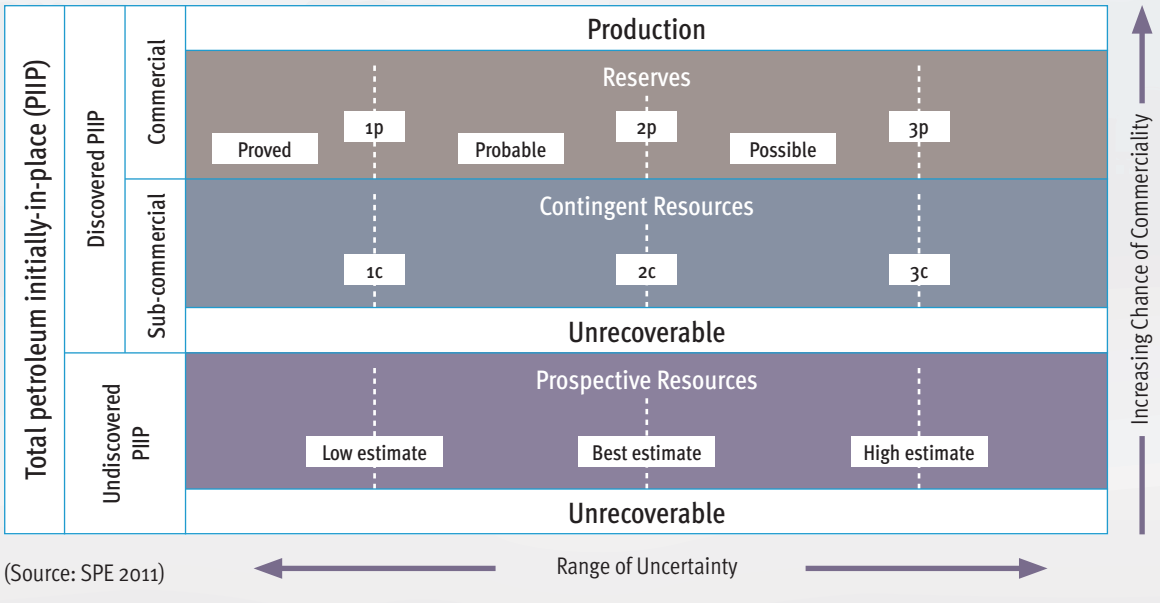
OIL AND GAS RESERVES REPORTING REQUIREMENTS

The 2007 Petroleum Resource Management System (PRMS) was developed by the Society of Petroleum Engineers' Oil and Gas Reserves Committee (SPE), which in turn was developed by a number of scientific and engineering experts in the global oil industry. The international SPE-PRMS standard provides definitions and guidelines that are used on an international basis to: (1) classify and categorise, (2) evaluate and report and (3) estimate recoverable quantities of petroleum resources (SPE 2007). The PRMS is sponsored by the Society of Petroleum Engineers (SPE), the American Association of Petroleum Geologists (AAPG), the Society of Petroleum Evaluation Engineers (SPEE) and the World Petroleum Council (WPC).

Reserves are sub-classified into those that are proved, probable or possible and *resources* into those that are prospective and contingent. None of the SPE-PRMS definitions for petroleum reserves and resources make any reference to environmental factors that might ultimately affect resource extraction. The PRMS resources classification system is summarised in the diagram in Box 3.3.

The SPE-PRMS is commonly applied in the countries reviewed for this report, apart from Canada, which has its own national system. The Canadian Oil and Gas Evaluation Handbook (Alberta Securities Commission, 2007) was developed largely because of the country's

BOX 3.3
SUMMARY OF THE PRMS RESOURCES CLASSIFICATION SYSTEM



(Source: SPE 2011)

As a result, reserves may change category, for example from 'proved' to 'probable', or they may no longer be seen as viable economic resources.

large tar sands reserves. The Canadian system is largely compatible with the SPE-PRMS, but has some differences (SPEE 2007).

OPPORTUNITIES FOR ENHANCED REPORTING

PROBABILITY OF EXTRACTION

Given that reserves are categorised according to the likelihood of their being extracted, this already means that the approach is determined by the probability of a particular outcome. This suggests there is an opportunity to integrate climate risk into this thinking by adjusting the calculation of the probability that the reserves will be extracted, or the parameters for assessing the likelihood of this. Factors such as costs, pricing, regulation, technology or demand could be adjusted. As a result, reserves may change category, for example from 'proved' to 'probable', or they may no longer be seen as viable economic resources.

COMPETENT PERSONS

Reporting standards for both mineral reserves and oil and gas reserves consider the competence and responsibility of the individual (or group of experts) tasked with the preparation of the reserves data. See Box 3.4 for definitions of what it means to be a competent person.

BOX 3.4
COMPETENT PERSON DEFINITIONS

Oil and Gas definition

There is great similarity across the jurisdictions as to the meaning of a 'Competent Person' and the role ascribed to such an individual. For example, the SME (1999: 4) notes that a 'public report concerning an entity's exploration information, Mineral Resources and/or Mineral reserves… must be based on, and fairly reflect, the content of a report prepared by a Competent Person (or Persons)' and that a Competent Person 'is a person who is a member of a professional society for earth scientists or mineral engineers, or has appropriate other qualifications. The Competent Person must have a minimum of five years' experience which is relevant to the style of mineralization and type of deposit under consideration'. In addition, as 'a general guide, persons being called upon to sign as a Competent Person should be clearly satisfied in their own minds that they could face their peers and demonstrate competence in the commodity, type of deposit and situation under consideration'. (SME 1999: 4).

Minerals definition

CRIRSCO's reporting template notes that:
Competent Persons must discharge their duties with fidelity to the public…[and I]n particular…recognise at all times that the responsibility of Competent Persons towards the Public overrides all other specific responsibilities including responsibility to professional, sectional, or private interests. (CRIRSCO 2006: 35).

It also states that :
[i]n performing their work, Competent Persons should strive to protect the natural environment and ensure that the consequences of their work do not adversely affect the safety, health and welfare of themselves, colleagues and members of the Public. (CRIRSCO 2006: 36).

The Competent Persons' report often forms part of the submission to a listings authority, and provides an independent assessment of the level of reserves. Competent Persons could be liable for losses resulting from misleading information. It could be argued that Competent Persons should also be considering wider risks such as emissions constraints or market shifts when assessing reserves.

KEY MESSAGES

- Reserves are typically assessed on economic viability, which is vulnerable to the contraction of the market owing to carbon constraints or substitution by alternatives.
- Most major mineral companies conform with CRIRSCO's prescriptions, thus encouraging consistent reporting.
- Generic references to environmental, social and governance issues in CRIRSCO's reporting template could be interpreted flexibly to include the types of risk being proposed.
- The SPE-PRMS, the dominant code for reporting petroleum reserves, makes no reference to environmental factors that might ultimately affect resource extraction, but there is still the fundamental impact on the economics of reserves as an entry point.
- The probabilistic approach to classifying reserves may provide an opportunity to incorporate the risk that some reserves are unlikely to be extracted and burnt through reclassification.
- 'Competent Persons' – referred to in both mineral and oil and gas reserves reporting standards – have a responsibility to the public in preparing reserves data. As the independent verifiers of reserves levels, they could include these GHG emissions related aspects in their assessments.

4: GREENHOUSE GAS REPORTING STANDARDS

Considering the stock of carbon reserves enables us to compare this with carbon budgets, which relate to the objectives of limiting global warming.

A range of GHG emissions reporting standards have been developed to serve different purposes. As they have developed, so a number of issues have come to the fore, such as the need for alignment with financial reporting standards, whether the focus should be on carbon stocks or flows, and how GHG information can best be reported.

WHO SETS THE STANDARDS?

