

Hans Landsberg Memorial Lecture – Resources for the Future

Washington DC - Wednesday 9 February 2005

## **ADAPTING TO A CHANGING CLIMATE**

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### *Slide – Cover Slide*

Good afternoon ladies and gentlemen. It's a real pleasure and distinct honor to be able to speak at Resources for the Future today. And it is truly a special privilege to have the members of Hans Landsberg's family here with us.

As I was thinking about what I might say to you today I was reminded of a story about Alexander the Great. At the Battle of Issus in 333 BC the massed forces of King Darius of Persia had trapped Alexander's army against the sea. Darius had the advantage of surprise, having outmaneuvered Alexander prior to the battle, intercepting his supply lines and surrounding him on the north, east and south. The Persians had vastly superior numbers, more advanced technology, and all of the advantages associated with fighting on their home turf. Alexander listened to his generals' concerns about their predicament. They had to go on the offensive or they would surely be crushed.

But should the cavalry or infantry lead the charge? Should they attack across the river in the shallows where crossing would be easiest but Darius's forces the strongest, or risk the deep waters and steep banks to attack their flanks? Even more importantly, **when** should they begin the attack? Should they cross under cover of darkness, or wait until morning when they could see the Persian troop formations more clearly?

Alexander listened to his generals' concerns but acted decisively. He issued orders for an immediate attack, mounted his horse, Bucephalus, and led a charge across the river into the heart of Darius's forces.

The Pinarus River is said to have flowed red with blood, but in less than one hour Darius's army had been routed. Historians of the day say Alexander lost 450 men against Persian losses said to total in the tens of thousands. Alexander had secured one of the most famous victories in the history of warfare.

After the battle the generals asked Alexander how he had decided when to begin the battle. He replied, "We could never gain the advantage staying where we were. The most important thing was simply to begin." Or as we say in London "let's just get on with it."

This story sums up the message I'd like to get across today about climate change. The obstacles may seem insurmountable. Our information is imperfect. We will probably make mistakes along the way. There is no assurance of success. The generals are offering conflicting advice. But the most important thing is simply to begin. So let me do just that.

Today I will address three basic questions. First, who is Rio Tinto and why should it take action to adapt and respond to climate change? Second, what are the critical government policy considerations we think are important in creating a climate for action. And third what is Rio Tinto doing to just get on with it?

***Slide – Rio Tinto – A Leader in Safety - graph***

One of the things that characterizes Rio Tinto is excellent safety performance. As you can see from this graph, we perform significantly better than our peers. But our aim is to eliminate all injuries from the workplace, so we still have much work to do.

***Slide – Rio Tinto – A Leader in Safety - people***

One approach we use to ingrain safe behaviors into the collective psyche of the company is to begin all meetings and presentations with a safety discussion. Perhaps King Darius should have considered this approach twenty three hundred years ago.

You may or may not be surprised to find that vehicles and driving is by far the most dangerous activity across all of Rio Tinto's sites in every part of the world. Yes, this does include the large mining trucks that can haul 360 tons in a single load, but mostly it means light vehicle accidents on paved roads – just the conditions you and I encounter every day.

The other interesting fact about injuries at Rio Tinto is that the root cause of over 95 percent of the injuries are the result not of unsafe conditions but of unsafe behaviors – in other words, poor decision-making. Our employees are very good at recognizing and judging hazards in the workplace, but they are almost universally poor at judging the probabilities – probabilities that bad things will happen to them.

So to lower our injury rates toward zero we've found it's much more effective to focus on the possible consequences of an activity rather than the likelihood it will happen. I think these same lessons apply outside the work place, so my safety tip to you is this:

First, driving is by far the most dangerous thing you will do. And second, if you are like our employees you will be far more effective in preventing injuries by staying aware of the consequences of an accident rather than debating the likelihood of occurrence.

Perhaps this advice could apply to climate change as well....

***Slide – Rio Tinto – A Leader in Resource Development***

Aside from safety another characteristic of Rio Tinto is that we are a leader in providing resources for the world. Our strategy is to invest in large, long life and cost competitive mines driven by the quality of the opportunity, not the choice of commodity. We produce metals and minerals as diverse as coal, diamonds, copper, and salt.

***Slide – Rio Tinto – A Leader in resource development - locations***

We have 80 mining and mineral processing operations in North and South America, Australia, Asia, Europe and southern Africa.

***Slide – Rio Tinto assets by region***

We operate 17 billion dollars of assets of which 20 percent are right here in the USA. You may be familiar with some of our US-based businesses – US Borax in California, Kennecott Energy in Wyoming, Kennecott Copper in Utah, and Kennecott Minerals in Alaska.

