

Speech to the Inaugural Conference of Australian Members of Parliament
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Distinguished delegates: Oscar Wilde once said “that an idea which isn’t dangerous is hardly worth having”. I hope to live up to Wilde’s maxim in my presentation today. And I will attempt to do that by painting a vivid picture - to tell a story if you like – crossing geographies and spanning the last 30 years.

However, there are two matters which I’d like to be clear about 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 this year, 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, that you are living in cloud fairy land 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.

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, (FN1) is a tough gig. But as political leaders, intimately and increasingly embroiled in the politics and policy of climate change, this unenviable task is yours.

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. There is 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. My presentation today will attempt to map out the journey we've been on and the realities of global energy demand and use, some of the politics and controversies and identify some key climate change solutions.

Proverbially speaking, it's been a long day; so let's put confusion to bed. The term *clean coal* was originally used to describe the technologies developed to reduce sulphur dioxide (SO₂) and nitrogen oxides (NO_x): the principal pollutants that cause acid rain. The term has also been used to describe the premium qualities and preparation methods of coal that Australia, in particular, exports. In recent times, the term has been widely adopted in the media and houses of parliament as a pseudonym for low emission technologies; that is, technologies which reduce greenhouse gas emissions before, during or after combustion in coal-fired power stations.

I'll try to avoid using the term *clean coal* during the rest of this presentation. The definitional heterogeneity **is** confusing. I want to confine the discussion to low and zero emission technologies and their role in turning the threats of climate change around. Having said that, I'm struck by how limited, if not inconceivable, such a discussion of solutions would have been in the 1980s.

What a difference a couple of decades make! In 2007, 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: as recently as 2005, the climate change conversation was mainly 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”. (FN4)

Since September last year, circumstances have arisen placing 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 recent State election in NSW and a looming Federal Election, and the volatile ingredients for our perfect Australian storm have all come together.

But, whilst this is consistent with Gladwell's thesis about the nature of epidemics and tipping points, the journey took a quarter of a century before it made the pole vault. Arguably, the 1st World Climate Conference organised by the World Meteorological Society (WMO) in 1979 was the starting point. This is where Governments were asked to foresee and prevent potential man-made changes in climate that might adversely affect humanity's well-being. It was followed in 1987, by the Brundtland Report - which first coined the term *sustainable development*.

In 1989, three years of Intergovernmental Negotiating Committee discussions commenced, with the first report of the Intergovernmental Panel on Climate Change (IPCC) published in 1990. That report caused a huge stir not only because the science was still so uncertain but because global action of an unprecedented scale was mooted. The fossil fuel producers and major consumers were in shock and denial. "Ah ha", I hear you say. But their questions (and the debate that ensued) forced scientific rigour. Their questions helped to generate funding for scientific research and a substantial upgrade in the tools available to climatologists to model the weather system and the interaction of greenhouse gases with both the atmosphere and with sinks. From uncertain and imprecise beginnings grew a body of evidence that human activity had the potential to generate warming of the earth that could lead to catastrophic changes in climate.

But that body of knowledge – whilst extensive and indeed conclusive today - was embryonic in the early 1990s. This is why the 1992 UN Conference on Environment and Development, known as the Rio Earth Summit, was also so controversial. It was here that the Framework Convention on Climate Change (UNFCCC) was signed - on the basis of the precautionary principle and scientific theory. By 2004, some 124 countries had ratified but there were no legally binding targets - although Annex 1 countries made commitments about stabilizing emissions at 1990 levels.

In 1995, the First Conference of the Parties was launched to negotiate the terms of what ultimately became the Kyoto Protocol. In the same year, the 2nd assessment report of the IPCC was released.

In 1998, 84 countries signed the Kyoto Protocol, the first attempt to secure unanimous global support for greenhouse gas emissions targets. But with a number of major emitters in the developed world deciding not to ratify, and

potentially enormous energy consumers from the developing world specifically exempted, a new circus of blamers and defenders took on centre stage.

In 2001, the IPCC warned that with unabated carbon emissions, global temperatures could rise by as much as 5.8 degrees Celsius by 2100, threatening the lives of millions of people. At the same time, US President George Bush declared that Kyoto was dead. In 2002, Australia followed suit.

In 2005, the Kyoto Protocol came into effect: establishing the first ever international targets and an emissions trading system. But without some of the major greenhouse emitters on board and substantial question marks about the robustness of the trading scheme has come a realization that things will need to be done differently.

