WATERING AUSTRALIA

AN ADDRESS BY PATRICK NEEDHAM TO THE PROBUS CLUB OF GOLD COAST CENTRAL ON THURSDAY 19 OCTOBER 2006

Good morning gentlemen – thank you for the opportunity to speak to you on a subject that has become very dear to my heart over recent years – how we can best use the most important thing we have after the air we breathe – **water**.

I have heard it said that Australia is the driest continent on the planet but I do not know the criteria which gives rise to such a statement. It would be hard to find a drier place than the Sahara desert in Africa but of course there are some pretty dense rain forests over there also. We have deserts in Australia like the Simpson Desert and the Tanami desert in the northern Territory and The Great Sandy Desert and the Gibson Desert in Western Australia. Against that there are areas in some parts of the country which experience monsoonal rains practically every year.

I think a more appropriate description would be to say that the huge amount of water we have in Australia happens to be in the wrong place.

I was fortunate to have been in the Kimberley region of Western Australia a little time ago and saw for the first time the expanse of water known as Lake Argyle.

This man made lake is Australia's largest body of fresh water. This magnificent lake is located 70 kilometres to the south of Kununurra and is part of the Ord River irrigation system.

May I digress for a moment and give a brief history of Lake Argyle. The first serious attempt to determine the potential of this part of the continent was made by the explorer Alexander Forrest in 1870, following previous exploration in the area by William Dampier in 1699, Lt. Philip King in 1819 and then George Gray in 1837 and 1840.

Forrest's glowing report of approximately 10 million hectares of fertile land created great interest, especially amongst eastern cattlemen, who were at that time constantly seeking new watered pastures on which to settle. Their treks, sometimes amounting to journeys of up to 5,600 kilometres across the trackless north with vast mobs of cattle, have become epics of Australian history.

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Foremost among these were the Duracks, Buchanans and Osmonds who took up to 3.5 years to complete their journeys, and who suffered extreme hardship to reach this land and lay the foundations of what were to become the cattle empires of the Kimberley. I met Michael Durack, one of the descendants of that pioneer family the other day when I was in Western Australia.

The damming of the Ord River was first contemplated in 1939 but work did not commence until some 20 years later with the building of the Diversion Dam and the township of Kununurra some 106 kilometres southeast of the port of Wyndham.

In 1941, the Western Australian government established a small experimental farm on the banks of the Ord River while its engineers investigated possible dam sites upstream. In 1945, the farm was abandoned and the Kimberley research station was established on Ivanhoe plain, part of the 15,000 hectares now irrigated from the Diversion Dam.

Further development of the area has been carried out in three stages.

The Diversion Dam is in fact regarded as stage one, for in 1958 the W.A. government was convinced of the viability of an irrigation scheme in the Ord. The Federal Government agreed to share the cost of stage one and this was completed in 1963 at a cost of $20 million. By 1966 31 farms had been allotted. The irrigation project suffered initial setbacks, principally from not growing the right crops. I have been told that the likes of cotton and rice were not suitable, principally because they were not able to control the various BUGS and BIRDS which did untold damage. The huge variety of crops which are now being grown are extremely successful and include sugar, mangoes – 120,000 trees – various types of melons and sandalwood to name but a few.

The second stage saw the construction of the Ord dam which provides a major storage reservoir that is called Lake Argyle. It cost a total of $22 million and was officially opened in 1972. As a part of stage two a further 200 hectares were allocated on the Packsaddle Plain and 5 farms were released in 1974.

Stage three saw a step away from irrigation with the development of the hydro-electric power station. Aside from providing a reliable source of power to the region, the scheme has had a positive effect on tourism. It is the only commercial hydro power station in W.A., replacing fossil fuels previously used to generate power. The hydro station harnesses a resource that would otherwise go to waste, which is environmentally a far better option. The power station was designed using 4 turbines and two mega-watt generators to produce more than 220 gigawatt hours of electricity per annum. Hydro-electric power from the dam commenced operations in April 1996, producing electricity for the towns of Kununurra and Wyndham and 80% of the electricity needs of the Argyle Diamond Mine.

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The dam which produced the lake was built over three years between 1969 and 1971. With an endless supply of rocks in the region the engineers were able to use these rocks on the outside of the walls with compacted clay in the centre. There is no concrete used in the construction. The base of the dam is about 100 metres wide and about 90 metres high. At normal storage levels the lake could fill Sydney Harbour 20 times. At flood time storage capacity covers over 2,000 square kilometres which would fill Sydney Harbour nearly 70 times.

