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Industry Response To The Greenhouse Challenge
Hunter Valley Coalfields Conference – 27 March 2008

Good Morning Ladies and Gentlemen

Whilst climate change is the most discussed issue of our times, it is the least understood. Similarly, the coal industry's response to climate change is equally misunderstood. So, I'd like to be clear about two matters right upfront. Firstly, the Australian coal industry has accepted, for well over a decade, the reality of global warming and that man-made CO2 is a major contributor to potential climate change. It came to that view on the basis of the scientific evidence which, whilst still imperfect, is irrefutable. It has also put its money where its mouth is: volunteering a billion dollars over 10 years, and leveraging several further billion in private and government funds, for the demonstration of a range of low emission coal technologies.

Secondly, the expression *clean coal* is not an oxymoron. It's not an unproven conspiracy or PR ploy cooked up by the 'coal lobby' to save its proverbial commercial hide. If you speak of *clean coal* it does not mean that you've sided with the devil, or that you've become an apologist for a toxin akin to asbestos. *Clean coal* – by which I mean low and zero emission technologies - represents a fundamental weapon in the arsenal available to the globe in its efforts to mitigate the impacts of climate change. And this reality is supported, perhaps inconveniently for those with differing views, by a compelling list of authorities: Al Gore, Sir Nicholas Stern, the IPCC and the International Energy Agency to name but a few.

Believing that if coal went away so would the problems of CO2, is also fantasy. Such beliefs ignore the variety of manmade contributors to global warming (ie., the 75% of manmade CO2 that does NOT come from coal fired power) as well as the reality of growing coal use globally. Australia, for example, produces 300mt of coal every year and consumes 60mt. This compares with annual world coal consumption of 5 billion tonnes with 2.2 bt of that consumed in China alone. By 2010, the growth in China's coal demand will be five times Australia's annual consumption. So burying one's head in the sand about the reality of coal is no answer.

Climate change is complex. Resisting the "seductive appeal of simplicity" and working hard to rally people around the far less alluring cause of complexity, is a tough gig; but as an industry, this is precisely what we must do.

What is needed is the ability to sort hyperbole from fact and to logically step through the implications of policy responses to climate change to determine the

most efficacious instruments – environmentally, socially and economically – which are proportionate to the magnitude of the threat.

Until a couple of weeks ago, I would have said that there's no room for religion in this matter. The pitfalls of myth making and grandstanding have to be avoided. It is the responsibility of government, industry and the environmental movement to shift the current debate from alarmism to reasoned discussion; because alarmism can breed results where the costs far outweigh the benefits.

Having said that, after 1,500 years, even the Vatican has weighed into the debate. It has updated the 7 Deadly Sins and expanded them to 14. According to Monseigneur Girotti the era of globalization has forced the Catholic Church to rethink its moral code. So now – as reported by Richard Owen – drug pushers, the obscenely rich, environmental polluters and manipulative genetic engineers are all in danger of losing their mortal souls. According to the Apostolic Plenipotentiary, we "offend God not only by stealing, blaspheming or coveting your neighbour's wife, but also by ruining the environment". So those of us who have spent, and will spend, most of our lives involved in the mining industry, keeping the lights on and providing the minerals that form the literal (not to mention economic) backbone of every country in the world, are apparently all going to hell. Of course, if we look at that logically, every consumer, producer and converter of virtually any product is an environmental polluter. Looks like the whole world is damned.

Because I can't imagine what the fallout of all of this will be, or what other extraordinary developments the mining industry might face over the next decade, I'm going to focus my discussion on what I do know. I'm going to discuss low and zero emission coal technologies and their role in turning the threats of climate change around.

Where as recently as 2005, such a discussion of solutions would have been inconceivable, in 2008 - apart from those who keep beating the worn out drum of panic - the general public is asking what should be done and how quickly. That's a profound shift. Just 3 short years ago, the climate change conversation was confined to the halls of academe, scientific laboratories and the other relatively elevated circles of business, government and environmental NGOs. There was sniping from the sidelines by activists and some journalists; finger pointing and dissatisfaction; but climate change didn't become mainstream and provide oxygen for a huge array of commentators and interested parties until 2006 – when the "tipping point" was reached - when global warming achieved the "power of [an] epidemic".