Existing GHG emissions reporting standards have emerged through a variety of channels: as part of international climate change processes, under national emissions regulations, or through industry sector initiatives. Examples are given in Box 4.1.

STOCKS AND FLOWS

Existing GHG reporting frameworks have been designed for reporting on annual flows of GHG emissions from industrial activity. This facilitates the monitoring of progress, for example towards international or corporate targets. It also enables comparison between entities.

Measuring and monitoring are key to management. Such reporting is valuable, but is only part of the picture. Considering the stock of carbon reserves enables us to compare this with carbon budgets, which relate to the objectives of limiting global warming.

FORWARD-LOOKING INDICATORS

The focus on reserves introduces a new dimension to the debate. It is forward-looking – focusing on the stocks of carbon being built up by governments and companies. This fits well with the science of climate change, in that global warming is the result of the cumulative levels of greenhouse gases in the atmosphere. This work makes it possible to understand the remaining carbon budget available if temperature rises are to be limited (Meinshausen et al. 2009). Perhaps even more importantly, looking at reserves means considering stocks of carbon-based fuels that have not yet been burnt – there is still a chance to influence the decision to combust these reserves. Investor needs are also met, in that this approach provides a forward-looking indicator of carbon exposure. This can then be translated into impacts on revenues and returns.

REPORTING MECHANISMS

The majority of GHG reporting occurs outside the financial statements. Typically, it may be in a corporate social responsibility (CSR) report, supported by more detailed web-based disclosure.

BOX 4.1

Source	Examples
International	• Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories (IPCC 2006) • World Business Council for Sustainable Development/World Resources Institute Greenhouse Gas Protocol (GHG Protocol 2013)
National	• US Environmental Protection Agency Mandatory Greenhouse Gas Reporting Rule (US EPA 2009) • UK Department for Environment, Food and Rural Affairs Environmental Reporting Guidelines (DEFRA 2013)
Industry	• American Petroleum Institute Compendium of GHG emissions estimation methodologies for the oil and gas industry (API 2009) • Canada Association of Petroleum Producers – 'Calculating GHG emissions' (CAPP 2003)

... the GHG Protocol needs to be developed to address the emissions potential of reserves.

The development of integrated reporting, however, means that stakeholders have to think about how to bring different types of material information together. The International Integrated Reporting Council (IIRC) has been developing an integrated reporting framework and working with companies to test it in their reports (IIRC 2013). This work could be informative in developing new or better ways of integrating information related to climate change, specifically the carbon budget viability of fossil fuel reserves, with other corporate performance data.

OUT OF SCOPE?

One of the most widely used approaches for greenhouse gas reporting is the GHG Protocol (developed by the World Business Council of Sustainable Development (WBCSD) and the World Resources Institute (WRI)), which classifies emissions in three different scopes of activity. The most relevant is Scope 3, which includes calculating the greenhouse gas emissions associated with products. See Box 4.2 for scope definitions.

BOX 4.2
GHG PROTOCOL SCOPE DEFINITIONS (GHG PROTOCOL 2013)

- Scope 1: All direct GHG emissions.
- Scope 2: Indirect GHG emissions from consumption of purchased electricity, heat or steam.
- Scope 3: Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (eg transmission and distribution losses) not covered in Scope 2, outsourced activities, waste disposal, etc. Emissions resulting from the use of sold products may be included as Scope 3 emissions in an inventory.

For investors, the value of information is a function of its materiality to company performance and position. For fossil fuel extraction companies, material issues centre on the ability to convert reserves into saleable products that produce revenue streams. In other words, the GHG Protocol needs to be developed to address the emissions potential of reserves.

This would essentially involve extrapolating the Scope 3 value chain emissions for a fossil fuel product into the future to reflect reserves. The methodology already exists to calculate the typical emissions[2] associated with extracting and combusting coal, oil and gas products, which could be applied in the future to provide reserves-encompassing GHG emissions information. This relatively simple extension may need to be merely a technical guidance note rather than something that requires extensive consultation.

VOLUNTARY OR MANDATORY?

Current levels of disclosure present a challenge for investors as extractive companies do not generally report voluntarily the emissions associated with the use of their products. There are exceptions, such as BHP Billiton, although that company presents this information in its sustainability report, not its annual report. BP and Shell have previously reported the global percentage of emissions relating to their products. Nonetheless, this information concerns a year's worth of products that have already been sold, rather than looking forward at use of reserves.

If, across a sector, investors are not provided with emissions data material to the company's business, the information is of limited use. If investors are informed that an oil company uses energy-efficient light bulbs, that gives them comfort about its good housekeeping but it does not provide insights that are either relevant to the company's long-term strategy or material to its future financial performance.

2 Existing reporting already uses typical values for certain activities, rather than using actual measurements of emissions, eg. for calculating vehicle emissions.

Without mandatory reporting requirements that demand the key climate change information required by investors, developments in this area are likely to be slow. If the primary audience is the investor wanting material, forward-looking information, then the carbon emissions potential of reserves must be the most pertinent data to disclose.

CONNECTING GHG REPORTING WITH FINANCIAL MARKETS

Greenhouse gas reporting should be connected with the financial markets through regulation. For example, the UK government has introduced a mandatory requirement for GHG reporting by listed companies. This stems from a requirement under the UK Climate Change Act (2008) that the government must implement this measure or explain why not. The reporting will be part of the annual reporting requirements under the UK Companies Act.

The development of these reporting requirements has raised a number of issues about how GHG disclosure should relate to the scope of financial reporting, whether the materiality test should be applied, and whether data should be verified. The proposed UK requirements are of a limited scope and will not require extractive companies to address the emissions associated with the combustion of their reserves, although their business model depends on the assumption that these reserves will eventually be combusted. This appears to be a missed opportunity to ensure that material climate change information is provided to investors and linked to the strategy of the company.

STANDARDISING CLIMATE-CHANGE-RELATED DISCLOSURE IN FINANCIAL REPORTS

The Carbon Disclosure Standards Board (CDSB) has developed the Climate Change Reporting Framework (CCRF) to help standardise climate-change-related disclosure in mainstream financial reports (CDSB 2012). The framework sets out reporting principles designed to facilitate consistency between climate and financial reporting, rather than duplicating existing measures. The CCRF is one of the approaches referenced in the proposed UK GHG reporting requirements. This demonstrates the formalisation of voluntary mechanisms under mandatory schemes.

KEY MESSAGES

- Any carbon metrics developed need to be compatible with financial reporting standards to enable them to be integrated into the annual report and accounts.
- Ensuring GHG metrics deal with material, forward-looking issues around stocks as well as annual flows is critical; otherwise they will omit vital information on hydrocarbon reserves and will not be used by investors.
- Markets need a better way of dealing with carbon reserves uncertainty and taking a longer-term view.
- Climate risk is much more complicated than pure carbon pricing – a range of relevant factors for determining the viability of the emissions need to be considered.
- The development of integrated reporting heightens the challenge of combining climate risks and reserves reporting into one corporate output.
- The GHG Protocol should be extended to produce a guidance note to deal with the greenhouse gas potential of the reserves reported by a company.
- Regulation to require mandatory reporting may be required to drive better risk disclosure.

5: STOCK MARKET REPORTING REQUIREMENTS

Raising capital by issuing shares to the public is a global business. Companies may decide to list in their domestic market, or seek access to a larger pool of investors in another market. Increasingly, companies are doing both, with multiple listings making shares widely available on several continents. Such companies are required to comply with the disclosure requirements of the exchanges on which they list.

WHO SETS THE STANDARDS?

The International Organisation of Securities Commissions (IOSCO) coordinates the activities of 95% of listing authorities around the world and is the recognised standard setter for regulation of listed companies. It also represents the stock exchange authorities on the monitoring board of the IFRS Foundation, set up to enhance the accountability of the IFRS standard setter, the International Accounting Standards Board (IASB).

