

THE POLITICS OF WATER

Chair: Peter Baume – is Chancellor of the Australian National University and Director of Sydney Water. He has been Minister in the portfolios of Aboriginal Affairs, Health and Education and Minister assisting the Minister for National Development and Energy and actively involved on the boards and management committees of many important welfare organisations. He is a physician (Professor of Community Medicine and Head of School, University of NSW 1991-2000) and an Officer in the Order of Australia.

Conversants:

Hans Coster - is the founding director of the UNESCO Centre for Membrane Science and Technology, University of NSW. He has recently been awarded the inaugural Sir Rutherford Robertson medal for biophysics, in particular for his work on the mechanisms of ion transport across mammalian cell and artificial membranes. He has also been elected president of the Australian Institute for Nuclear Science and Engineering.

Denis Hanley - managed Memtec Limited for fourteen years, first as Managing Director and then as Chairman and CEO. He also served as Board member and then Chairman of the IR&D Board; was a member of the Prime Minister's Science & Engineering Council, the Industry & Higher Education Round Table and the Australian Council for the Development of Environmental Opportunity. He is a member of the Order of Australia and was awarded the Clunies Ross medal for his work in commercialising Australian technology.

Peter Baume (PB): It would appear that we don't have many choices yet we are pampered people. We just turn our taps on and out comes the water and it is absolutely ridiculous to me that we hose our lawns and wash our cars with drinking water.

We can perhaps use less, and every one of us should have double flush lavatories and efficient showerheads. We can also collect more. It is ludicrous that every time it rains we lose what comes down from the sky as runoff because most of us don't have rainwater tanks. It is unacceptable that we pump millions of litres out to sea every day. There was an English philosopher named Malthus and every one of his predictions has been disproved but if I want to be Malthusian for a minute, I would say that a continuing unlimited supply of fresh water in the future does not look possible right now. So our two speakers may care to take these factors into account when they tell us what needs to be done.

Hans Coster (HC): Our interests in this discussion largely focus around Australia's looming problems with water but before we get too parochial and consider only our own situation, it is worthwhile to look at the broader picture and the socio-economic problems that can arise in countries such as China.

The problems associated with water are not just due to the fact that you've got to catch it, distribute it and purify it but what you do with it at the other end. A good example of this is to consider the amount of water it takes to produce a tonne of wheat. It is about a thousand tonnes of water and wheat is worth about four hundred dollars a tonne, which immediately gives you an economic perspective. Of course it may not have to be piped anywhere, it might just fall out of the sky as rain, but it is nevertheless water that you are going to consume and which otherwise might have been available for other purposes. As countries industrialise they often need a lot of water and the products that are being manufactured in this way are worth ten or twenty thousand dollars - a great deal more than four hundred dollars a tonne. So the question then arises, if you have a shortage of water and you are trying to industrialise, do you use the water for agriculture or do you use it for high-technology enterprises?

In a rapidly industrialising country like China there is very little water available for agriculture. That may seem like a good thing for Australia in the future because there will be extra markets for our wheat, but it is not good news for other people who are also importing these food products because almost

certainly prices will go up. So there is a dimension to water that is not just related to the amount you drink or put on the land for agriculture, but to the impact of that water use on your society.

In China the problem is quite severe. In the northern provinces where they have been pumping water out of the ground, the water table has been dropping at the rate of one and a half metres per year. Obviously you can't keep on extracting artesian water because it will eventually run out. So, what do you do for water? The amount of water from the sky is more or less fixed; all you can do is use it more efficiently. But how much more efficiently and what are the economics of moving it from one spot to another? If you divert a river, it may serve a purpose somewhere else but how are the people downstream going to feel? This is the bigger picture that I'd like you to think about before I come back to discuss possible solutions and perhaps put it more in an Australian context.

Denis Hanley (DH): One of the things that used to amaze me about water - coming from my business background - was the age of the paradigm for the provision of water to a city. In Roman times, people used to seek out a pristine source of good clean water, transport it in pipes or aqueducts to urban centres then use it. Later, people came up with the good idea that you can also use water to collect the waste from that city and transport it away. In business parlance, the product lifecycle for water delivery is thousands of years old. If you have ever bought a PC or anything with a computer chip in it, you know how rapidly things change - rather like recent technological changes in arithmetic. You and I might be familiar with log tables and slide rulers but most current practitioners don't know what they are.