The catchment area for Lake Argyle covers an area of over 46,000 square kilometres. The average catchment rainfall in the area is approximately 550 mm per annum. From records that I have been able to examine, the lowest rainfall in any one year have been just under 353 mm, while the highest has been 1,570 mm. The main point to note is that substantial rainfalls occur almost without exception in the months of December, January, February and March so that after each wet season the dam is filled to capacity, assuring a permanent supply of fresh water. Since 1985, no rain has been recorded in the month of August.

The water which drives the turbines in the power station goes out into the Ord River then into the Diversion Dam where that required for irrigation , approximately 10%, is taken. The balance flows on down the river eventually into the Timor Sea.

Our guide on the boat trip down the Ord River told us that at this time of the year some 45 tonnes of water per second goes through the power station. Let's put that figure into numbers which might mean something. 45 tonnes equals 45,000 litres. In real time that is 2.7 million litres per minute, 162 megalitres per hour or 3,888 megalitres a day. 1 megalitre equals 1 million litres and 1 gigalitre equals 1000 megalitres. At the height of the water in the wet season, the 45 tonnes a second goes up to something like 70 tonnes which is a huge amount of water

If all of that water could be captured it would take 1 hour and 6 minutes to put back into the Hinze Dam the average daily water usage for the Gold Coast .

I said earlier that I am of the view that we have plenty of water in this country, it just happens to be in the wrong places. What then do we do? To me the answer is simple – its implementation perhaps is not so simple but problems do arise and the human being has been endowed with the intellect to solve them. What is wrong with a pipeline from the Kimberley region to south western Queensland? Let's look at some figures.

One meter, of a one and a half meter pipe, will hold 1,768 litres. A kilometre would hold 1.768 million litres – i.e. 1.768 megalitres. The distance from Lake Kununurra to the Warrego River near Charleville is approximately 2,500 kilometres so it would take 4,420 megalitres to fill the pipeline. On these numbers, if 60% of the water released from the Lake Argyle could be captured the pipeline would be filled in 2 days.

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Now I do not accept for one moment that all the excess water from Lake Argyle can be captured for insertion into a pipeline, but the fact remains that the water is there and it is running into the Timor Sea.

There are any number of questions which arise from the comments which I have just made. First of all why did I suggest we terminate the pipeline in the Warrego River near Charleville? As you know the Warrego and the Culgoa come together just below Bourke in NSW and form the Darling River, which joins the Murray River at Wentworth in southern New South Wales and eventually enters Lake Alexandrina in South Australia. For sure, it would take some time for the water from Lake Argyle to be running through South Australia but just think of what will happen as it makes its way through that part of the continent. The Darling River will be rejuvenated, the Menindee Lakes will have a permanent supply of water for the vast irrigation areas which are now struggling, and the river which is dying, will come to life again.

The economic benefits to New South Wales are almost mind boggling. In all probability there could also be substantial benefits to both Victoria and South Australia. Some time ago I read where Lake Alexandrina was silting up. A new source of water reaching that area on a regular basis could improve the situation.

The big question which I am sure is on your mind is "what will a project like this cost, who will pay for it and who will pay for the water that runs through it?"

I am not in a position to even attempt to answer the first part of that question. The Snowy Mountains Scheme built in the 50's was perhaps the biggest engineering project we have seen here in Australia and if my memory serves me correctly it cost then something like 20 million pounds. I am frightened to think what that figure would be in to-day's dollars. I can however tell you something of another major pipeline about half the distance I mentioned earlier but which traversed a much more difficult route. I am referring to the trans Alaskan crude oil pipeline – one of the largest pipeline systems in the world. Its design and construction is considered to be one of the most difficult engineering feats of our time.

The pipeline carries crude oil from Prudhoe Bay in the Arctic region of Alaska over 800 miles (nearly 1,300 kilometres) of rugged Alaskan Mountains, rivers and harsh terrain to Valdez – the northern most ice-free port in North America. The pipeline is buried for 380 miles while the balance is supported by 78,000 vertical support members or VSMs for short, placed at 60 feet intervals and which are embedded at depths of from 15 feet to 60 feet. The VSMs are necessary for two reasons. Firstly the crude oil is heated to a temperature of between 32 degrees Celsius and 49 degrees Celsius. Temperatures at this level would melt the permafrost, cause the ground to be unstable and be environmentally devastating. Secondly a pipeline on the ground – it is 4 feet in diameter – would be a barrier to the migration of the wild life in that country. We are taking about moose, caribou, grizzly bear, Doll sheep, fox, ptarmigan, wolf, polar bear, parka squirrel, .../5

wolverines, marmors and musk oxen. I have seen that pipeline and walked under it – it is about five feet off the ground.