IOSCO has a mandate that includes the obligation:

'to cooperate in developing, implementing and promoting adherence to internationally recognised and consistent standards of regulation, oversight and enforcement in order to protect investors, maintain fair, efficient and transparent markets, and seek to address systemic risks' (IOSCO 2013).

There is also some regional coordination. For example, the European Union has passed the Prospectus Directive, which sets out minimum requirements for an IPO prospectus. This means that a company listing on one market in the EU can use the same information for any other market within the EU.

IOSCO itself collaborates with the World Federation of Exchanges (WFE), which represents the world's stock exchanges (WFE 2013). There is some overlap between the members of IOSCO and the WFE, depending on the structure in place in each jurisdiction. For example, in some countries, the stock exchange and the listings authority may be part of the same government department. In many countries, however, the two functions have been split, with the stock exchange being a commercial entity, and the listing authority the regulator.

The WFE has been developing its sustainability programme and showcasing the efforts of individual exchanges to require environmental, social and governance disclosure, or create new indices that reflect certain standards.

A summary of relevant listing rules referencing reserves reporting can be found in Appendix III. Pressure is growing on stock exchanges and governments to introduce new requirements for enhanced sustainability reporting by a number of major initiatives or organisations such as such as CDSB, Sustainability Accounting Standards Board (SASB), IIRC, Corporate Sustainability Reporting Coalition (CSRC), Sustainable Stock Exchange Initiative (SSEI) and Nasdaq.

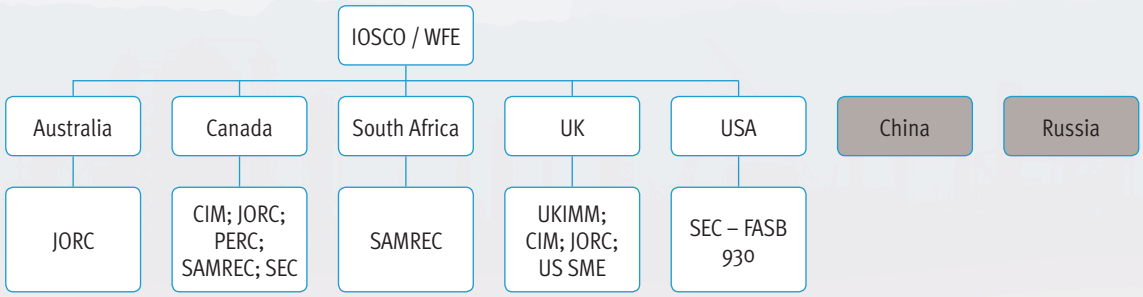
MINING RESERVES DISCLOSURE

The US Securities and Exchange Commission (SEC) has produced its own guidance on reporting of mineral reserves in SEC filings. This refers to accounting standard FASB 930 for Extractive Industries produced by the US Financial Accounting Standards Board (FASB) (see Box 2.2 for more detail).

Most stock exchanges, however, appear to refer to the local regional code for reporting reserves (as shown in Box 5.1). The UK and Canada also allow use of other regional codes, reflecting the fact that these exchanges have become known for listing mining companies from around the world. An Australian company could therefore use the same data to report in the UK and Canada, as well as on its domestic stock exchange. The rationalisation that CRIRSCO has brought to minerals reserves reporting facilitates the compatibility between regional codes.

The listings authorities in each country tend to work in partnership with the minerals codes organisations. For example, in 2013 the Australian Stock Exchange

BOX 5.1
STOCK EXCHANGES AND THE MINERALS RESERVES CODES THEY ENDORSE



The research was unable to find any clear requirements in Russia and China, where the local stock exchanges have not endorsed industry standards.

(ASX) consulted on changes to reserves disclosure, and revisions to the JORC code will be made in parallel.

OIL AND GAS RESERVES DISCLOSURE

Outside North America, listing authorities mainly require the International SPE–PRMS standard to be applied. (No specific requirements were found for China and Russia.)

In the US, the SEC refers to FASB 932 for oil and gas, believing its own rules should be aligned with those of the accounting standard-setter, the FASB, to prevent the emergence of a dual system for reserves reporting in the US. The SEC has also modernised its rules (see Box 5.2) in response to the changing economic conditions, and the significant exposure of US-listed companies to unconventional oil (SEC 2008). The FASB and SEC essentially operate in parallel to ensure that they are coordinating standards. The FASB approach is also intended to be largely compatible with SPE-PRMS.

Canada has its own National Instrument, which refers to the *Canadian Oil and Gas Evaluation Handbook's* reserves reporting system (Alberta Securities Commission 2007). In recent years the higher oil price has made unconventional hydrocarbons more viable

BOX 5.2
WILLINGNESS TO CHANGE: SEC RULES EVOLVE

Listing authorities can adapt to changing circumstances. For example, in 2010 the SEC revised its rules on reserves. It now requires companies to distinguish between conventional oil reserves and unconventional oil reserves. Companies operating in Canada extracting tar sands from open pit mines are essentially mining, rather than drilling wells for liquid reserves. This gives more certainty of the physical existence of the material, but raises a greater question over the economics of projects owing to the higher processing costs.

It is not inconceivable that a similar measure could be introduced to assess potential carbon constraints.

but Canadian listing requirements still refer to reserves that are due for 'imminent production'. This is to accommodate the stop-start nature of activity in this region, with projects often being halted when the price has made them uneconomic. Investors are therefore reluctant to include all reserves where investment has not already been made to develop the mines.

Incorporating carbon budget viability into the assessment would have the same aim – providing investors with information they need to make more informed judgements about a company's future performance potential.

The production of unconventional hydrocarbons also tends to be more GHG and water intensive. Therefore, distinguishing between conventional and unconventional reserves provides a means for investors to factor in potential environmental constraints. The recent shale gas boom in the US, for example, has prompted investors to ask about the emissions associated with this process (Fabian et al. 2012).

COMMON OPPORTUNITIES

COMPETENT PERSONS

Chapter 3 discussed the emphasis on 'Competent Persons' in industry reserves reporting standards. In some jurisdictions, listing rules have adopted the requirement for a report from a Competent Person alongside statements of the reserves (for example, the Hong Kong Stock Exchange 2007). This requirement essentially links the geological assessment of reserves with the company's financial reporting. It is designed to prevent misleading statements of reserves and so protect investors from overvaluing a company's shares on the basis of assumed future revenues that will not materialise because reserves do not exist or are not proved to be viable. Incorporating carbon budget viability into the assessment would have the same aim – providing investors with information they need to make more informed judgements about a company's future performance potential.

SENSITIVITY ANALYSIS

The SEC requires discussion of known trends and uncertainties, which may include changes to prices and costs. It is currently optional to provide a reserves sensitivity analysis as set out in Box 5.3.

This shows that the listings authorities are already encouraging companies to consider different scenarios. This could provide an opportunity to translate regulation and reduced demand into a drop in price. For example analysis by HSBC demonstrated that around half of some company's reserves would drop out with a $50/barrel price ceiling (HSBC 2013). A cost curve of the future projects being considered by companies shows that many unconventional oil and gas projects need a higher price than traditional projects to breakeven (Citi 2012).

SECTOR AND ISSUE SPECIFIC REQUIREMENTS

It is now commonplace for market regulators to require specific disclosures on new issues, or apply sector relevant measures to address emerging issues. These may relate to financial matters, such as pension liabilities, or to environmental, social or governance issues. Following calls from investors for clarification on whether climate change constituted a material risk, in 2010 the SEC issued interpretative guidance for companies, explaining the types of risk to consider (see Box 5.4).