The inaugural meeting of the Asia Pacific Partnership (the AP6) in January 2006 aligned Australia with China, Japan, India, South Korea and the USA. AP6 members together account for nearly half the world's emissions, half the world's GDP and almost half its population. Perhaps ironically, AP6 represents a more significant chunk of the world than those which have signed up for binding emissions targets under Kyoto. As I understand it, the principle behind the AP6 framework is flexibility and the tailoring of national climate change responses to specific national circumstances.

Just 4 months later, *An Inconvenient Truth* was launched with enormous international impact. And then in October (2006) Sir Nicholas Stern released his *Review of the Economics of Climate Change*. It concluded that whilst immediate action would cost in the vicinity of 1% of global GDP per annum, it would prevent a potential 20% hit to global GDP in future years if no action were taken.

In December 2006 the Commonwealth government established an emissions trading task force that recently released its report and recommendations for the development of a trading scheme.

It turned out that May 2007 was a big month: China unveiled a new policy to curb emissions, committing to a target of 10% renewable electricity by 2010 and technology exchange with other developing countries. There was talk of the principle of common but differentiated responsibility. However, the Premier Hu Jintao argued that China's development should not be compromised: as it was the rich which created most of the greenhouse emissions, the rich should bear most of the burden reducing them.

Meanwhile in Germany, the G8 Summit agreed to reduce greenhouse emissions but without targets. George Bush announced US plans to develop a new Framework on Climate Change for both developed and developing nations by 2008; Australia announced a Global Initiative on Forests & Climate - committing

\$200 million towards reducing the 20% of greenhouse gas emissions derived from clearing forests worldwide and the Federal ALP launched its climate change policy and announced a low emission technology fund.

And here we are just 2 months later, at this inaugural conference, discussing what has become the great subject of our times - and one with which the general public is now very much engaged. So perhaps it's timely that the position of the Australian coal industry was clearly articulated. Wherever you look in the media, the industry is getting coverage.

This coverage is pretty schizophrenic: a tale of two industries: with mining either the "darling" of the business sections 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 has been 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. It is essential to create a shared international vision of long term goals... (p ix)

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 committing hari kiri: 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.

Practical solutions are exactly what the Australian coal industry sought to generate when it formed Coal21 in 2000 – 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. Earlier this year, the Fund was uncapped and increased to \$1 billion over 10 years.

The Coal21 Fund 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 Mark O'Neill has commented, it would have to rate as the most expensive PR campaign in history. (FN6)

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, government policy or a price signal. The Coal21 initiative – with its sole focus on technology demonstration and ultimately commercialization and widespread adoption - 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, that 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. The FutureGen project in the USA is the largest project of this kind in the world: the aim is zero CO₂ emissions.

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 (CCS), 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.

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.

International Power's \$360m Hazelwood Project in Victoria for example, involves retrofitting of a 1600mw brown coal power station. Brown coal, common not only in Victoria but also in China, India, Indonesia, Russia and Eastern Europe, because a younger coal, has high levels of moisture and a lower calorific content than the black coals of NSW and Queensland. This means that power plant

efficiencies are relatively low: more coal is needed to produce a given amount of electricity; which in turn means that CO₂ emissions are correspondingly higher.

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%. However, this project also involves carbon capture – the first demonstration to come on stream in Australia in early 2008.

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: the largest being the FutureGen project in the US. A plant is being trialled in Japan (which I had the opportunity of visiting a month or so ago) and 2 are being developed in China.

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'être 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 recent 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 - because reasoned debate on issues and policy is vital; it's a motor for continuous improvement and innovation.

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". (FN5) 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 \$xx 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. My concern is with the principle involved in jumping to unjustified conclusions. I want to give you an example of how badly we can get it wrong when we don't apply a reasoned lens.

The UN Environment Program's (UNEP) Executive Director, Achim Steiner has said that changing climate is already pushing people into other people's territory leading to inevitable conflict. (FN7) Steiner points to a UNEP report examining Darfur in the Sudan, where more than 2.5 million people have been displaced and 200,000 killed. The report says the roots of the armed conflict are the drought that swept through Sudan and the Horn of Africa in the 1980's. Since then rainfall has dropped 40%; a result, it is claimed, of global warming.

Whilst the ghastly reality of the impacts of drought and the battle for scarce resources are incontestable, it's a very long bow to surmise that global warming is the original culprit.