The pipeline crosses three mountain ranges. The highest elevation is 4,739 feet where the wind chill factor caused the temperatures to drop to below minus 100 degrees F or nearly 38 degrees C - I repeat 38 degrees below freezing - and where 40 feet of snow can accumulate in winter. A number of rivers had to be crossed necessitating the construction of 13 bridges, the longest of which is 2,295 feet long over the Yukon River.

The first pipe on this project was laid on 27 March 1975 and the final weld was made on 23 May 1977. The first oil flowed on 20 June 1977. You can see that the job was completed in just over two years at a total cost of approximately US$8 billion. While this pipeline is about half the length of the line from Kununurra to Charleville, the terrain over which the line would traverse in this country is nothing like that in Alaska nor are the conditions which would be encountered. These factors would have had a major impact on the total cost of the project.

At the time I was in Alaska, there were 13 pump stations in operation to keep the 1.7 million barrels of crude oil moving through the pipe each day. I am sure there would be more than 13 pump stations required to push the water from Kununurra to Charleville; however there is boundless sunshine along the route I have talked about so I see no reason why we could not use solar power to drive whatever number of pumps are needed. Stand-by pumps driven by diesel or the likes would be necessary.

I have included these figures in an effort to give you some idea of what the construction costs might be. The only thing that I believe would be common to both projects is that the costs would be billions. However the construction cost in itself should not be a deterrent. What I consider to be more important is the cost to the nation if it is not done.

As far as the cost of the water is concerned let's look outside the square and take another approach. I believe the last Federal Budget showed that the GST collected in the last year was of the order of $37 billion which under current legislation is distributed amongst the states, virtually at the discretion of the Federal Government. Now as all states except Western Australia will benefit from the proposed pipeline, why not allocate the first X% of GST to W.A. as the purchase price for the water. If X were to be set at 2%, instead of distributing $37 billion amongst the states, we would see something like $36.26 billion being distributed. Consider also that the more prosperous the eastern states become, the greater the return to W.A.

What the eastern states do with the water they get from the scheme will be determined by the respective state governments.

Nearly every year we are bombarded with the authorities telling us how much the drought is costing the country. Could we make a large slice of the country drought proof? I believe we can. No mention has been made of compensation to land owners through whose properties the pipeline would travel. Instead of a cash compensation, consider building

dams on such properties and filling them a couple of times each year with the water as it flows by for growing/irrigating fodder such as lucerne.

Some years ago I had a trip to Broken Hill and saw at first hand a property known as Tandou where some 15,000 hectares have been laser levelled and a range of crops, including cotton, are grown with flood irrigation. Water is syphoned from the Darling River and Menindee Lakes into irrigation channels from which it is then syphoned onto the crops. No irrigation pipes have to be moved as was the case on my brother's cotton farm at Biloela and afterwards on his lucerne farms in the Brisbane Valley near Esk.

With the exploding populations in Asia, and the economic growth of countries such as China and India, the markets in those countries for fresh produce is massive and growing. I grew up in Central Queensland and have seen what can be grown in the black soil plains in that area when there is an adequate supply of water. With the Adelaide to Darwin train service now in operation, it would not be a difficult task to get fresh produce to the northern capital for prompt deliver to the Asian markets.

In Queensland to-day there is talk of spending millions on new dams and water grids. Besides displacing hundreds, if not thousands of people, and flooding what is now productive land we just hope and pray that in the future rain will fall at the right time to keep the dams filled.

If the Federal Government were to finance the construction of a Kununurra/Charleville water pipeline, the Queensland government, instead of building questionable dams, could construct a pipeline from Charleville to the existing dams in the south east of the state.

The benefits of such an undertaking would not only be a far more reliable supply of water to this region but there is every possibility of generating hydro-electricity. Toowoomba for example is about a thousand feet above sea level so that water flowing through pipes from that height to the coastal areas, would I am sure, be capable of driving turbines, generating electricity at an economical figure and reducing greenhouse gasses. Such a project would be a big plus to the political party that could organise it.

May I sum up these few thoughts by saying such a project has been talked about before. I only hope further discussion will take place and quickly. The more that people talk about it the more chance it has of being implemented. Undoubtedly there are people in this country with intellects far higher that I have demonstrated who could come up with refinements to what I have spoken about. If they have no refinements, then an alternative scheme or why such a scheme cannot be done. I hope they come up with something. If I have done nothing more than to get the population talking about it, then I will have achieved something.

Of one thing I am certain. The political party which initiates a scheme like this and does it before too much more time goes by will be in power for a long, long time. As I see it, the only thing that is delaying a project like this is the will to do it.