BOX 5.3
SENSITIVITY OF RESERVES TO PRICES, BY PRINCIPAL PRODUCT TYPE AND PRICE SCENARIO

Price Case	Proved Reserves			Probable Reserves			Possible Reserves		
	Oil	Gas	Product A	Oil	Gas	Product A	Oil	Gas	Product A
	mbbls	mmcf	measure	mbbls	mmcf	measure	mbbls	mmcf	measure
Scenario 1									
Scenario 2									

(Source: SEC 2008)

BOX 5.4
THE SECURITIES EXCHANGE COMMISSION

For shareholders wishing to challenge management on its approach to climate change, this guidance has also provided a useful reference point: it is no longer possible for entities to claim climate change could not be material or did not exist. Companies now have at least to review their exposure and provide an opinion on the materiality of climate change risk. They are, of course, entitled to conclude there is no material risk if they believe this is the case.

The US Investor group Network on Climate Risk (INCR) reviewed the subsequent disclosures by oil and gas companies in the first round of annual SEC filings to occur after this guidance was introduced. Disclosures varied hugely in both quality and quantity, with no company giving an excellent analysis of all its climate-related risks, in INCR's opinion (Ceres 2012).

The US SEC (2010a) issued 29 pages of interpretative Guidance Regarding Disclosure Related to Climate Change. This identifies four possible areas in which climate change and concerns about it may have consequences that companies should consider for disclosure:

(i) impact of legislation and regulation
(ii) international accords
(iii) indirect consequences of regulation or business trends
(iv) physical impacts of climate change.

The SEC's guidance document included an overview and extended discussion of existing rules that may require disclosure of climate change issues. These include:

- description of the business
- legal proceedings
- risk factors, and
- management's discussion and analysis.

The US also recently showed the potential for mandating greater transparency from the extractive industries. The Dodd–Frank Act amends the Securities Exchange Act to require disclosure of payments relating to the acquisition of licences for exploration, production, etc where 'payment' includes fees, production entitlements, bonuses, and other material benefits (SEC 2010b). The new provisions on conflict minerals, requiring disclosures where companies obtain minerals from specific parts of Africa, are an important precedent for the types of additional requirement that the SEC and other authorities could impose.

KEY MESSAGES

- IOSCO is mandated to deal with systemic risks and has started to think about sustainability disclosure.
- High-cost extraction tends also to be carbon intensive and water intensive, so distinguishing between conventional reserves and unconventional reserves (which typically have higher extraction costs) could be useful for investors.
- Including an assessment of the carbon budget viability of reserves in the Competent Persons' report that is required on listing would give investors additional, useful information.
- The use of sensitivity analysis is established as a technique for dealing with uncertainty in prices. This could be applied to other issues, such as the energy demand implications of the 450ppm scenario as advocated by the International Energy Agency (IEA).
- Listing authorities can and do change disclosure rules to reflect changing external circumstances and societal expectations.

6: SPOTLIGHT ON CURRENT DISCLOSURES

Disclosures made by mining and oil and gas companies are determined by a mixture of standards and measurement systems. So how do these translate into the actual disclosures companies are currently making?

A review of the disclosures around reserves and climate change information in 35 annual reports and accounts of listed companies was undertaken for this report.[3] The companies selected are among those identified by Carbon Tracker as having the largest reserves – and therefore the most reason to address these issues adequately. All are listed in the seven countries (five reports per country) whose regulations were examined in this research. The sample contained 21 coal mining companies and 14 oil companies . BHP Billiton and Rio Tinto have both coal and oil operations, but have been classified in this sample as coal companies because this is their primary exposure to fossil fuels.

DISCLOSURES ABOUT PROVED FOSSIL FUEL RESERVES IN ANNUAL REPORTS AND ACCOUNTS

Reserves data were reported in 31 of the 35 cases tested, with all 14 oil companies reporting such data. Two of the non-reporting cases were listed in China, with one company from each of Canada and South Africa failing to disclose reserves. 11 out of the 35 companies did not include a discussion around the reserves data, such as associated risks and dependencies.

If investors are to be able to integrate climate change risk into their assessments of future corporate performance, information on reserves is the first piece of the puzzle they require. Yet, as these findings show, information on reserves cannot be taken for granted in all markets, while an assessment of the assumptions about these holdings can by no means be considered universal.

DISCLOSURES ABOUT CLIMATE CHANGE IN ANNUAL REPORTS AND ACCOUNTS

Of the annual reports examined, 63% mentioned climate change risk but only 37% disclosed greenhouse gas emissions. Frequency of disclosures varied across stock exchanges.

- All companies in the UK and South Africa included information on climate change. The majority of Canadian and US companies included reference to climate change although only one North American company specifically provided GHG emissions data.
- In the US there was good coverage of references to regulation, risk and technology, although no support was indicated for global action on climate change.
- Just a single company listed in Russia discussed issues connected with climate change, with one further company reporting on carbon emissions.
- Only one Chinese company discussed issues connected with climate change, by highlighting the potential impact on its costs and operations of 'China's increasingly strict policies'.

The fact that Chinese and Russian listed companies made the fewest mentions of climate change or carbon emissions reflects the less advanced state of environmental reporting in those countries. In any case, reporting GHG emissions in line with Scope 1, 2 or 3 was poor across all exchanges. Of the 13 companies to consider GHG emissions in the annual report only three, all listed in South Africa, broke them down by scope. Admittedly, some of these companies provided these data elsewhere, but the limited consideration of detailed emissions data in the annual report indicates that the operational emissions are not considered material by the companies. The fact that few extractives companies currently consider the impacts of combustion of their

3 The reports used were those available at the end of 2012. This report is intended to provide a snapshot of recent disclosure – some companies will inevitably have published further information by the time this analysis in published.

BOX 6.1
BREAKDOWN OF THE TYPES OF INFORMATION DISCLOSED BY THE 35 COMPANIES

Country of Listing	Company (Coal / Oil)	Reserves data	Discussion of reserves	Mention of climate change	GHG emissions data	Split by scope (1/2/3)	Mention of regulatory climate risk	Reference to UNFCCC and/or Kyoto	Mention of techno-logical solutions	Mention of risk of lost revenues	Support for global action on climate change
Australia	Rio Tinto (C)	✓	✓	✓	✓	×	✓	×	✓	×	✓
	BHP Billiton (C)	✓	✓	✓	×	×	✓	×	×	✓	✓
	Wesfarmers Ltd (C)	✓	×	×	✓	×	×	×	×	×	×
	Oil Search Ltd (O)	✓	×	×	×	×	×	✓	✓	×	×
	Woodside Petroleum(O)	✓	×	×	✓	×	✓	×	×	×	×
Canada	Teck Resources Ltd (C)	✓	✓	×	×	×	✓	×	×	×	×
	TransAlta Corp (C)	×	×	✓	✓	×	✓	×	✓	×	✓
	Canadian Natural Resources(O)	✓	✓	✓	×	×	✓	×	✓	×	✓
	Suncor Energy (O)	✓	✓	✓	×	×	✓	×	×	×	×
	Husky Energy (O)	✓	×	✓	×	×	✓	×	×	×	×
China	China Resources Power Holdings (C)	×	×	×	×	×	×	✓	×	×	×
	Inner Mongolia Yitai Coal Co (C)	×	×	×	×	×	×	×	×	×	×
	China Shenhua Energy Co (C)	✓	×	×	×	×	×	×	×	×	×
	SINOPEC (O)	✓	✓	✓	×	×	×	×	✓	×	×
	CNOOC (O)	✓	✓	×	×	×	×	×	×	×	×
Russia	Severstal JSC (C)	✓	×	×	×	×	×	×	✓	×	×
	Mechel OAO (C)	✓	✓	✓	×	×	✓	✓	×	✓	×
	Rosneft (O)	✓	✓	×	×	×	×	×	×	✓	×
	Lukoil Holdings (O)	✓	✓	×	×	×	×	✓	✓	×	✓
	Gazprom OAO (O)	✓	✓	×	✓	×	×	✓	✓	×	✓
South Africa	Exxaro Resources (C)	✓	✓	✓	✓	1/2/3	×	×	✓	×	✓
	Sasol (C)	×	×	✓	✓	×	✓	×	✓	×	✓
	African Rainbow Minerals (C)	✓	✓	✓	✓	1/2/3	✓	×	×	×	×
	Optimum Coal (C)	✓	×	✓	✓	1/2	×	×	×	×	×
	Wescoal Holdings (C)	✓	✓	✓	×	×	×	×	×	×	×
UK	ENRC (C	✓	✓	✓	✓	×	×	×	×	×	×
	Xstrata (C)	✓	✓	✓	✓	×	✓	×	×	×	✓
	Anglo American (C)	✓	✓	✓	✓	×	✓	✓	✓	×	✓
	BP (O)	✓	✓	✓	✓	×	✓	✓	✓	✓	×
	Royal Dutch Shell (O)	✓	✓	✓	×	×	✓	×	✓	×	×
USA	Peabody Energy (C)	✓	✓	×	×	×	✓	×	✓	×	×
	Alpha Natural Resources (C)	✓	✓	✓	×	×	✓	✓	✓	✓	×
	Arch Coal (C)	✓	✓	✓	×	×	✓	✓	✓	✓	×
	Exxon Mobil (O)	✓	✓	✓	×	×	✓	×	✓	✓	×
	Chevron (O)	✓	✓	✓	×	×	✓	✓	✓	✓	×
TOTAL	35	31	24	22	13	3	20	10	18	8	10