In little over a year, circumstances have arisen which place mining, and especially coal, firmly on the centre stage of politics. Al Gore's documentary, *An Inconvenient Truth*, closely followed by the release of the Stern and IPCC Reports, fuelled a virtual tsunami of public debate across the developed world:

most recently typified by the Live Earth concerts and accompanying documentary series.

In Australia this heightened debate on climate change has become enmeshed with our terrible drought and concerns that recent extreme weather patterns may be linked to global warming. Throw into the mix both the NSW and Federal elections, and the volatile ingredients for our perfect Australian storm all came together. So it's timely that the position of the Australian coal industry was clearly articulated.

Wherever you look, the industry is getting media coverage. This coverage is pretty schizophrenic: a tale of two industries: with mining either the "darling" of the business pages or the "demon" of the general news. The 'demon' has been variously painted as skeptical, obstructionist, a polluting relic from the past and an impediment to the development of a 'clean, green, renewable future'. When the coal and power generating industries point out that some of the targets being proposed for alternative power generation will bring Australia to its knees, we are howled down as lacking authenticity because driven by vested interest.

Regardless of one's views about targets (and the Australian coal industry believes that a well constructed emissions trading scheme is essential), I personally think that debate about Kyoto was a costly distraction from the main game. If you don't have all major emitters – developed and developing – prepared to do what it takes, you just don't have a solution to climate change. "Piecemeal" approaches won't get us there: a lot of action in one country - if not complemented by major efforts in others - just doesn't cut the global warming mustard. As Nicholas Stern has said:

Countries facing diverse circumstances will use different approaches to make their contribution to tackling climate change. But action by individual countries is not enough. Each country, however large, is just a part of the problem.

In short, to suggest that what we do in Australia, however important, will be a deciding factor in addressing climate change is a nonsense. To suggest that we should go it alone, in the name of leadership (and switching off coal on our way out), is akin to falling on our swords for no environmental gain. Australia is not a bubble and global warming doesn't respect borders – geographic or developmental.

It has been a huge challenge for the international community to mobilise support for concrete responses amongst more than 200 sovereign states. But I think things are changing - with the development of a variety of regionally based coalitions and with China (now the world's largest greenhouse gas emitter) embracing the need for action. A *one size fits all* approach has not delivered the change that comes with the territory of accepting the reality of human induced global warming.

Clearly, however, waiting around for some magic fix to come from somewhere else is not an option either. Practical answers are called for and these answers involve a whole suite of technical solutions ranging from low and zero emission coal technologies, advanced renewables, demand management, nuclear, and energy efficient buildings, appliances and industrial processes: a hamburger with the lot if you like.

There simply is no silver bullet.

The NSW minerals industry is hugely active in reducing its greenhouse gas footprint through energy efficiency and demand management, and reducing fugitive emissions. Here I am talking about on the ground action, specifically around mining practices.

These efforts are delivered through participation in schemes at State and Federal level, including the NSW Government's GGAS and Energy Savings Action Plans, the Federal Government's *Energy Efficiency Opportunities* legislation and the Greenhouse Challenge Plus programme, in which the majority of the mining industry are voluntarily participants.

One area in which the mining industry is leading innovation, is in the reduction of fugitive methane emissions released as a result of mining. This is particularly significant in our bid to tackle climate change, because methane has 21 times the global warming potential of CO2.

Several coal mines in NSW generate electricity by burning methane drained from coal seams prior to mining. The electricity is used to power on-site operations or sold for distribution in the state grid. This reduces the demand for electricity from other sources and decreases the amount of methane escaping into the atmosphere.

One example of this type of initiative is Illawarra Coal's Appin Tower Project. Methane is drained from the Bulli seam through bores drilled ahead of the longwall face at depths of up to 1km. The gas is drawn continuously to the surface by vacuum where it is captured and converted to electricity using 94, 1 mw gas turbines. Enough electricity is generated to power 80,000 homes in NSW, with greenhouse gas emissions reduced by an estimated 3 million tonnes of CO2 equivalent per year.

However, not all coal seam methane can be drained. Small amounts are present in ventilation air which is exhausted in substantial volumes from the underground operations. So, in 2007, Illawarra Coal made a further breakthrough with a $30 million investment into the WestVAMP project, which utilises dilute methane to reduce emissions by 250,000 tonnes of carbon dioxide equivalent each year, while at the same generating electricity to power a further 20,000 homes. This

new technology has wide potential application for methane abatement and power generation globally.