In competitive business situations, wherever a product lifecycle begins to run out and there is no significant economic benefit left in it, typically you get a technology shift. But water delivery hasn't changed; you can walk into Mogden Farms wastewater plant in London or the Baltimore plant that was built within the last ten years and you won't see very much difference. And so we are stuck with models that cost a couple of million dollars per kilometre of pipeline to build, particularly an underground pipe, and you have thousands of hectares of pristine land set aside just because you want water to fall on it.

I'm not advocating private versus public, I'm just advocating that people analyse what they're doing in terms of the delivery of water. Another point I'd like to plant in your mind is, do we actually 'use' water? Some things are chemically converted and so I suppose there is a small amount of usage. From memory, households in the Sydney region use up to a thousand litres a day, two hundred of which is to carry the waste to the ocean. There's enough water in the ocean, we don't need to put more in it - and that water is not converted, it is exactly the same in chemical terms when it reaches its destination as it was at the beginning. This says to me that the current paradigm for water 'usage' is more about water transportation - from the pristine source to the user and from the user to the deposition of the waste. Therefore the issue is, do you have to transport it? Can you take it close to where you want it, clean it up, use it and put it back again in a pristine form? The answer is 'yes'. Instead of taking that wastewater forty kilometres to the ocean to throw it out, you can introduce a relatively low form of technology and re-use it. Ten years ago my own organisation built a plant in the Hunter region for a large power station. We took domestic wastewater as the source - millions of litres of it - and converted it to boiler feed water to run the turbines. Now human beings are far less picky in terms of water quality than a high-pressure boiler. We talk about '18 mega-ohm resistance' water that is so pure it actually dissolves everything with which it comes into contact.

The point I'd like to make is that if you do get a technology shift, particularly in circumstances where you are not chemically converting the water, you can change the cost-benefit structures. You can use it temporarily and put it back where it came from and that gives you very significant benefits.

A passing comment on water use in Sydney. When it is not raining heavily, it is my understanding that the flow in the Hawkesbury River is basically non-existent because most of that water is being diverted into the town water system. I defer to Hans' comment about China, but I've got friends who live in Adelaide and they don't like what we deliver to them down the river system. So we have to do something about it. The paradigm shifts that have already started on the West Coast of the United States are coming to places like Adelaide. I think we are in a very interesting transition time in terms of water

because if we don't do something different it will become a fundamentally scarce resource. There will be wars fought over water.

PB: It is a very wasteful as you say Denis, to use water as a transport for our waste. We could find new sources of water and you may care to think about desalination. In the Persian Gulf States, where the economics are different, it is worthwhile to desalinate seawater for drinking whereas it would cost us too much. A new housing estate in Rouse Hill, in northwest Sydney is double reticulated; one lot of pipes carries re-used water for gardens, another lot carries drinking water. BHP is now re-using water and a lot of golf courses are using treated wastewater instead of water from our dams. Any comments?

HC: I think you are quite right about the wastage and about where we still have elbowroom. More efficient use is obviously something we can aim for but you do have to remember that there are limits. In cities (that is, non-agricultural use), there is great scope for saving and recycling water in the way that Denis, and the company that Denis led, brought to fruition. You can produce very good quality water and it is only a psychological block about not wanting to drink water that has been taken out of sewage that stops people from drinking it. Certainly it is crazy to purify all of our water, even the water we get from Warragamba Dam, and then to use the majority of that water for flushing toilets and watering gardens. In Sydney, where there is a relatively high rainfall, it is even crazier not to catch rainwater. In fact we create problems by not catching it because every time there is a heavy downpour, the system taking storm water to sea, clogs up. There are problems with the overflow in pipes, with cross communication between sewage and water pipes and we could avoid that by catching the water.