***Slide – Market capitalization of major miners***

Rio Tinto employs 38,000 people and has a market capitalization of nearly 45 billion dollars, making it the second largest mining company in the world.

***Slide – Rio Tinto shareholders***

Although Rio Tinto has historically been considered an Anglo-Australian company, the proportion of US shareholders has grown steadily over the past few years, with more than one in five shareholders now located here, coincidentally matching our asset base.

***Slide – Market/product diversity***

We supply products to customers around the world, and our diversity of markets and products cushions the effects of commodity price cycles and local economic cycles.

***Slide – Rio Tinto – a leader in sustainable development***

Rio Tinto's strategic view is long term because our fundamental mining assets are long-term.

Without access to new resources, our business slowly dies, so it is critically important for us to be welcome in those regions and local communities where resources can be found.

To help ensure future access, Rio Tinto has been a leader in demonstrating the contribution that a mining company can make to society's move towards sustainable development.

Rio Tinto worked through the World Business Council for Sustainable Development and the International Institute for Environment and Development to undertake the Mining, Minerals and Sustainable Development or MMSD project.

The outcome of this project, a report entitled 'Breaking New Ground', documents the multi-stakeholder process showing the way forward for the mining industry to increase its contribution to sustainable development.

Nothing of this nature or scale has ever been attempted in any other major industrial sector.

Rio Tinto contributes to sustainable development by helping to satisfy economic, social, and environmental global and community needs and aspirations.

Our commitment to addressing climate change is an inherent and expanding component of our sustainable development program.

Let me turn now to why climate change is an important issue for Rio Tinto.

***Slide – Energy intensity of Rio Tinto products***

As I mentioned earlier, Rio Tinto produces a wide array of products, many of which are essential ingredients in creating solutions to excessive carbon dioxide emissions.

This graph shows the energy intensity of some of our products. If you assume for a moment that energy intensity is related to greenhouse gas emissions intensity, you see that the climate challenge for Rio Tinto's operating units is quite diverse.

***Slide – Rio Tinto's Emissions Profile***

This graph illustrates Rio Tinto's emissions profile.

In 2003 Rio Tinto businesses emitted 13 million tonnes of carbon dioxide equivalent. Consumption of electricity in our processes produced another 12 million tonnes.

Together with emissions from transport of our products, Rio Tinto's emissions were about 30 million tonnes of carbon dioxide equivalent.

However, when our customers burn the coal we produce or convert the iron ore we mine into steel, they emit 5-10 times as much greenhouse gas as Rio Tinto.

I believe that our approach to climate change must recognize - and any solution must address - these emissions, and that we must partner with our customers to find solutions.

Let me now focus on just one of our commodities, one near and dear to my heart – coal.

***Slide – Coal, then ...***

Many people believe that coal is a fuel of the past, and that we have moved on to more modern, cleaner sources of energy.

***Slide – Coal, then and now***

The reality is quite different, as eventually recognized by publications like the Economist.

Coal use has increased every year for centuries, and energy experts will tell you that, although its proportional contribution to world energy demand may diminish, its actual use is likely to continue to increase for the foreseeable future.

There are a number of fundamental reasons for this, but the three most important are security of supply, availability, and affordability.

The world used about 5 billion tons of coal in 2004. Of that total the US used about one billion tons. But China has overtaken the US as the world's coal giant. In 2004 alone China increased its production of coal by nearly 250 million tons, bringing its total coal use for last year to almost 2 billion tons – two of every five tons used in the world.

On a simplistic level you might say the answer to coal's carbon dioxide emissions is simply to stop burning the coal. But energy is an essential component of societal economic development and the alleviation of poverty. Developing countries like China and India are justifiably seeking the same quality of life that we in the developed world enjoy. To do this, they will vastly increase their energy consumption in the coming decades.

### **Slide – The Role of Coal**

The importance of coal as a future energy source is illustrated by this graph. Coal fuels 90 percent of China's, 70 percent of India's, and 50 percent of America's electricity demand, and for good reason. Proven coal reserves are vast in these countries, so coal is affordable. Coal also provides short term and long-term energy security.

The physical properties of coal mean it can be stockpiled to ensure continued availability, and unlike natural gas multiple distribution networks reduce the likelihood of disruptions. Coal also provides long-term energy security by enabling individual countries to limit or avoid reliance on critical energy supplies imported from other countries.

While this current and expected future provision of energy based predominantly on hydrocarbons meets social and economic needs it does not meet all environmental needs. There is no simple solution to this problem. Renewables alone cannot yet meet society's needs for affordable, available and secure energy, particularly in developing countries. And nuclear power, although enjoying a Renaissance in some countries, will always struggle with security around a complex fuel cycle.

