Jon Reed – Evaluating the options

[00:00:00] Tēnā tatou katoa. Kō Jon Reed tōku ingoa. I'm Jon Reed. I'm working for a company called Beca. I reckon I'm really lucky. I get to work with companies, utilities like Watercare to help make sure they've got enough water for the future. So I'm sort of always looking at 20-30 years away, making sure that we're planning to... to make sure we've got enough water for everyone for all their uses.

So. I reckon that's a pretty lucky job. So, yeah, I'll be talking to you for about 15 minutes. Just really wanted to tell you a little bit about what I've done in the past. I spent 10 years in the UK working in the water industry then, and then I moved here in 2010 and I've been working with Watercare and other councils in New Zealand, mostly around things like this - [00:01:00] how to plan for your future water needs.

Through that I've been through some droughts and that's one of the things I want to really emphasize today is that we're actually... this year, I think the dams are all spilling now, which is fantastic, but this sort of weather is the weather we're not worried about at all as a water resource person.

There's plenty of water around 99 years out of a hundred. That's fine. It's that hundredth year - those years that are really, really dry that maybe your grandmother might be remembering - it's those single years in a lifetime that we are worried about, to make sure we've got enough water for everyone in those years.

This is just an example. This is the approach we took - you might have heard about the inquiry last year - this is the approach we took, looking at different options. We took as many options as we could think about. It was about 160... [00:02:00] included things like bringing up icebergs from Antarctica, you know, all those sorts of things. And we slowly whittled those down and came up with a strategy for 30 years.

And one of the key things in that was a new extraction from the Waikato. And then we used that as part of the resource consent process. So, what we were looking at was what happens when there's a drought, what will it be like in 30 years? What do we need? What are the other sources that we need - that was sort of the overall approach for that.

And this is what we're trying to avoid. So this is some lovely ladies, standing by a standpipe. I think this is the 1976 droughts in Yorkshire in the UK. They ran out of water. They didn't have enough water to supply for one, because it was so dry for so

long. [00:03:00] And what is that? That's actually just a failure of planning, it's that not doing the thinking right - not understanding how your water resources react to the drought, not carrying out the investment that's needed and then this sort of thing happens.

So what Watercare is doing now, and you are helping to do is to understand - what do we need to do, so we don't want to have to come up with this. This is absolute failure. And imagine the health impacts of this city, the size of Auckland, if everyone had to be collecting water and boiling it before they drunk it. So that's failure.

This is something I was involved with back in the mid 2000s in the UK, working with Southern Water, they supplied about twice the volume of water that Watercare supplies, across southern England. This is one of their main reservoirs for pure water. And it was at a third full then... so [00:04:00] I was involved with helping them to manage their water resources and do all sorts of drought measures to get them through. They did get through just with some very severe restrictions and some new sources and some various things. But, you know, it sort of was actually a bit of luck, really.

So, yeah, so hopefully you can all hear me better. So, pure water - that is one of Southern Water's biggest sources and that was sort of on the edge of some really severe issues there in the mid-2000s. Interestingly, they had a drought there in the last few years, and because of the investment, and because of all the planning, the work they did, they had a similar sort of summer, a couple of dry summers, and they did get through it without having any of the same sort of effects. [00:05:00] So that's a real success.

I don't expect you to read this or understand it... what I'm trying to illustrate really is that... it's just lot of the rainfall stats, for the last 75 years or so - I've just lined them up in terms of the wettest years to the driest years, and that red circle on the end - that's just trying to illustrate again that those driest years are the ones that we're thinking about.

Most of the time we've got plenty of water. Most of the time the dams will get to 80-90% full and there's enough water for everyone. It's just those really dry years that we need to plan for. When there's not enough water available. So, you'll see in the wetter years you might have twice the rainfall that you do in the dry years. And it's those really dry years that we're worried about.[00:06:00]

So this is from the booklets here. Page 20. What we're trying to do is look into the future a little bit about how our water resources will be operating and the some of the challenges that it will be facing. So we look at rainfall and not only are we going to have the mixture of wet years and dry years, but also with climate change, our drier years will get drier. Our wetter years are going to get wetter as well, but the dry years will get drier. So that's going to affect not only our future sources, but the current ones we've got as well. There won't be as much water available.

There's going to be - or we expect there's going to be - a lot more people here in Auckland that we need to supply. Though most people will be using water differently. We always tend to be driving water [00:07:00] use down just through using different types of washing machines and those sorts of things, but just the fact that the city is growing means that we're going to need water.

Waste water will be seen much more as a resource in the future. At the moment Watercare spends a huge amount of our money treating the wastewater to... actually a pretty good standard... and then chucking it either into the Manukau harbour, or out into the Hauraki Gulf. That, that water is actually a very precious resource - it's almost clean water and it also has some other... there's also other nutrients and things within it. But at the moment we just chuck it away. If you go to Australia, or some other places around the world that waste water is seen as a resource. So you don't have wastewater [00:08:00] treatment plants in Australia, you have resource recovery plants.

So you can move much more towards a safe economy thinking about how we reuse what we've got, rather than taking more. And just - we're going to be talking about different sources later - and you take desalination. You are taking this actually very, very salty, very difficult to treat water from the sea. And you turn that into pure water - when you've got this waste water that's almost pure already.