DH: From a slightly different angle, there is – has been for some time – a thought process variously described but probably best recognised as ‘environmental accounting’ which is an attempt to find out what the true cost of something is because the economic calculations for GDP for example, are deficient in that way. Environmental accounting manifests itself in things like the carbon cycle - an instance where we believe it costs us nothing to put rubbish into the sky. The same thing applies to water. We take water from a particular location, move it to somewhere else then degrade it to a lesser quality and throw it back into nature and say, ‘there you go, that’s yours, you fix it’.

People should be responsible for the cost of the degradation. Instead of paying for water per se, you should have to pay either for the degradation or the transportation of the water. If we regulated in such a way that people who extract water to use in a process have to put it back in the same quality and adjacent to where they got it then the true economic cost of processing the water will be understood. It will force people to change their ways. You can go on saying, ‘you should save water’ and some people will. But if there isn't some accounting that says you have to put things back the way you got them, then I don't think we are going to have very sensible discussions about how things should be.

In terms of purification, when people have no water they have to think about it. The West Coast of the United States is a rich place but it has no more water and the people there have interesting but stupid conversations about going to Alaska for water. However what they have done is to take all of their wastewater and develop what they called ‘Water Factory 21’ technology in Orange County. The authorities realised that people would never use sewage water so they process it, make it very pure and then inject it into the ground under Los Angeles. People down the road extract it again from wonderful bounteous nature and use it quite happily.

The process is likely to be repeated in San Diego and other places. It truly is just an emotional issue; we can clean water to any standard and with any degree of assurance you could ever want - even water you can inject into your vein. So technologically, it isn't a problem to fix water before you throw it back into the aquifer, which is what the Americans are now doing. The paradigm is starting to change. People are beginning to start think about closing the cycle and treating it.

The cost for desalination is prohibitive if you are playing around with the ocean. But desalination is simply the removal of salt. Salt concentration in sewage is very low so it is economically feasible to desalinate grey or wastewater to any standard or purpose you want without incurring very significant costs. It is certainly cheaper than building additional pipes and much cheaper than building another dam on the south coast and having eighteen thousand hectares of land set aside, which at the moment is not

factored into your water bill. If we set any sort of economic value for that, the price of water in Sydney would cause you to think very differently about how you use it. It is almost inconceivable to go to the Shoalhaven and take their water and bring it north; we'd probably have a civil war.

HC: I agree with Denis. One other point is that when you are talking about agricultural use, there isn't quite the same opportunity to recycle water. But given that the amount of water is limited, we should recycle where possible so that there is more left over for essential uses where recycling may be difficult.

PB: Denis, could you go a bit further on how you would introduce accounting so that people pay for any degradation of water they use?

DH: During a meeting at the University of NSW, somebody was discussing the valuation of the park across the road from here (the Botanic Gardens), adjacent to the harbour. It is part of state government assets and, as I understood it at the time, valued on the books at two dollars. They were trying to come to grips with how to value an asset in terms of its future cash flow. It seems that people are actually paid to work over there in the Gardens - a negative cash flow - so the people in the meeting were having difficulty figuring out what it was worth.

Another example of this type of environmental accounting, which is closer to waste water management, is the calculation of the cost of outfalls in South Australia, in particular what the value – or the degradation value – would be for the beaches below Adelaide. Of course beaches are basically not valued at anything either. However if you want to buy the land next to them, that is another matter. The authorities came up with a methodology that calculated the number of people who bought bus and train tickets to the beach. This indicated that there was some economic value and that was enough to warn them that they had to be very careful about how they build outfalls.

Your accounting doesn't have to be perfect, nor the 'bus ticket' scenario, but anything that is half reasonable: some number that says, 'if you use it, it costs you X. If you put it back in good condition or in a similar form, you get a credit for whatever you put back'. At the moment, nature is paying and the government in all its munificence is giving it to us to waste. It doesn't matter what the thing is that you calculate – you can be generous in the extreme – it will still initially be enough for people to start changing what they do and then you can gradually refine it.