Where it is not technically feasible to burn methane for power generation, companies can flare the gas to reduce emissions. Xstrata's United Collieries Flaring Project in the Hunter Valley, abated in excess of 40,000 tonnes of methane in the first 9 months of its operation alone.

These kinds of practical solutions define the Australian coal industry and explain what it sought to generate 8 years ago when it formed Coal21. Coal 21 is a partnership between Australian governments, coal producers, the research community and electricity generators. Perhaps typically of our industry, Coal21 was launched without much fanfare but with a lot of passion, professionalism, scientific collaboration……and money.

The industry announced an historic, world first initiative in March 2006, committing $300 million to the Coal21 Fund to develop carbon capture and other low emission technologies. In 2007, the Fund was uncapped and increased to $1 billion. It leverages several billion dollars of funding already committed by governments and individual companies towards this vitally important development and deployment effort.

I hear the reaction from some people that this is not enough, too little too late. Some claim that this is merely PR; if it is, as the former head of the ACA (Mark O'Neill) once commented, it would have to rate as the most expensive PR campaign in history. Furthermore, I can think of no other industry in the world that has invested in pre-competitive RD&D.

Major technology development – whether in advanced renewable or fossil fuel energy generation – has always had and will always have lead times. You cannot get to your destination without starting somewhere and the coal industry started years ago - in the absence of international consensus, in the absence of government policy and in the absence of a price signal. The Coal21 initiative – with its sole focus on technology demonstration and ultimately commercialization - represents an important model for other industries and countries to follow.

By my count, there are 39 LET research and demonstration projects around the world; of those 39, 10 are in Australia. Given that Australia contributes just 1.4% of global greenhouse gas emissions, this suggests that we are punching well above our weight. In essence these technologies are trialling different ways of combusting coal and mechanisms to capture CO2 from the flue gases that would ordinarily be released to the atmosphere, so that they can be compressed, liquefied, transported via pipeline and stored in deep geological formations.

Thermal efficiency in a power station is a measure of how much useful energy can be extracted from a given amount of fuel. Efficiencies have improved from

about 5% in 1900 to an average of 38% for modern pulverised coal plants used in Australia. Best of breed existing technology (in particular ultra supercritical, widely used in Scandinavia and Japan for instance), have generating efficiencies of around 45%. The newest generation of low emission coal technologies, which will come on stream in the next 15-20 years, will see efficiencies of around 55%. When combined with carbon capture and storage, the world's future looks set to be decarbonised.

So what are some of these major technologies? Are they off the drawing board yet? How far down the delivery pipeline are they?

I think it appropriate that I begin with carbon capture and storage, also known as geosequestration, not only because world authorities like the IPCC, Stern and Gore all recognise how significant this technology will be in coming years, but because opponents of the coal industry often claim that capture and storage is either a fiction or a major problem in itself. At the outset can I state that CCS is science, not science fiction. That's why countries like the Netherlands have said no to nuclear as a CO2 abatement strategy and instead committed to CCS (along with a 20% renewable target) as the key plank in their strategy to combat climate change.

The images on the screen show the Sleipner project in Norway. A million tonnes of CO2 has been captured and is being stored 1,000 metres beneath the seabed each and every year since 1996. 2,000 tonnes of CO2 is separated from Sleipner's gas production each day and is injected into the Utsira aquifer.

This formation is large enough to store all of Europe's 600 billion tonnes of CO2 emissions for the next 600 years. Since 2000, when monitoring of the CO2 started, there has been zero leakage. The Norwegians estimate that the CO2 will remain in situ at least until the next Ice Age in 5-10,000 years.

There are at least 20 other projects of this type up and running or in development across Europe, in Algeria, India, China and North America. The technology is proven, not by virtue of these demonstration projects, but because the oil and gas industries have been using it for well over 20 years as part of enhanced resource recovery techniques.

In Australia, 7 demonstration projects are either committed or underway where CCS will play a vital role in the pilot - including the CO2CRC storage project in the Otway Basin in Victoria, the Gorgon natural gas project in WA and HRL's IDGCC project.

The launch of Australia's first carbon storage project in Victoria's Otway Basin next month is an historical milestone in the development of low emission technologies. The CO2CRC Otway Project and carbon capture and storage

projects being developed in NSW and throughout Australia will place the country at the forefront of the development of these vital technologies.