### ***Slide – World Primary Energy Demand***

The International Energy Agency forecasts that by the year 2030 world energy use will increase by 66 percent. Fossil fuels will remain the primary sources of energy and will meet more than 90 percent of this increase in demand.

Rather than seeing the future only as a series of threats, Rio Tinto sees opportunities for our business to provide long-term sustainable energy sources, enabling developed and developing countries alike to meet their energy needs economically and without harming the environment.

But there are no quick fixes. These developments will take 20 to 50 years not only because it will take that long for government policies to come to grips with the issue, but also because of the long capital cycles inherent in the energy industry.

But I am certainly not advocating a go-slow approach.

***Slide – Long term problem***

It is critical to act now precisely **because** these developments will take time.

Stabilizing concentrations of greenhouse gases in the atmosphere will require fundamental changes in energy system worldwide.

Improved technology options can both reduce the amount of energy needed to produce a unit of economic output and at the same time lower the carbon emissions per unit of energy used.

Successful development and deployment of new technologies, and improvement in existing technologies, can significantly reduce the cost of achieving any particular concentration target.

However, the current rate of public investment in energy R&D is not sufficient to achieve even the baseline technology improvements projected in current global change scenarios.

***Slide – Rio Tinto’s Climate Change Program (1)***

I will turn now to Rio Tinto’s view of climate change.

***Slide – Rio Tinto’s Climate Change Program (2)***

Rio Tinto believes that emissions of greenhouse gases resulting from human activities are contributing to climate change.

We believe that avoiding these human caused changes to the climate is an important international goal.

And we believe that to achieve this goal the world needs deep cuts in emissions of greenhouse gases.

Rio Tinto’s climate change program focuses on action in three key areas:

***Slide – Rio Tinto’s Climate Change Program (3)***

- Building support for government action

***Slide – Rio Tinto’s Climate Change Program (4)***

- Developing low emission pathways for our products, and

***Slide – Rio Tinto’s Climate Change Program (5)***

- Taking a proactive stance at our operations to reduce emissions

Let me explain.

***Slide - Building support for government action (1)***

Governments around the world have already started taking action to address greenhouse gas emissions.

The UK has had an emissions trading scheme in operation for 2 years now and the European Emissions Trading Scheme started just last month.

Many countries have levies or obligations to increase investment in renewable energy.

Here in the US, there is a strong focus on technology development with the billion dollar Futuregen project as well as a number of state based initiatives.

While many of these initiatives are effective and worthwhile, the risk is that a variety of ad hoc policies can be inefficient and costly, and the policies can even work against one another.

The best opportunity for achieving effective, efficient and equitable government policy is through constructive stakeholder engagement, a process we’re quite familiar with as a result of the MMSD project I mentioned earlier.

Rio Tinto is engaging with a variety of stakeholders – local communities, customers, suppliers, NGOs, shareholders, and governments - to improve our understanding of climate change and build coalitions for action.

***Slide - Building support for government action (2)***

- We want to encourage leadership from developed economies while enabling all countries to contribute to effective management of GHG emissions.

***Slide - Building support for government action (3)***

- We want governments to set credible limits for future emissions that recognize the scale and long-term nature of the climate change challenge.

***Slide - Building support for government action (4)***

- We support technology development and deployment to change the way we use energy, and we urge governments to do likewise.

***Slide - Building support for government action (5)***

- Governments should utilize broad-based market mechanisms that increase flexibility and reduce the cost of abating GHG emissions.

As a tool to achieve a specific emissions reduction target, we prefer emissions trading over carbon taxes or inflexible on-site reduction requirements.

***Slide - Developing low emission pathways for our products (1)***

Rio Tinto is committed to helping develop low greenhouse gas emissions pathways that will allow our products to continue to meet the needs of society.

Our businesses are contributing to this goal now. Let me give you a few examples:

***Slide - Developing low emission pathways for our products (2)***

Kennecott Energy and our other coal businesses are working to accelerate development and deployment of near “zero emissions” power generation and hydrogen production from coal.

Rio Tinto participates in other research projects to find ways to reduce and perhaps eventually eliminate the emission of greenhouse gases when producing electricity from coal.

These initiatives range from improving the performance of existing boilers, to promoting the adoption of more efficient, advanced boiler designs, to coal gasification and, eventually, to carbon capture and sequestration.

Among fossil fuels, coal has unique advantages that would facilitate such technology.

Kennecott is one of ten private sector parties who have volunteered to participate in the Futuregen project, a pledge of 20 million dollars.