We have to start thinking about how we are going to fix our water supply problems and some contribution towards this, increasing over time, will cause people to think very differently. At the moment, it is just 'head in the sand' to say that nature is giving us this wonderful gift and we are not causing any problems for anybody. But it is a big paradigm shift to change water provision from being an enabling piece of infrastructure to an economic cost. It is difficult to do if you are the only place on earth doing it, but it is useful to start thinking about the Californian situation and how the cost of reprocessing the wastewater is being built into their overall cost of providing water. I see in a future world a paradigm in which little towns or clusters are built around a small lake or something similar, as the pool from which everybody draws. But people have to put the water back again or pay a fair amount of money to buy those rights from somebody else. You are taking from nature adjacent to your fellow residents so you are borrowing from them or your offspring - however you want to think about it.

PB: Our reluctance to use re-used water in this city is largely emotional and attitudinal and I'd like to ask my two colleagues is, if we want to re-use more of our water what are some of the things we might use it for?

DH: One of the principal concerns with a citywide network for the re-use of water is that if anybody of terrorist persuasion wanted to play havoc with the water system, then it could have a very significant effect across a broad part of the city before anyone really understood what was going on. There have been epidemics in Milwaukee within the last twenty years or so where bacterial infestations got into the water and one third of the people contracted the problem before anyone worked out what was wrong.

Again, monocultural, large structural or integrated activities are fairly old-design paradigms. We really need to work on a cellular basis, to break treatment and quality systems down into small modules. Around Sydney, there are probably a hundred locations where water is stored and pressure is achieved.

If purification happened at the local level, then it wouldn't matter if something were put into the water because you would clean it again within that cell. As we move towards the cellular provision of water, which we should do for safety reasons, sooner or later we will be able to introduce the concept of recycling. We will move towards treating water locally and therefore thinking about it locally rather than bringing more from a dam in some grand interconnected scheme.

PB: Our stormwater is treated locally and we don't do that so well in a many areas of Sydney. Explain that a bit more about that to us.

DH: I don't want to be critical of anybody but for a long time there wasn't much treatment of stormwater in Sydney. Sydney is a very wet city and nearly all the water drains to the coast. More recently people have started applying some technology in collecting it but I think a lot still ends up in the sewage system, which you really don't want because it plays havoc with treatment processes. No one can design plants that work well when your average flow goes from double to fifty times the average dry weather flow during rains. Stormwater has always been a problem, in my estimation the poor cousin of the system, and dealt with by councils in the way that they deal with many things: they are responsible but don't do much. I don't say for a minute that you should break apart the organisational structure but rather just distribute the system under the control of experts a little better.

PB: Hans, do you have comment on water re-use. How we might go about doing it?

HC: To implement it on a large scale is very costly. To have two grades of water – one for drinking and one for other purposes – would mean doubling up on all your pipes and distribution systems. Ultimately it is the way to go but instead of trying to retrofit to an existing system, you are better off going in the direction that Denis has just indicated, where you have more local treatment plants. It is inconceivable that a government would actually fund a process whereby the whole of Sydney's water would be recycled back to Warragamba and then re-purified. It is just too big a project. If you had local treatment plants then you could begin by recycling some of the water and returning it to that local cell.

A cell of course can be large or small and in fact, there is no reason why some industrial concerns can't be closed cells. The industries would use water, clean up their wastewater and re-use it, thus needing only a little water to keep the system in balance. You do need to have some output to get rid of sludge and so on but basically that's only a few percent. It could almost be a closed system and there's no reason why industry cannot operate like that. In the domestic situation, you could begin by using the grey water - your shower and washing machine water, which is easier to clean up than the sewage - and re-cycle that onto the garden. Gradually you should be able to improve on that first step. I agree with Denis that you have to decentralise.

PB: Hans, when you use the word 'retro-fitting', everyone understands that as trying to adapt houses that are already built. It is obviously different if you are substantially renovating a house or building new places. A new housing estate is an ideal place to try out a new system and this is why Rouse Hill was chosen for double reticulation. Leaving aside the question of retrofitting, what might it cost just to treat water that way?

HC: Again, that would depend on what you are going to re-use the water for. If you want to use it for drinking water - and scale comes into this - you'd probably want to treat it with reverse osmosis, in which case you are talking in the order of fifty cents per thousand litres. That might seem high compared to what you're paying at the moment for your water but of course, if you've got a split system where you only use that for drinking and cooking, then it is not very expensive. To recycle shower and washing up water to use on gardens, then all you need to do is some fairly coarse microfiltration. You could almost put it through a sand filter and your cost would drop considerably. Denis would probably be able to comment better on that.