> *the increasingly stringent requirements of the Clean Air Act may result in more electric power generators shifting from coal to natural gas fired power plants…*[which] *could reduce the price of steam coal that we mine and sell, thereby reducing our revenues and adversely impacting our earnings and the value of our coal reserves.* (Alpha Natural Resources 2011)

products for investors demonstrates the need to mandate the disclosure of the emissions potential of reserves.

The types of disclosure on climate change made in annual reports also varied across all companies in the review. This suggests potential for determining the thinking of companies listed on different exchanges around the world. The different types of corporate disclosure can be divided into groups of decreasing frequency as follows:

- 20 (57%) referenced risks associated with climate change regulation, while a further four companies who did not mention regulatory risk, did acknowledge the global climate treaties
- 18 (51%), including every company in the US sample, highlighted the potential value of carbon capture and storage or other technologies,
- 10 (31%) called for global action to address climate change – none of these companies were listed in China or the US
- 13 companies discussed their own greenhouse gas emissions, primarily those in South Africa and the UK. 9 of these 13, however, did not categorise their emissions by scope
- 8 (23%) noted the risk that climate change presents to revenues, particularly in the US, which accounted for half of these cases.

The inclusion of these issues in the annual report indicates that companies considered them material for investors' understanding of company performance now and in future, or were guided by recent disclosure requirements to address them. The disclosures were often found in the company's discussion of risk management and potential impacts on the operations and financial health of the company, or in the forward-looking discussion by management. The variation geographically in whether companies perceive the issue as a regulatory risk or a technological challenge could have major implications for how they respond to the challenge of climate change. The reliance on carbon capture and storage when the IEA's figures show it to be of limited potential, and still decades from being proved and commercially viable, is worrying.

SOURCES OF INFORMATION

Although research for this report focused on what is considered to be the primary document for investors – the annual report and accounts, many companies may provide further information voluntarily in CSR reports or on their corporate website. They may also respond to surveys such as the CDP to provide further information (CDP 2012). Some companies refuse to participate, thus preventing a full assessment of the systemic risk or comparison across all companies.

Efforts to introduce integrated reporting have also driven increased consideration of how to provide meaningful information on material climate change issues. South Africa is a leader in this developing field.

IS DISCLOSURE ENOUGH?

US coal companies have included warnings in their annual reports that environmental regulation could reduce revenues and the value of their coal reserves. However, if this forms one paragraph of a lengthy annual report, does this provide sufficient coverage of the issue, will they simply provide boilerplate disclosures to cover all eventualities, and does this meet investor needs?

Arguably, it is impossible for investors to weigh up every risk faced by every company in their portfolio. On the other hand, failure to disclose a material issue could expose a company to investor action to recover losses. Achieving appropriate levels of disclosure can require substantial management judgment.

US companies were reporting in their 2011 annual reports on the potential impact that US regulation might have on their businesses. Arch Coal has done so, as has Alpha Natural Resources.

Ratings agencies downgraded both Alpha Natural Resources and Arch Coal in 2012 (Moody's 2012a; 2012b). This affected debt totalling $5.6bn. As a result of amended earnings expectations the share prices of both companies fell by over 50% in the first half of 2012 – indicating that the risk factor identified was indeed real and material. Compliance costs increased and natural gas prices went down; as a result, in early 2012, coal consumption in the US was at its lowest level for 25 years.

With hindsight it is clear that neither the companies nor their shareholders paid enough attention to the risk of a rapid decline in domestic demand for coal. More detailed discussion of this type of risk would therefore seem appropriate. This is also an example where it was not measures specifically targeted at climate change that impacted the market for the coal. It was a combination of competition from alternative energy sources (cheap gas) and regulatory measures to improve air quality (mercury emissions).

THE MISSING LINKS

If investors are to make judgements about how future carbon budgets may affect the use and value of companies' fossil fuel reserves, and hence their future revenue-generating potential, they need those companies to report certain information about their fossil fuel reserves – specifically, the carbon emissions associated with those reserves.

This report's review of current corporate disclosures shows that the more sophisticated reporters are minded to at least mention the potential risk to their revenues, the value of their reserves, and ultimately the viability of the company. It is not clear however that the management have actually thought through the implications of this risk materialising, and attempted to stress-test their business against this scenario.

Reporting companies will need further guidance, regulatory requirements and demonstrations of investor demand in order to take the next step and build climate-change risk into reserves reporting, valuations and risk analysis.

Discussions with experts during this research indicate that it is only a matter of time before these risks hit businesses. Indeed, investors in the US coal sector may feel that time has already come. Urgent work needs to be done to ensure that reporting frameworks and standards are ready to provide investors with adequate information on what is clearly becoming a material issue.

IMPROVEMENTS IN DISCLOSURE

The big question is: how can the missing links in the information chain be filled in? In order to truly integrate climate risk into the fundamentals of the business and the consideration of reserves, annual reports need to start producing the following kinds of information:

1. Reserves and resources converted into potential carbon dioxide emissions

	Million tonnes Coal	Billion tonnes Carbon Dioxide
Coal reserves	333	0.87
Coal resources	1330	3.39

2. Sensitivity analysis of reserves levels in different price/demand scenarios

Price Case	Proved Reserves	Probable Reserves	Possible Reserves
	Oil (Mbbls)	Oil (Mbbls)	Oil (Mbbls)
12month average price ($100 / barrel)			
Low demand, low price ($65 / barrel)			

3. Valuations of reserves using a range of disclosed price/demand scenarios

Price Case	Proved Reserves	Probable Reserves	Possible Reserves
	NPV-10 ($USmn)	NPV-10 ($USmn))	NPV-10 ($USmn)
12month average price ($100 / barrel)			
Low demand, low price ($65 / barrel)			

4. Discussion of the implications of this data in the explanation of capital expenditure strategy and risks to the business model

"The strategy is based on our assessment that global demand for coal will continue to rise x.x% a year over the next 10 years, there will be no significant measures to reduce greenhouse gas emissions, or improve air quality put in place, and renewable energy and energy efficiency technologies will not be price competitive. We will continue to spend capital on acquiring and developing new coal assets to increase production in line with the expected growth in demand. This is consistent with the world following a greenhouse gas emissions trajectory consistent with Y°C of warming."