As it happens, I was heavily involved in research on African famine in the mid 80's. That research showed that the act of metaphorically unscrambling colonially scrambled eggs accounted for most of the political, social and economic turmoil that has beset large parts of Africa since the 1950s. The Africanists amongst you will know that during the 19th and 20th centuries colonial rulers redrew the map of Africa (and Asia): establishing borders and territories that bore no relationship to

the ethnicity or historical political relationships of people living there. Post colonial African leaders, in the battle for territory or the unseating or installation of minority ruling cliques, were impoverishing their own people on a grand scale in an attempt to resurrect pre-colonial polities. Some 40% of the GDP of Sudan, Ethiopia and Somalia alone was diverted in these years to unproductive military expenditure. Add corruption to resource diversion of this scale and you can start to see how Achim Steiner's 2+2 has totaled a lot more than 4.

F16s, Kalashnikovs, tanks, cluster bombs and land mines don't feed anybody. Hungry people displaced; agricultural pursuits made impossible by virtue of war; no electrification meaning that trees are being felled at astonishing rates – encouraging the vicious cycle of desertification – can all account for sustained drought in societies without the funds to mitigate devastation.(FN8) African famine is a direct result of the worst kind of politics. The idea that it is a consequence of global warming neglects the facts and represents unadulterated myth.

So we need to be very clear about the character of the debate currently raging, the different voices we are hearing and the different connections being made. Not all criticism of coal mining is misguided and not all critics of the coal industry are ill-informed or politically motivated. Essentially, and with some trepidation, I could classify industry critics into three broad churches.

The first church might be described as technically accomplished environmental NGOs; organisations which don't go in for stunts but which are across the issues in all their complexity and which want to see solutions that are practical, global in application and likely to deliver significant positive results. For this group of organisations, differences with the coal industry tend to be ones of degree – particularly around timing of deployment of new technologies, policy emphasis and what the energy balance should look like.

The second church comprises community organisations and individuals focused on the direct impacts of mining. For the majority the issues of concern are local and represent legitimate questions about how to balance the benefits of mining with impacts on those who live proximate to mining activity. Local mines and local communities are best placed to assess the matters to hand: often what is required is more information or information presented in a different format. Mines frequently change the way they do things to accommodate local needs and changing expectations. Across Australia, community engagement of this type is extensive and appropriately so.

The third church – comprising some political aspirants and what I'll describe as campaigning NGOs is extremely noisy but they are a far cry from the powerful change agents represented by the environmental NGOs. I say this quite categorically because they 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.

My point, quite simply, is that the third church has done most, particularly over recent months, to hijack the climate change debate and deflect 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'), the third church 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. In 2005, the US, for example, imported more oil from the Gulf of Guinea than it did from Saudi Arabia and Kuwait combined and within 10 years they'll import more oil from Africa than the entire Middle East.

Putting aside the fact that renewables 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 the third church 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 whom you represent 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 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 isn’t 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. FN9.

More than 70% of that growth will come from non-OECD nations; that is, in the emerging powerhouse economies of China and India. With China having overtaken the USA as the largest CO2 emitter, the scale and pace of its 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? FN10 One thing I think is certain: none of us in this room will see a decline in greenhouse gas emissions in our lifetime.

Furthermore, the IEA estimates that fossil fuels - oil, natural gas and coal - 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; and those minerals generate the electricity that enables us to heat and cool our homes, prepare and preserve our food, run our TVs, PCs, stereos and produce the steel, copper wire, alloys and microchips, amongst millions of other products, to construct and operate them.

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 hasn't been made transparent in the public domain and it is perhaps timely that it was. In my view, and I am not alone in this, we must have severe reservations about the “either or” model espoused by the third church 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 and that this mix lacks the sexiness of a quick fix.

International experts clearly state, however, that low emission, or *clean 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.” FN11

The third church conveniently ignores 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 2020. 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 - which don’t contain many voters after all. What are we doing in the domains where every voter will be palpably touched? What are we doing about vastly improved land management as a greenhouse gas mitigation strategy? What are we doing in Australia about deforestation and rice paddy agriculture? 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: as MPs would you 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 for palm oil plantations to replace fossil fuel use which has resulted in the release of “2 billion tonnes of carbon between 1997 and last year, an amount roughly equal to 8% of annual global emissions from the burning of fossil fuels...If emissions from peat swamps were factored into calculations of national greenhouse gas emissions, Indonesia would jump from 21st place to 3rd” .(FN12)

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, 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. If there is a snake in the Garden of Eden, it's not the coal industry!