DH: I think a cost of fifty cents a thousand litres is probably not excessive for high quality water from fairly dirty water. It is expensive, but remember that the real cost is already being born and we just don't see it because there's no environmental accounting. There is the massive cost of the current system in terms of land that's set aside for pipes, the dumping of water into the ocean and the

destruction of the Hawkesbury and other systems. If you think that it costs you nothing for water, just look at the developers' accounts for connecting a new development to the city.

People pay two dollars for a quarter of a litre of drinking water brought from France 'mit gaz'. It is ludicrous when you think about that. The quality of water from your tap is equally as good, so the economics are more than capable of being addressed. I would be indicating to people that the cost will rise. You don't have to say it is going up tomorrow but in ten or twenty years we will pay for it.

PB: One thing you may care to know is that there is something called 'Healthy Rivers', which requires us to use some of the water for maintaining flow in certain rivers and there might be a bit of argy-bargy about how much should go to each. Before we open up for discussion and questions from the floor, would Mr Jim Walker, of Sydney Water, wish to make any comments?

Jim Walker (JW): Thank you for the opportunity. You have covered quite a few of the issues we wrestle with. In fact our major challenge at Sydney Water is the sustainability of urban growth and development in our city of four million people. I would like to say that it is not all doom and gloom. When I started at Sydney Water four years ago, I found that the good stories never made it to the six o'clock news on television. For example, up until about 1980, aggregate demand for water in Sydney grew in parallel with population. Since 1980, this aggregate demand flattened out, not only because of things that Sydney Water has done but also because of industrial redevelopment, urban consolidation, different lifestyles, fewer large gardens - all those factors.

We now know a bit more about climate. Our history - our data on weather - is not very old but we know that we cannot continue to extract water from the established storages at the same rate as we have been. We also know that we do have issues of environmental flows in the Hawkesbury-Nepean. There is now some water being released and there is an expert panel trying to come up with a recommendation about how much water should be released on an ongoing basis for the sustainability of the Hawkesbury River. We know it is more than the current rate so we are looking at the amount we could safely take for people and for industry. We also have the problem that the growth of the community - at the net rate of about 70,000 people per annum - now occurs more and more in the Hawkesbury-Nepean draining catchments rather than in those catchments which drain to the ocean. This imposes even greater pressure on the river systems and greater cost on the community to clean up the wastewater.

To put a few facts into the discussion. The cost of water in round numbers is one dollar a kilolitre (or a tonne). The cost, for example, of the Rouse Hill recycled water is about two dollars a tonne. We actually charge people twenty-seven cents per tonne for it because we're doing that project to explore the technology and to establish the necessary processes to prepare for the long term. There is no single technological solution for solving all our problems. We are trying to understand all of the possible solutions and find those best suited to where we are - or will be - in a sustainable position in the future. I would say in summary that the problems people face and the technologies that are of assistance to us are pretty well known and the biggest difficulty is the one we have always had, as our predecessors had and it is well documented, is that we start from where we are. We have a tremendous legacy, some of which is positive and some of which is negative and we have to move towards sustainable solutions.

We try to use environmental accounting as well as conventional accounting on our journey towards sustainability. Last year for the first time, we used a technique called the 'ecological footprint' which was based on work done at university level, to attempt to assess how much land our city (or Sydney Water) uses - if you like the impact of Sydney Water and its services to the community. We found that the factor that extended our ecological footprint was energy because water is heavy stuff and the cost of pumping it up hill and down dale is extremely high and also ecologically quite damaging. So the task of capturing all the water that falls on the coast and transporting that to Western Sydney, let alone over the mountains to the west, is an enormous one.

DH: I was very interested Jim, in your comment that water costs one dollar per thousand litres but that the recycled water costs two dollars per thousand litres. This is the point that I was trying to make, that the environmental cost when you don't recycle is at least one dollar a thousand litres. It doesn't matter

if it is the right number of not, the true issue is that it is not incrementally more expensive to re-cycle, it is just that the other cost if you don't re-cycle, is being borne by the environment.