OR

"The global demand for coal is weakening following emissions measures in the European Union and competition from cheap gas and air quality standards in the United States. China has indicated its demand for coal will peak by 2017, which will likely cause a structural shift in the market. Prices have already weakened, which is putting pressure on free cash flow. In order to prevent oversupply and further depress prices which will devalue assets and reduce predicted revenues, we are cancelling new capital expenditure on developing coal reserves. The lifetime of high cost, low quality coal mines may also be shortened if they become uneconomic to operate. This will enable us to maintain dividend payouts going forward. This is consistent with the world following a greenhouse gas emissions trajectory consistent with Z°C of warming."

KEY MESSAGES

- Coal reserves data themselves are not always available in some jurisdictions.
- In most regions it is now the norm to have some disclosure on climate change in the annual report.
- Some coal companies did mention the risk of reduced demand for their products from increased legislation.
- In the US, this risk materialised and saw coal company share prices halved and credit ratings downgraded as a result, but only after the event.
- While carbon data are now widespread, they do not always make it into the annual report. Perhaps this suggests that this information is not considered material.
- Integrated reporting is starting to bring the disparate business elements together, but reporters are not pursuing the implications for reserves reporting and valuation.
- Given that this is a real risk for investors, reporting frameworks should be ready to provide adequate information on the carbon budget viability of reserves.

7: THE WAY FORWARD

Adjusting how hydrocarbon reserves are reported and accounted for should be considered a high priority for supporting the continued efficient working of the world's capital markets.

Corporate reporting has developed, and continues to do so, to meet the information needs of investors as new risk factors and business opportunities arise. For example companies historically did not have to include pension liabilities in financial statements, but now this is a standard requirement. Adjusting how hydrocarbon reserves are reported and accounted for should be considered a high priority for supporting the continued efficient working of the world's capital markets.

At the 2012 Rio+20 summit, investors called for the integration of material sustainability issues within the annual report of large companies (Aviva 2012). Without the development of standardised approaches, or requirements for disclosure by listing authorities, the information companies provide is likely to be patchy and difficult to compare. Unless GHG reporting initiatives liaise with financial reporting standard setters and industry reserves reporting bodies, incompatible data requirements may result.

No one organisation acting alone is likely to be able to achieve the change some believe is vital: the economic viability of disclosed reserves factors in measures to regulate emissions and associated impacts on demand and price. It is clear that the various reporting standards are already interlinked – but the consideration of carbon is not yet integrated in a consistent way. This could also bring efficiencies through integrating requirements into existing standards, rather than creating whole new approaches and increasing the reporting burden.

Currently, for example, there is no obvious sensitivity analysis applied to reserves levels to reflect climate change risks. But there are optional requirements by the SEC to provide alternative reserve levels based on a different price scenario. For example, companies could compare their current assessment with a low demand/low price scenario to estimate the range of potential outcomes.

IAS 36 has been developed to deal with impaired assets, and there is scope to apply that to this area to give an indication of the impact on reserves as well as associated generation capacity and infrastructure.

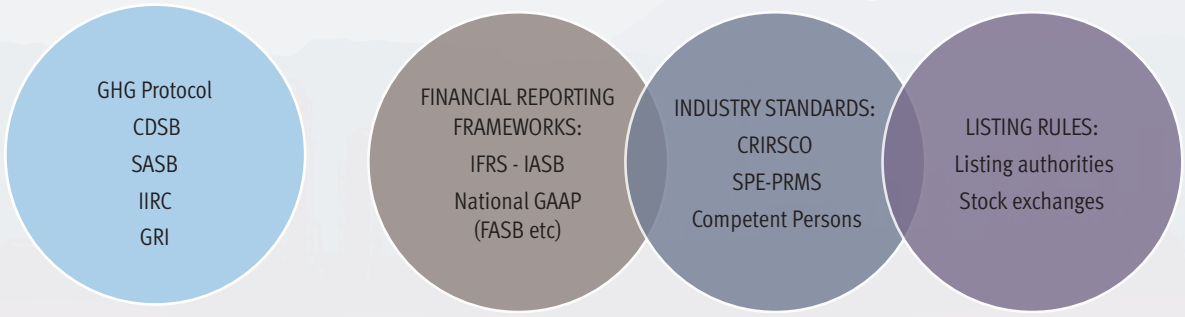
Accountants have important roles to play in all their guises: whether as members of standard-setting bodies or professional associations, as financial directors in reporting entities or analysts and investors. Through their reach and influence, accountants could themselves provide the ultimate mechanism for creating the missing links in the corporate reporting chain. Working alongside other professionals (in the legal, climate change, engineering, standard-setting, regulatory and other fields), they have an excellent opportunity to stimulate change.

Listing authorities and securities commissions already draw on a range of industry and financial standards. Exchanges and regulators are already starting to think about how to add sustainability disclosures to their frameworks. This is an opportunity to take a clearly material issue and integrate it into corporate reporting requirements. This can lead to more climate-literate markets, and help manage the systemic risks the world is facing.

The industry standards for reporting reserves are a common reference point for the financial markets. The probability of reserves being economic is based on assumptions around commodity prices. This offers an opportunity for reserves to be adjusted based on lower expectations of demand and price. Given the uncertainty around the future prices of commodities it may be useful for companies to start providing a range of levels, rather than relying on the average of the previous year.

Carbon disclosure efforts have generated a wealth of guidance to bring reporting up to an appropriate level of quality. Recent developments have aimed to make the approach more compatible with financial reporting, which can only help to support more integrated reporting. We see the overlay of reserves and climate risk to be a true test of how effective integrated reporting frameworks are.

BOX 7.1
EMISSIONS CONSIDERATIONS DO NOT CURRENTLY OVERLAP WITH ESTABLISHED FRAMEWORKS



Investors have a variety of perspectives from which to view information on reserves, but not necessarily a complete picture. Listing rules reference both the industry standards and the financial reporting standards for minerals and oil and gas reserves. These frameworks overlap and are interrelated, often being developed in parallel. With increasing attention being given to climate change matters, further linkage is needed with evolving GHG reporting standards and climate disclosure frameworks. This could help to fill important gaps in the information on the economic viability of fossil fuel reserves.

At present, a number of different standards and rules provide lenses through which to focus on the reserves information presented to investors. These are:

- financial reporting standards – indicating how disclosures about reserves should be reflected in financial reports
- reserves reporting industry standards – determining the classification of reserves according to economic viability and geological certainty
- listing rules – applicable to companies seeking to list on a stock exchange and often drawing upon the other as reference points for disclosure requirements.

However the GHG implications of reserves are currently not explicitly connected to these standards.

Existing reporting frameworks are missing a lens that would bring the economic viability of reserves *and* the policy context and technological developments into focus together. This would provide an opportunity to review the impact of regulations, policy and technology on demand for fossil fuel reserves and fuel prices. The application of such a lens would provide a clearer picture – both to management and investors – of the viability of existing hydrocarbon reserves. In practice, the certainty attached to the viability of these reserves may subsequently need to be adjusted.

There are existing relationships between financial reporting frameworks, industry standards and listing rules. Work to develop integrated reporting is encouraging linkages to GHG reporting as well. These relationships can be used to develop reporting standards that also integrate a carbon budget viability assessment. Such standards, which would provide compatible reference points for comparing companies internationally, could ultimately be incorporated into listing rules.

Achieving this goal will require the involvement of the many different parties involved in developing corporate reporting frameworks, and applying these frameworks in practice. The recommendations set out below draw on the findings presented throughout this report.