Our company Borax operates the Boron mine in the Mojave Desert.

***Slide - Developing low emission pathways for our products (3)***

Borates are key ingredients for insulation fiberglass.

Fiberglass greatly improves energy efficiency thereby saving gas and electricity and reducing greenhouse gas emissions.

***Slide - Developing low emission pathways for our products (4)***

The aluminum we produce can be used to provide lightweight transportation components that make cars, buses and planes lighter so they use less fuel.

***Slide - Developing low emission pathways for our products (5)***

Our iron ore business in Australia is developing a more efficient process called HIsmelt for making steel from iron ore.

This process produces 20 percent less greenhouse gas emissions than traditional blast furnaces.

***Slide - Developing low emission pathways for our products (6)***

And within my own energy product group we produce uranium fuel for low carbon emission nuclear power.

Of course the most direct and demonstrable route we can take to cutting greenhouse gas emissions is to look to our own operations.

**Slide - Taking a proactive stance at our operations to reduce GHG emissions**

Rio Tinto is taking a proactive, pragmatic, and transparent approach to achieve greenhouse gas emissions reductions from our operations. We have constructed carbon abatement cost curves for all of our major operations so we know where we can get the biggest bang for the buck. We've set progressive targets to reduce greenhouse gas emissions intensity. For example, in 2003 we set a public 5-year target to improve energy efficiency by 5 percent per unit of production and to reduce greenhouse gas emissions by 4 percent per unit of production.

These targets may not seem very ambitious to some of you, so I should explain how challenging they are to our business units. Our operations always strive to be world class and many were at or near world's best practice in emissions management before the advent of these targets. For example, many of our businesses are energy intensive so we have been focusing on energy efficiency for a long time.

By their very nature, as open cut mines age they require the removal of more and more overburden to expose each ton of ore, and many of our mines have been operating for many decades. They are also constrained by the theoretical limits of metallurgical or electrolytic processes. To make deep cuts in greenhouse emissions we need technology breakthroughs to find new ways of making our products to supplement the efficiency improvements we have already realized in the old processes.

To find the technology breakthroughs we are undertaking and encouraging research and development projects designed to reduce GHG emissions. For example, our aluminum group is working on a new type of production cell that can reduce energy use by 20 percent. And while our actions are predominantly focused on reducing greenhouse gas emissions, we acknowledge that the world will not be able to reduce emissions quickly enough to stop any climate change from occurring.

So as part of our normal planning and risk management processes, we consider the physical impacts of a changing climate and we have contingency plans in place to adapt to changing weather patterns.

Even though there is much uncertainty around a future price of CO2 emission, we already use a notional price of greenhouse gas emissions in our financial evaluations of major projects and investments.

Let me summarize my key messages to you today

***Slide – KEC Operations photo***

Rio Tinto prides itself on being a leading resources company that practices good social and environmental responsibility starting with the safety of our employees, our contractors, and their families.

Our commitment to addressing climate change is an inherent part of our sustainable development program, which seeks to satisfy economic, social and environmental needs.

***Slide – ERA Operations photo***

Affordable energy is an essential component of societal economic development and the alleviation of poverty, and all primary sources of energy will need to grow to meet societal demands for better standards of living.

Coal will remain pivotal in providing the developed world and developing countries like China and India with a long term, secure, reliable and affordable energy supply.

***Slide – RTCA Operations photo***

To improve the sustainability of this energy option, we need to apply technology to improve the efficiency of coal-fired plants and speed the development of new electricity generation processes.

To change the trajectory of our future global emissions, we need more investment in these key technologies now.

***Slide – Rossing Operations photo***

Governments have a lead role to play in developing policies

- That encourage and enable all countries to contribute to emission reduction
- That set credible future emission limits
- That facilitate technology development and
- That utilize broad based market mechanisms to minimize the cost of emissions abatement

Rio Tinto is reducing greenhouse gas emissions from our own operations, developing products that contribute to global emissions reductions, and working with our customers to find ways to improve energy efficiency and reduce greenhouse gas emissions.

I'll leave you now with two alternative visions of our future

***Slide – flood photo***

Will this be the city of tomorrow?

***Slide – zero emission city of the future***

Or will this? In this version of the future, fossil fuels remain a primary energy source but harmful emissions have been eliminated.

In conclusion, Rio Tinto's modest contribution to the climate change debate and our actions to date cannot really compare with Alexander's crossing of the Pinarus River, and we certainly cannot hope to succeed as quickly and decisively as Alexander, but at least we've decided to get our feet wet.

Now I'd be happy to take few questions.