Questions from the floor

Q: A recent trip to South Africa has given me quite a different way of looking at issues to do with water, particularly the privatisation of water supplies. In Apartheid South Africa, the Blacks did not have clean water and one of the top priorities of the new government was to provide an infrastructure so that people would have access to water. The second biggest item in the South African national budget is paying foreign debt and so one of their solutions is to privatise everything possible including the delivery of water. So while infrastructure is being created to provide water to black townships - and there are now taps and clean water - it has been privatised so you have to pay for it. Water is one silo, health is another and employment is another. Many people are poor and unemployment is high. Imagine a single mother with kids and no support whatsoever; the water is turned off because she can't pay. As a consequence people are now using polluted water sources again and disease is rife. So, how do you cope in a more sophisticated manner with the consequences of the use of water in ways that don't aggravate problems to other parts of society?

DH: The essence of the issue is not the source of capital to do it. I don't think it makes any significant difference whether a private company or the state provides the water – it makes no difference to me. In mathematical terms, there is no straight line to Nirvana but if we only draw one line, the chances of getting it right are fairly low. If you are going to privatise the water supply, there should be some overriding rules that say, 'if you have a development in this location we will have bidders to provide the infrastructure for it', whether they be the pipes or electricity or whatever.

It certainly is not very clever if you save money on the water only to pay for it in the health care system. The problem is that you need to separate the gamekeeper from the poacher. But I don't think it makes sense to take a function performed by government and just privatise it to get the cash for Treasury – with no disrespect to Treasury.

HC: The question of privatisation is a very complex one and you have to divide that process into two parts. One is the purification and delivery of water and even though Sydney Water is doing a good job, there is no reason why this part of the process shouldn't be privatised. Secondly, at the moment our water comes from a catchment area that is very large. It doesn't just fall out of the sky; it has to drop on to something and somebody has to own that. If it goes into the river and is then diverted into a purification plant and delivered through, say, a private organisation, who owns the water in the river? I think there are many social implications in the process - salt levels and soil pollution in the rivers, the ecology downstream and so on - that the government has to oversee. That is something that has to stand aside from the mechanics of delivering and purifying water because it is a big issue that involves the whole community and I don't think that can be privatised.

Q: Although a lot of stormwater goes into the ground, it is flowing over all our development areas and our commercial complexes. You were saying that 'every drop counts', so should moves be made to encourage people who are willing to have water tanks and build sustainable houses?

DH: That's a good point. For a couple of years I lived in a corporate town in Illinois where you could not connect your downpipes to any system. You had to absorb the rainwater on your own land so you either had a boggy garden or you figured out a way to use the water that came off your roof. That wouldn't be hard to do here either. People could put a tank somewhere and certainly take the surge out of it just by fiat; it doesn't have to be complicated. Why is it we want to take the water away anyway? A lot of the roof areas could be used and I dare say other parts of the ground too.

Q: I use about twenty per cent of water for sewerage, about ten percent for drinking and cooking and the rest for washing clothing, the car, the dog, that sort of thing. I can't imagine that I would drink fifty per cent of the water that comes into the house. So if I'm anywhere near the right mark, is it technologically feasible to consider having the existing grid used for grey water as close as possible to the consumer, even to every block of flats or every home, and use the technology to turn grey water or roof water into potable water?

DH: Let me give you the first answer and then probably the right answer will come second. It is absolutely possible to do – and you are right, the numbers are not too far out and it is practical to set up a ‘per house’ system where the individual is responsible for it – but the problem is that there enough people out there who are incompetent enough to kill themselves. You certainly could go to a localised area where a qualified organisation could do it for you.

HC: It would require some additional piping but I agree with Denis. A lot of people do install small inexpensive units in their own house. Nevertheless because the maintenance of those units would need to guarantee that the water is of high quality and isn’t going to cause problems, it probably isn’t wise to do this on a house-to-house basis. There could be a small local plant in every street or one for every few streets, a bit like your transformer for electricity, a couple of blocks away.