RECOMMENDATIONS

When the world's energy mix gradually becomes significantly altered in response to changing regulation, prices and demand, the impact will drive change across standard setters, stock exchanges and other reporting frameworks. This evolving context will need to be addressed and absorbed into current accounting standards, listing requirements, industry standards and other corporate reporting requirements. Collectively, these developments will fill current gaps in information on the economic viability of fossil fuel reserves. They will help drive companies to disclose (as yet) uncalculated stores of GHG emissions within their reserves. By factoring in this structural change, investors are better informed to make a judgement call on the risks facing companies, based on more comprehensive information.

The following recommendations are made to each of the four facets of the reporting framework, and the companies that apply the standards:

FINANCIAL REPORTING STANDARD-SETTING BODIES

For example, IASB, FASB

- Issue guidance to interpret existing standards (eg IAS 36 impairment of assets; valuation of reserves) so that preparers of reports and accounts consider the need to include information on the carbon viability of reserves.
- Consider how the use of fair value accounting could reflect the potential impact on the value placed on reserves.

STOCK MARKET REGULATORS AND LISTING AUTHORITIES

For example, WFE, IOSCO and their members

- Integrate climate risk into processes considering systemic risks.
- Require information in annual reports and listing prospectuses on the emissions potential of reserves, and the emissions trajectory assumptions of corporate strategy.
- Require sensitivity analysis of how reduced demand and price could affect the fossil fuel reserves of a company.

RESERVES REPORTING STANDARD-SETTERS

For example, CRIRSCO, SPE-PRMS and regional bodies

- Integrate consideration of how emissions regulation and market dynamics could affect demand and price into the methodology for classifying reserves and producing a Competent Persons review.

OTHER INFLUENTIAL REPORTING GUIDELINES

For example, WRI/WBCSD, CDSB, IIRC, GRI

- Develop technical guidance on reporting the greenhouse emissions potential of reserves to provide a forward-looking indicator, ensuring compatibility with financial reporting standards.
- Ensure the CDSB and SASB capture this material issue in their approaches.
- Ensure the IIRC brings together climate risks with how reserves are reported in integrated reporting.

COMPANIES

Companies need to start disclosing the following information in their annual reports:

- Reserves and resources converted into potential carbon dioxide emissions
- Sensitivity analysis of reserves levels in different price/demand scenarios
- Valuations of reserves using a range of disclosed price/demand scenarios
- Discussion of the implications of this data in the explanation of capital expenditure strategy and risks to the business model.

GLOSSARY

This list of terms has been provided to accompany the specialised acronyms used within the report.

AAPG	American Association of Petroleum Geologists
AASB	Australian Accounting Standards Board
ACCA	The Association of Chartered Certified Accountants
API	American Petroleum Institute
ASX	Australian Stock Exchange
CAPP	Canada Association of Petroleum Producers
CCRF	Climate Change Reporting Framework
CDSB	Climate Disclosure Standards Board
CIM	Canadian Institute of Mining
CRIRSCO	Committee for Mineral Reserves International Reporting Standards
CSR	Corporate social responsibility
CSRC	Corporate sustainability Reporting Coalition
DEFRA	Department for Environment, Food and Rural Affairs
EADP	Extractive activities discussion paper
EPA	Environmental Protection Agency
FASB	Financial Accounting Standards Board
FPC	Financial Policy Committee
GAAP	Generally accepted accounting practice or principles
GHG	Greenhouse gases
GRI	Global Reporting Initiative
IAS	International Accounting Standard
IASB	International Accounting Standards Board
IEA	International Energy Agency
IFRS	International Financial Reporting Standards
IIRC	The International Integrated Reporting Council
INCR	Investor Network on Climate Risk
IOSCO	International Organization of Securities Commissions
IPCC	Intergovernmental Panel on Climate Change
IPO	Initial public offering
JORC	Joint Ore Reserves Committee
mbbls	Thousand barrels
MD&A	Management discussion and analysis
mmcf	Million cubic feet
MP	Member of Parliament
NAEN	National Association for Subsoil Use Auditing
NGO	Non-governmental organisation
NPV	Net present value
OSC	Ontario Securities Commission
PERC	Pan-European Reserves & Resources Reporting Committee
PIIP	Petroleum initially-in-place
PRMS	Petroleum Resource Management System
SAMREC	South African Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves
SASB	Sustainability Accounting Standards Board
SEC	Securities and Exchange Commission
SME	Society for Mining, Metallurgy & Exploration
SORP	Statement of Recommended Practice
SPE	Society of Petroleum Engineers
SPEE	Society of Petroleum Evaluation Engineers
SPE-PRMS	Society of Petroleum Engineers Petroleum Resources Management System
SSEI	Sustainable Stock Exchange Initiative
UK GAAP	UK generally accepted accounting practice or principles
UKIMM	UK Institution of Mining and Metallurgy
UNFCCC	United Nations Framework Convention on Climate Change
US GAAP	US generally accepted accounting practice or principles
WBCSD	World Business Council for Sustainable Development
WFE	World Federation of Exchanges
WPC	World Petroleum Council
WRI	World Resources Institute

APPENDIX I: FINANCIAL REPORTING STANDARDS FOR OIL AND GAS

Country	Financial reporting standard applicable
International	IFRS 6: *Exploration for and Evaluation of Mineral Resources* (2005)
Australia	AASB 6: *Exploration for and Evaluation of Mineral Resources* (2009) (this standard relates to both minerals and oil and gas)
Canada	Accounting Guideline AcG-16, Oil and Gas Accounting — Full Cost (Alberta Securities Commission, 2007)
China	Standard 27
Russia	US GAAP (FASB, 2013)
South Africa	Society of Petroleum Engineers: Petroleum Resource Management System (SPE 2007)
UK	Statement of Recommended Practice: *Accounting for Oil and Gas Exploration, Development, Production and Decommissioning Activities* (SORP 2001).
USA	*Accounting Standards Codification*™ Topic 932 *Extractive Activities – Oil and Gas Reserve Estimation and Disclosures* (FASB 2010).

APPENDIX II: REPORTING REQUIREMENTS FOR MINERALS

Country	Reporting requirement
International	Combined Reserves International Reporting Standards Committee's International Reporting Template (CRIRSCO 2006)
Australia	Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC 2004)
Canada	Canadian Institute of Mining: Definition Standards on Mineral Resources and Mineral Reserves (CIM 2005)
China	No standard
Russia	The [Russian] National Association for Mineral Resources (NAEN 2011)
South Africa	The South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves (SAMREC 2007)
Europe/UK	Pan-European Code for Reporting of Exploration Results, Mineral Resources and Reserves (PERC 2013)
USA	Society for Mining, Metallurgy and Exploration: A Guide for Reporting Exploration Information, Mineral Resources and Mineral Reserves (SME, 2007) *Accounting Standards Codification*™ Topic 930 *Extractive Activities – Mining* (FASB, 2010)

APPENDIX III: LISTING REQUIREMENTS FOR RESERVES

Country	Listing requirement
Australia Stock Exchange (ASX)	**Mining:** Chapter 5 of the Listing Rules (based on JORC 2004) **Oil and Gas:** Chapter 5 of the Listing Rules; specifically rule 5.9 and 5.11–5.17 (consistent with SPE 2007)
Canada	**Mining:** National Instrument 43-101: Standards of Disclosure for Mineral Projects (OSC 2011) (accepts JORC, PERC, SAMREC and SEC Industry Guide 7) **Oil and Gas:** National Instrument 51–101: Standards of Disclosure for Oil and Gas Activities (Alberta Securities Commission 2007)
China	No information on listing requirements found after extensive research.
Russia	No information on listing requirements found after extensive research.
South Africa	SAMREC (2007) for minerals; and SPE-PRMS for oil and gas (SPE 2007)
UK *(main exchange).* *There is also a specific 'Note for Mining and oil and gas companies' for listing on the Alternative Investment Market (AIM), issued in June 2009.*	Practice is to accept mineral experts' reports prepared under the codes adopted by the following professional bodies: **Mining:** Australian Joint Ore Reserves Committee (JORC) Canadian Institute of Mining, Metallurgy and Petroleum (CIM) UK Institute Materials, Minerals and Mining South African Mineral Committee US Society of Mining, Metallurgy and Exploration (SME) **Oil and Gas:** Society of Petroleum Engineers in association with the World Petroleum Congresses and the American Association of Petroleum Geologists
USA	**Mining:** SEC Industry Guide 7 (SEC 2007) Description of Property by Issuers Engaged or to be Engaged in Significant Mining Operations **Oil and Gas:** SEC Final Rule – Modernization of Oil and Gas Reporting (Release No. 33-8995) (consistent with FASB Topic 932 Extractive Activities – Oil and Gas) (SEC 2009)