It will inject 100,000 tonnes of carbon dioxide two kilometres in the deep subsurface in the first two years of operation, supported by the most comprehensive monitoring program of any carbon dioxide storage project in the world.

I will be hosting a Sydney briefing of the Otway Basin Project next week. An official launch will take place at the project site on the same day, with the Federal Minister for Resources and Energy, Martin Ferguson and the Victorian State Minister for Primary Industries, Peter Batchelor. This is rubber on the road for a low emissions energy future.

International Power's $360m Hazelwood Project in Victoria, involves retrofitting a 1600mw brown coal power station. Brown coal, common not only in Victoria but also in China, India, Indonesia, Russia and Eastern Europe, has high levels of moisture and a low calorific content. This means that power plant efficiencies are poor and CO2 emissions are high.

Dewatering and drying the coal enhances plant efficiency and reduces greenhouse gas emissions per unit of electricity generated. Using a pioneering drying and gasification technology it is estimated that CO2 emissions will be reduced by 30%. This project will also involve carbon capture to further reduce emissions.

The CSIRO's PCC project in NSW is also interesting because it involves retrofitting an existing coal fired power station with a mobile capture unit (pictured on your screen). Retrofitting technologies will be key to delivering the 60% cuts in CO2 that the IPCC says are required by 2050, because many trillions of dollars are already invested in existing power stations around the world - the useful life of which may span another 30 years in many instances.

The $188m CS Energy oxy-fuel project will capture CO2 and transport, inject and store it in the Denison Trough. What is particularly interesting here is the innovations surrounding the capture of CO2 from the flue gases of the power station through oxyfuel combustion.

The 'capture' challenge is not technical, it's economic. Whilst a lot of CO2 exits a power station, the molecules are very diffuse. So the focus is on how to concentrate the CO2 in the flue gases.

Oxy-firing involves feeding the power station boiler with pure oxygen rather than air and recycling some of the flue gases through the combustion chamber. This raises the concentration of CO2 and is a relatively low cost and thus low risk technology option for achieving near zero emissions.

Another extremely important technology is Integrated Coal Gasification Combined Cycle. There are at least 6 such plants being scoped or under development around the world. A plant is being trialled in Japan (which I had the opportunity of visiting late last year) and 2 are being built in China as we speak.

Almost all involve collaboration between a number of generators, research institutions and governments. The $1b Stanwell ZeroGen project in Queensland is moving through feasibility as we speak.

These examples of the pioneering work being done, explain why Al Gore has said that "CCS will play a significant and growing role as one of the major building blocks of the solution to the climate crisis".

Given this work and its contribution to global climate change solutions, I struggle with the sad but true fact that the demonisation of the coal industry has become a popular sport in some media outlets and the raison d'etre of some campaigners and electoral aspirants.

Frightening headlines on climate change with the coal industry painted as the sole culprit, scandalous shock-jock journalism on some TV programmes especially in relation to water, breathless reporting of coal mining being responsible for Newcastle's tragic 1989 earthquake (not to mention the stranding of the Pasha Bulka), and a largely unquestioned media ride for vitriolic anti-mining campaigners, has so far defined the general direction of much print, TV and radio commentary.

I'm not being insular or defensive here; and I'm not having a go at the media or suggesting that people and policy makers ought not to be concerned or express that concern. What the industry is calling for is an informed debate. We want to see facts not fear widespread in the public domain.

In 1962, John F Kennedy said that "the great enemy of the truth is very often not a lie – deliberate, contrived and dishonest – but the myth – persistent, persuasive and unrealistic". Climate change policy that derives from myths and demons will not safeguard future generations; it will prejudice their opportunities.

Let me explore some of the facts and the myths:

Fact: Over the next 10 years, 800 new coal fired power stations will be built around the world with 500 in China alone.
Myth: Stopping Australia's 230mt of coal exports to international markets will slow global coal consumption and reduce CO2 emissions.
Fact: Even though Germany has the world's largest investment in solar and wind power, coal still accounts for 25% of the energy mix. Germany is the world's 7th largest coal producer and 4th largest coal consumer.