Q: I come from Gippsland in Victoria where some of the local water is diverted from the natural catchment and goes over the hill to Melbourne. Of course that diminishes flows in the streams and has an impact on the Gippsland Lakes. Is it reasonable therefore that the people who accept the water should pay some rent as part of the cost of that water to those people or that community whose environment is degrading?

HC: That comes back to Denis’ point of calculating the real cost for water. The fact that you take the water from A and you deliver it to B, denying the people around A that water, is a problem but that should be part of the costing.

Q: I recently found a website called ‘Water Asia’. Thinking of all these problems to do with water, is there a ‘Water Australia’? Is that a good idea and is it possible to do such a thing?

DH: Yes there is a need to communicate the facts a lot of which are not very well known or understood. The Water Board gets grief every time it announces that it has to put the price up but people don’t realise that it is practically a steal. To talk about the real cost of these things there probably should be some disseminating organisation that is seen to be disassociated from the players because obviously everybody brands them, no matter what they say. One of the principal issues in trying to get the water paradigm changed is dissemination of information. It is not a bad idea to have someone explain why.

Q: I can think of four possible sources of water: firstly desalination. When I was in Saudi Arabia, I was involved with the supply of desalinated sea water to two cities and as one of the speakers said, that it is too expensive for Australia. But eventually if we have solar, tidal or thermal energy maybe we can afford it. The second source is icebergs. Forty-five years ago, there was an experiment to pull icebergs from the Antarctic to San Francisco but at that time it wasn’t commercial. Another source is self-sufficient houses and that has been covered. The fourth one is what Alan Jones has been suggesting the last few years and that is to use the Kimberley and Ord River water. Can we afford eventually the latter for instance and what about icebergs?

HC: Icebergs have been costed and it is an interesting idea that we might want to continue to examine. But diverting water from rivers - and the Ord is a particular example - is not just a matter of building a pipeline. If you do that you have to look at – and more so in the future – the real ecological cost of doing it and the cost on the community locally.

In some ways we have had it too good here because we’re drinking the water for the first time and not recycled water as Peter was saying, as occurs now in many parts of Europe and the US. We are very lucky that we are the first-time users but we have to be careful, in the Nepean for example, because the flow is reduced and discharge into the rivers has become a problem. We’ve also seen it in the Parramatta River, which is now a lot cleaner than it was say twenty years ago but could still be improved. The water dumped should be as pure as that received. It is worth looking at countries that have a problem, because this could be us in the future if we don’t watch it. Back to China: there are about fifty thousand kilometres of river in China and eighty per cent of them will not sustain life. That is a scenario I hope we will never see here.

DH: The only point I would make relates to icebergs. If you can take waters from a source in the south of France, put it in little green bottles and ship them all around the world, you could certainly take

pristine water from the Antarctic and stick it in a bottle and sell it at a profit. But truly I think that using icebergs just extends the transportation paradigm. I think that the future of water is not in transporting it from place to place but in figuring out how not to transport it.

Q: I'm involved in local government in Queensland. Given that about seventy per cent of water is used for irrigation and that along the Murray-Darling Basin, drip irrigation is now being used to achieve double the efficiencies, why hasn't that taken place in the urban sector to the same extent, something which would presumably free up twenty to thirty per cent of water? Any comment on that?

DH: I think the point of drip irrigation is a good one. There's no reason why you have to make imitation rain fall over everything when all you need to do is wet the roots. It costs nothing at the moment to run a sprinkler. People would be more frugal if they had to pay for it. While water is free and you simply tell people it is naughty to waste water, what the heck, people are naughty.

Q: I'd like to pick up what Mr Walker said about 1980 being the time when water consumption flattened out. My memory as a ratepayer is that that was also the time when we began to pay about fifty cents a kilolitre for our water. I think we've flattened out our rate of price increase so can I please suggest that we continue to increase the price until it is about one dollar a kilolitre? At that point I believe all sorts of other technologies become economical and people will adopt them. But while we are charging a very low price per kilolitre, many other technologies are too marginal to be introduced.

HC: That's of course the delivered water, through the pipe and so on. The actual cost of purification of that water and recycling it is less than that. Reverse osmosis can bring that down to around fifty cents a kilolitre but not for delivering it a long way away of course.