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REFERENCES

WEBLINKS ACCESSED MAY 2013

ACCA (Association of Chartered Certified Accountants) (2011), *The Carbon We're Not Counting: Accounting for Scope 3 Emissions.*

Alberta Securities Commission (2007), *Standards of Disclosure for Oil and Gas Activities.*

Alpha Natural Resources (2011), *Annual Report.*

API (American Petroleum Institute) (2009), *Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry.*

Anglo American (2012), *Financial Reports: 2012 Report.*

AASB (Australian Accounting Standards Board) (2009) *Amendments to Australian Accounting Standards.*

Aviva (2012), *Earth Summit 2012: Towards a Convention on Corporate Sustainability Reporting at Rio+20.*

CAPP (Canadian Association of Petroleum Producers) (2003), *Calculating Greenhouse Gas Emissions.*

CDP (Carbon Disclosure Project) (2012), *CDP Global 500 Climate Change Report 2012.*

CDP (2013), *About.*

Carbon Tracker (2011), *Unburnable Carbon: Are the World's Financial Markets Carrying a Carbon Bubble?*

Carbon Tracker (2012), *Letter to Bank of England FPC.*

Carbon Tracker (2013), *Unburnable Carbon: Wasted Capital and Stranded Assets.*

CDSB (Climate Disclosure Standards Board) (2012), *Climate Change Reporting Framework – Edition 1.1.*

Ceres (2012), *Sustainable Extraction? An Analysis of SEC Disclosure by Major Oil & Gas Companies on Climate Risk & Deepwater Drilling Risk.*

Ceres (2013), *Investor Network on Climate Risk (INCR).*

CIM (Canadian Institute of Mining) (2005), *CIM Definition Standards – For Mineral Resources and Mineral Reserves.*

Citi (2012), *Global Oil Vision.*

CRIRSCO (Committee for Mineral Reserves International Reporting Standards) (2006), *International Reporting Template.*

Deloitte (2012), *Energy Accounting, Financial Report and SEC Update.*

DEFRA (Department for Environment, Food & Rural Affairs) (2013), *Environmental Reporting Guidelines.*

Ernst & Young (2012), *Benchmarking European Utility Asset Impairment: How Companies are Communicating and What May Lie Ahead.*

Fabian, N., Williams, N. and Bowen, B. (2012), *Global Investors Call for Action on Methane Emissions from Shale Gas and Oil Fracking.*

FASB (Financial Accounting Standards Board) (2010), *Extractive Activities – Oil and Gas (Topic 932): Oil and Gas Reserve Estimation and Disclosures.*

FASB (2013), *Home.*

FPC (Financial Policy Committee) (2012), *A Response to the Coalition's Call.*

GHG Protocol (2013), *FAQ.*

Haldane, Andrew (2011), *The Short Long (Speech).*

Hong Kong Stock Exchange (2007), *Content of a Competent Person's Report for Petroleum Reserves and Resources.*

HSBC (2013), *Oil & Carbon Revisited: Value at Risk from 'Unburnable' Reserves.*

IFRS (International Financial Reporting Standards) (2005), *IFRS 6: Exploration for and Evaluation of Mineral Resources.*

IFRS (2010a), *Conceptual Framework for Financial Reporting 2010.*

IFRS (2010b), *Extractive Activities.*

IFRS (2012), *Feedback Statement: Agenda Consultation 2011.*

IFRS (2013), *About the IFRS Foundation and the IASB.*

IIRC (International Integrated Reporting Council) (2013), *About.*

IOSCO (International Organisation of Securities Commissions) (2013), *About.*

IPCC (Intergovernmental Panel on Climate Change) (2006), *Guidelines for National Greenhouse Gas Inventories.*

JORC (Joint Ore Reserves Committee) (2004), *The JORC Code: 2004 Edition.*

Meinshausen, M., Meinshausen, N., Hare, W., Raper, S., Frieler, K., Knutti, R., Frame, D. and Allen, M. (2009), 'Greenhouse-gas Emission Targets for Limiting Global Warming to 2°C, *Nature*, 458: 1158–62.

Moody's (2012a), *Moody's Downgrades Arch Coal's Corporate Family and Unsecured Debt Ratings to B1 and B2 Respectively, and Assigns Ba2 Rating to Arch's New Secured Term Loan; Outlook Negative.*

Moody's (2012b), *Moody's Downgrades Alpha Natural Resources' CFR to B1 from Ba2, Outlook Stable.*

NAEN (2011), *Russian Code: For the Public Reporting of Exploration Results, Mineral Resources, Mineral Reserves.*

OSC (Ontario Securities Commission) (2011), *National Instrument 43-101: Standards of Disclosure for Mineral Projects.*

PERC (Pan-European Reserves and Resources Reporting Committee) (2013), *The PERC Reporting Standard.*

SAMREC (South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves) (2007), *The South African Mineral Codes.*

SEC (Securities and Exchange Commission) (2007) *Industry Guides.*

SEC (2008), *Modernization of Oil and Gas Reporting.*

SEC (2009) *Modernization of Oil and Gas Reporting: Final Rule.*

SEC (2010a) *Commission Guidance Regarding Disclosure Related to Climate Change.*

SEC (2010b), *Dodd–Frank Wall Street Reform and Consumer Protection Act.*

SME (Society for Mining, Metallurgy and Exploration) (1999), *A Guide for Reporting Exploration Information, Mineral Resources, and Mineral Reserves.*

SORP (Statement of Recommended Practice) (2001), *Accounting for Oil and Gas Exploration, Development, Production and Decommissioning Activities.*

SPE (Society of Petroleum Engineers) (2007), *Petroleum Resources Management System.*

SPE (2011), *Guidelines for Application of the Petroleum Resources Management System.*

SPEE (Society of Petroleum Evaluation Engineers) (2007), *Definitions of Oil and Gas Resources and Reserves.*

Spelman, C. (2012), *Written Ministerial Statement: Company Reporting of Greenhouse Gas Emissions by Quoted Companies.*

US EPA (US Environmental Protection Agency) (2009), *Mandatory Greenhouse Gas Reporting Final Rule.*

WFE (World Federation of Exchanges) (2013), *Topics.*

Following Carbon Tracker's publication of its *Unburnable Carbon* analyses in 2011 and 2013 (Carbon Tracker 2011; 2013), it has become clear that there are more fossil fuels listed on the world's capital markets than can be burnt if dangerous climate change is to be prevented. Yet the way in which fossil fuel reserves are accounted for and reported does not factor in the risk that some current reserves may not be combusted. As a result, stock market valuations of these companies, either currently and/or in future, may not be accurate. The world's stock markets and investors could therefore be facing the risk of a 'carbon bubble'. Carbon Tracker and ACCA have come together to explore global reporting practices on fossil fuel reserves and the nature of any information gaps. They sought to answer two questions.

1. To what extent do existing reporting standards governing company disclosures to financial markets require or enable the provision of useful information on fossil fuel reserves?

2. What steps are necessary to integrate emerging and future climate change risks into disclosures?