Myth: The higher cost of Germany's renewable power generation is equivalent to the price of 2 ice creams per person a year.
Fact: Germany has the world's third highest residential electricity prices and subsidises the renewables sector to the tune of US$6 billion every year. Germany competes in a European market where electricity prices are at least 3 times higher than in Australia. Australia competes in an Asian market where electricity prices are comparable to our own.
Myth: If Germany can develop such a large renewables sector, supplemented by 28% nuclear power, then the 1.1 million Australians who work, directly and indirectly, in energy intensive industry won't lose their jobs if Australia closed or limited competitively priced coal fired power.
Fact: 55% of Denmark's electricity is coal fired. Over the next 2.5 years, there will be a 10% increase in renewable energy, a 9% increase in natural gas and a 23% increase in CO2 emissions.
Myth: Increasing the share of renewables and gas in a country's energy mix means that CO2 emissions decline.

My point, ladies and gentlemen, is that there is a veritable disconnect between the reality of global energy demand and coal consumption and public perception of what is reasonable, achievable and will make a contribution to reducing our greenhouse gas footprint. This is a real challenge for rigorous policy making.

And the problems don't end there. We are seeing a lot in the press at the moment connecting natural disasters or other human tragedies and climate change. The making of these parallels - designed in many cases to frighten the public, amplify the sense of impending doom and to make ill-conceived, knee-jerk policy action look justifiable and inevitable – is a troubling trend. It is a trend which is gaining momentum both inside and outside Australia.

But why should we be troubled? Because this speculation is not currently supported by scientific evidence. Connecting the Australian drought to climate change, for example, is the stuff of myth making – JFK's greatest enemy of truth. No-one can say whether this drought is related to global warming or not. In the absence of science to disprove the assertion however, the myth seems to be morphing into a reality in the minds of many Australians.

This trend is being encouraged by a heterogenous group comprising some political aspirants and what I'll describe as campaigning NGOs. I want to make it very clear here that I am talking about a group quite distinct from leading NGOs like WWF, the Climate Institute and ACF, with whom the industry has for a long time shared constructive dialogue and a focus on solutions. These NGOs are powerful change agents and a far cry from the noisy activists who have no solutions - only slogans and war cries. The noise created by this group has not been helpful to the public debate: it is a terrible distraction when all of us should be working collectively on the way forward.

We saw a recent example of how political aspiration can derail important debate with the campaign launch of Senate candidate and sometime celebrity scientist Dr Karl Kruszelnicki. Dr Karl, you might recall, described clean coal as a "complete furphy" and likened it to Nazi propaganda.

"Goebbels, the Nazi propagandist, said if you're going to tell a lie, tell a big one, and this is a beauty," he said.

Well Dr Karl was having one of his micro-sleeps on clean coal technology to get his facts so wrong.

Some of Australia's leading scientists from the Co-operative Research Centre for Greenhouse Gas Technology, Australia's top research institution on low emission technologies, were quick to point out the serious technical flaws in Dr Karl's claims.

For example, his estimates on C02 emissions were 2000 times higher than Sydney's actual emissions, 600 times higher than Australia's total emissions and more than 10 times higher than the world's C02 emissions.

Not only that, but Dr Karl also found himself at odds with the Intergovernmental Panel on Climate Change (IPCC), Nobel Peace Prize winner Al Gore and respected British economist Sir Nicholas Stern, who have all said that carbon capture and storage will play an absolutely essential role in the global response to climate change.

Still, it took a complete news cycle, hours of work by the NSWMC and some colourful discussions with several journalists to get the story back on track.

It is these types of campaigners who have done most to hijack the climate change debate; deflecting attention from where the industry, many politicians, government agencies and, I'll posit, the silent majority, believe it needs to be focused.

In painting a stark picture of a complex global problem with the easy, silver bullet solution of shutting down the coal industry, (variously described as 'no new mines', 'coal exports banned' and 'no new coal fired electricity'), this extremist fringe has sought to drown out the voices of environmental reason, of social justice, of science and of economics. It doesn't take much imagination to visualize how our modern life would be affected without sufficient electricity to supply the daily needs of households, schools, hospitals, factories and businesses generally.

The cold hard facts of the matter are that coal is the dominant source of electricity in the world. It holds that place for some very good reasons: the fact that it is available from over 100 countries globally means that it is not only highly

price competitive, its diverse geography provides security of supply to consuming nations. And this is not a trivial point. 70% of world oil and gas reserves are located in the Middle East and Russia. That concentration has led to numerous price shocks over the last 35 years and a fixation with energy security particularly for those countries lacking the kind of natural resource endowments Australia enjoys.