DH: It is important not to get too simplistic when we are talking about costs because we have vast sunk costs – for the land and the pipes that are in situ – and then marginal costs for doing a little bit extra. The point that I'd pick up on and agree with is 'keep the price comin' up'. Because unless the price continues to rise to something that gives you a reasonable return on your asset base – and I mean the full asset base including all the land – then I think you are talking about marginal utility of assets. Start talking about real economic costs and let's see what comes out of that in terms of alternatives.

While the price is set politically - and let's face it, the grief always goes back to the government whatever happens - there's a strong tendency not to put the price up. I can remember when the Water Board obtained a massive cost reduction by extending the life of their pipes. The depreciation rate – this is pre-Enron mind you – was not low enough, so they changed it by doubling the life of the pipes. I'm not saying they were wrong. All I'm saying is that coincidentally, the government at the time was very happy to see the reduction in cost. So there is a need to move towards the true economic cost, whatever it might be.

Q: I'm a Sydney Water employee and so I'd like to make a comment first about re-use of water in the Hawkesbury-Nepean River. The most sophisticated water treatment plant in Sydney is at North Richmond. The discharge of sewage from Penrith and Winmalee and also the drainage from the Blue Mountains is three kilometres upstream from North Richmond so that sewage actually goes into the river and is consumed, after treatment, by the people in North Richmond - analogous to the European and American situations. I came along because I was interested to hear about the politics of water. So far I've heard a lot about the economics of water and I get a strong impression from the panel that water is too cheap; that it is undercharged. My professional allegiance as an aquatic ecologist is to the environment. I've worked in the water industry for many years and I do agree wholeheartedly that we undervalue that resource. So my question is, how is the environment to be paid back? That's the real political question. We've heard that Sydney Water should raise the prices but I understand that Sydney Water makes a profit which is kept by the government and given to Treasury, so how is the government to pay back the environment?

PB: Can I come in here? Just imagine you were a minister concerned with water and you were sitting around a cabinet table. You are one of twenty-five so any proposal for the re-use of water has to be set against proposals for provision of trains, the building of roads and hospital wards and cabinet has to

make some choices at the end of the day. There will be a lot of people around that table who won't be terribly sympathetic to the things that you and I might want to raise.

DH: That is why I was trying to introduce the idea of some sort of environmental accounting because unless there is some charge made to the user for what is to be done to the water, then the user will never change. If I was sitting around a cabinet meeting and I was responsible for water, I'd be thanking my lucky stars because the world is subsidising water. You wouldn't do it if it were a telephone company. I don't think that's well understood. People think water falls out of the sky. It is free; God gave it to us so we can do what we like with it. There is a dearth of understanding in terms of what happens and why it happens, and this I think is being driven by politics because a lot of developments have been subsidised by the provision of all of these services at low cost and nobody has to pay for them. The point I was trying to make earlier – what you do to the water - is what your charges should be about.

If I build a plant next to the river and I take water out and clean it up and put it back into the river, and I don't use very much, I don't think I should pay. If I take it away and do a whole lot of other things with it, then I should pay. To me the system is not really geared towards measuring that environmental impact and until it does, we have problems. The same thing happens with greenhouse gasses. You start your car and you think the cost of petrol is what you pay at the bowser. The reality is that somebody gets a snowstorm where they didn't expect it. These issues concerning the environment need more quantification than is currently happening.

Q: This is happening in New South Wales so are we looking at pollution in the rivers as a result? If that is the case, is it a question of conflict between the demands of industry, agriculture, domestic use and the environment and can this be resolved? Is it a political issue that can be resolved?

PB: The phosphorus that comes from domestic units is a big problem and the algal blooms that you see in the Hawkesbury are due to that phosphorus. One of the things imposed on us is what are called 'adequate environmental flows' to try and keep the rivers flowing and we are now required to put a certain amount of water back.

Regretfully, we have to bring this discussion to a close. Both speakers have raised a lot of questions: about rights and responsibilities, about cost, prejudice, political responsibility and environmental concerns, with an important subtext of 'whose water is it anyhow?' How we overcome all these stumbling blocks along that way of course, is another question, but to see some light at the end of this tunnel I think, is very important.

Edited by Susan Steggall