And, putting aside the fact that renewables for example, are between 10 and 20 times more expensive than coal fired electricity and the minor problem that sun and wind doesn't shine and blow 24/7, I would be very interested to know what extremist opponents believe Australians and the developing world generally should be sacrificing? It's time that the anti-coal lobby was challenged much more comprehensively on its more outrageous demands, so that the community can better judge how much pain they really can withstand and to what extent that pain will actually deliver CO2 abatement.

Now let me back up this point with some hard data. The Australian Electricity Supply Association (ESAA) has modeled what would need to be done if Australia was to comply with widely touted demands. For example, to meet a call for a 30% emission cut by 2020, almost all of Australia's coal fired power stations – which meet 85% of the nation's demand – would have to close. The sheer construction requirement involved in replacing those power stations (20 across mainland Australia) in just 13 years with a mix of other generation facilities, would be a Herculean (if not impossible) task with a capital cost of $45 billion and with a further $20b of stranded investment needing compensation.

ESAA also says that meeting a 25% renewables target would require construction of 4,500 2 megawatt wind turbines (occupying some 4,000 square kms) and 20 biomass generators.

Even if this were achieved, the electricity load still could not be met without the additional construction of 30 new gas fired baseload plants plus 12 best of breed coal fired stations. As Kermit the frog once pointed out "it's not easy being green".

And if Australians can't afford to embark on this path, how can the developing world be expected to?

As the World Bank points out, electrification is inextricably linked to the alleviation of poverty.

So when you consider the increasing demand for power from developed nations, married with the desire of the 2 billion people on the planet who don't even have access to a humble electric light bulb, to rise above subsistence, it's easy to see why the International Energy Agency (IEA) predicts that global net electricity

consumption will more than double between now and 2030 leading to a growth in CO2 emissions of 55% over the same period.

More than 70% of that growth will come from non-OECD nations; that is, in the emerging powerhouse economies of China and India. The scale and pace of China's industrialization cannot be underrated. Nor can the fact that nearly 1 billion Chinese are still not connected to the grid. So what does that tell us about future emissions growth? One thing I think is certain: none of us in this room will see a decline in global greenhouse gas emissions in our lifetime.

Furthermore, the IEA estimates that fossil fuels will continue to supply up to 82% of world energy needs over this period. So if we don't do something about the 25% of the world's greenhouse gas emissions that come from burning coal, not to mention the 75% that don't, we will fail to achieve the emission cuts that the IPCC says are necessary by 2050.

The voices of those who are concerned not just with the magnitude of the problem but of why, who and what needs to be done have not been given much airplay. These voices are often characterized as heartless and wicked by campaigners who question the merits of development.

As the debate on climate change progresses, we need to be differentiating amongst the voices and fleshing out what is really driving each of their views. The debate needs to unfold over multiple levels and the outcomes need to be decided as a society because I can't think of any society, in any geography, in any period of history, which has voluntarily put a halt on its development.

And based on my experience living and working in the developing world, most of the people that this encompasses, desperately seek an improved quality of life. That improved quality of life requires electrification. For people in the developing world, donning the chains of protest is an inconceivable luxury.

Australia has built its economic wealth on competitively priced coal for more than 80% of its energy needs over more than 150 years. Our current quality of life is intimately related to the mining industry. If it's not animal or vegetable – it's mineral.

So, when campaigners call for radical change – like the elimination of the coal industry - they are also, by extension, calling for radical changes to the way we live our lives and how we define the quality of those lives. That's a legitimate debate – but it has taken until the interim report of Ross Garnaut , to make this transparent in the public domain.

Billed as Australia's own version of the Stern Review, Professor Garnaut's report was commissioned to examine the impacts of climate change on the Australian

economy, and recommend policies and frameworks to improve the prospects for sustainable prosperity.

Garnaut outlines a transition period involving economic pain; with Australians on low incomes being seriously affected. In an important development in the debate, we are now actively discussing the costs of action: both on consumers and on business.

To put the size of the task into sharp relief, to achieve a 20% cut in emissions by 2020 would actually require a 38% drop given Australia's rate of economic growth which is currently running at 5 times the rate of the EU. Ladies and gentlemen, I stand before you as an advocate of action, but we should not kid ourselves that it will be without pain.

In my view, we must have severe reservations about the "either or" model espoused by the extremist element which pits environment against development. As Sir Nicholas Stern has said: "the world does not need to choose between averting climate change and promoting growth and development".

Now cynics claim that the coal industry has a vested interest in "cleaning up its act". Of course we have a vested interest: there's not an individual, organization or movement in the world that lacks vested interest. But the vested interest of the mining industry would not be served by standing still, living in denial, hoping problems will go away. In vested interest terms, that would be commercial suicide; and it would also be totally contrary to the precepts of sustainability against which the mining industry, through Enduring Value and its day-to-day operations, has been demonstrably delivering for many, many years.

An industry or sector can only be sustainable if the economic, environmental and social dimensions are all evaluated in any given decision equation. And it is an equation ladies and gentlemen; it is not a case of "either or".

This is an industry – perhaps because populated by so many engineers and mine workers whose job it is to keep modern society functioning - of realists and problem solvers which, without resting on its laurels, should be immensely proud of its leadership role in respect of the response to climate change. And to reiterate, climate change mitigation requires a suite of solutions which will take time and money. From a public policy point of view I suppose it's a pity that a mix of solutions is needed because "mix" lacks the sexiness of a quick fix.

International experts clearly state, however, that low emission *coal* technology, will definitely be part of that mix. As Stern states, even after deep emission cuts, fossil fuels will still account for 55% of global energy supply and "extensive carbon capture and storage would allow this continued use of fossil fuels without damage to the atmosphere……CCS is essential to maintain the role of coal in providing secure and reliable energy for many economies."

The extremist campaigners conveniently ignore these realities. And that's a problem because investment in low emission technologies for coal and other fossil fuels represents one of the best opportunities to achieve the deep emissions cuts the IPCC has indicated are necessary. Over time it will also create an important new export industry for Australia.

The industry estimates that a range of low emission coal technologies will be ready for commercialization by 2017. These will be the workhorse CO2 strippers of our children's generation.

But given those lead times, there are things which can and should be being done right now: picking of the metaphorical low hanging fruit. This includes retiring old and inefficient power plants and replacing them with best of breed existing coal technology: stripping millions of tonnes of CO2 from the atmosphere immediately. We also need to radically improve the energy efficiency of equipment and appliances; better manage demand; deploy more renewables and invest in co-generation.

But we also need to give thought to actions beyond the perimeter of power stations. What are we doing about vastly improved land management as a greenhouse gas mitigation strategy?

What are we doing about the combustion engine and better fuel efficiencies in the passenger and commercial air and land transport fleets? The largest car fleet in Australia is owned by governments: would MPs be prepared to eliminate the 6 cylinder car from that fleet?

What are we doing to rectify the consequences of good environmental intentions gone wrong – like the draining of 120,000 km2 of peat swamps in Indonesia for palm oil plantations to replace fossil fuel use which resulted in the release of "*2* billion tonnes of carbon between 1997 and 2006, an amount roughly equal to 8% of annual global emissions from the burning of fossil fuels".

We have to get smarter, we have to build bridges to the major structural solutions of low emission technologies and advanced renewables, and we have to do that in concert with other major emitters (recognizing the justice of their desire for development) if we really are going to play a major role in slowing growth in global greenhouse gas emissions.

Simplism and naiveté don't have a role here. And because mining is an industry which is comprised of many large businesses, it doesn't mean that our detractors should be given automatic standing room in the moral high ground stakes. This debate is not about the moral high ground or mortal sin, it's about what needs to be done about identified problems in proportion to the magnitude of those

problems and the reality of world energy demand and the fuels and practices that underpin it.

I don't know anyone who isn't ***for*** the environment and ***for*** social justice. But there are some people that seem to believe that being ***for*** the environment and ***for*** social justice means you have to be ***anti***-everything else. Personally, I think that approach is just all too easy. What's not easy is to be ***for*** the environment, ***for*** social justice and to deliver real solutions to real challenges. But that, ladies and gentlemen, is exactly what the coal industry, scientists, environmentalists and governments ***are*** doing.

So, ladies and gentlemen, if there is a snake in the Garden of Eden, it's not the coal industry!

ENDS