So it's just that we haven't thought about it that way. Stormwater will also be a challenge in the city - everywhere actually - with denser development and the climate change impact means that the sort of very topical... the sort of events you've seen over the last few days in places around the country - those are going to get more frequent, more [00:09:00] common. And so, just in terms of our urban development, we can be thinking about that as well.

So page 21 of your document there's some information about the different constraints that we are facing... the top one there is that we've got to be able to

meet the demand that's out there - the demand for water. And that you've got to be able to do that when it's very dry - that's a bit of a tough challenge.

Those new sources or existing sources have to be resilient. So when you say resilient, there's a couple things that... first up for me, it's about that drought resilience, so that we've got a source of water that's available, when it's very dry. The second thing is... when events happen - when things happen that are outside our control - like a big storm event, or a big... you know... in some parts of the country - I'm working in Wellington at the moment and the [00:10:00] big issue they face there is an earthquake, and making sure that they've got supplies of water available.

So we want to make sure that whatever we do, actually, for drought and our water supplies, also contributes to making us a more resilient city for other things that occur. We need obviously to be environmentally responsible, and that comes particularly about with carbon. There's no point in trying to respond to just the problem, but to respond to climate change and what's called adapt to climate change - because of the climate... rainfall and drought. So that's going to be where we need to spend more money, we've got to build stuff. But that very act of building means that we are emitting more carbon. So we've got this real challenge. Any options that we develop need to be socially acceptable, it's got to be what people want. We've got understand that, and it's gotta be affordable.

All of [00:11:00] these things are very expensive. We're talking about a billion here - at least a billion dollars for a sizeable water resource, which is a lot of money for anyone.

I just wanted to touch a little bit also on rainwater tanks. So, this is some work that we did specifically looking at how rainwater tanks might contribute to Auckland's water supply during a drought. So most of the time, rainwater tanks can work perfectly well. There's plenty of water. Each of them is essentially like a little dam with its own little catchment, which is the roof and they store the water. And you can use that for either what we call non-potable use - your toilet flushing and garden watering. Or you can use that [00:12:00] for - if people are outside of the network - for their water supply. What we did, we said, well, what happens if we really invested in rainwater tanks? Would it actually solved this problem for us? So we did quite a lot of modeling - I won't bore you with that - but we modeled 270,000 rainwater tanks... that's a third of Auckland properties. We looked at three different sizes of tanks. So the large ones are 25 cubic metres. So that's sort of like the typical tank you might see on a farm, and then cubic metre ones - so 1x1 metre, and five cubic metres as small and medium ones.

So we looked at those different sizes of tanks and looked at how they would react. So the left three bars are looking at 2019 and the ones on the right, looking at 2020. Just at the rainfall that occurred then. And we looked at three different periods - the [00:13:00] February period, which is usually when it's driest and there's highest demand, what we call the peak five days - so the five days when there was the highest demand in Auckland and then the summer period - January, February, March. And actually what we found in 2019... it was a bit dry, but actually you could see that each of those bars, the red, green, and purple, they're each making a contribution. They're all providing some water.

You go to 2020, and across February, even... they're still all managing to find some water. You go to the peak five days and those small and medium sized tanks are empty. They're not able to make a provision. What that would mean would be that people would be using water most of the time from these rainwater tanks, but when they're dried out in those years, [00:14:00] they need to take water from the network.

And that means that you'd almost need to invest in another source just to provide water in those few days when the water tanks are empty. You're actually almost doubling up on the issue. Which is why we've come up with these numbers about the actual contribution that rainwater tanks are going to meet - about 15 to 30 megalitres a day, which is about 10 to 20 percent of what's required if we're looking at 150.

So... not saying that they're not the option, but just saying that in a drought, which is the period that we're looking at, they don't necessarily perform as well as the other options that we might be thinking about.

So - combinations of options... I've got [00:15:00] a few slides here just to talk you through how we look at meeting what we call supply and demand. Then I'll be done. So just to very simply describe this, the teal box on the bottom - that illustrates how much water we've got available. We call that the available supply of the water that we've got in our different groups of sources.

This is a chart - so what we're saying is... what we're illustrating along the bottom is how time goes on. And as time goes on, we're saying population is increasing, so our demand, which is that purple line, is going up. There's a dashed line in the middle that illustrates the period - the point in time, when, for example, we need to invest in a new source.

So you get to a point where something, almost like a tipping point or something you say, [00:16:00] hey - that's the time. That's what Watercare or other councils can look at and say, well in 10 years, we're going to need a new source... so that's what we're looking at here.

Something you can do to try and make your supply and demand balance is try and reduce demand. So that's some of the options we've got ahead of us. So that means things like changing behaviours, reducing leakage, metering - in a lot of places in New Zealand, there's no metering - so that that can reduce the demand by 15% or something like that.

So you can do all those things to really try and reduce demand. What that means is it pushes that purple line down, you're then planning for what's called reduced demand, or demand with some savings. And the effect of that is to push out when you need your source. So it buys you [00:17:00] some more time, which is great.

It's also making more use of the existing resource that we've got, which is fantastic. The only downside is, it's not free. So people often think this is free - but no, it's absolutely not free. You've still got to invest, you've got to spend money on reducing demand. Often that's the right thing to do though. So definitely something to be thinking about.

The other thing you can do is build a new source. So that orangey yellow box, just go ahead and build one big source that might meet our needs for the next 25, 30 years. So from an engineering point of view, it's very easy. We can go and build something big. It's quite [00:18:00] exciting. And it means that we solve the problems with something that's very easy for us to control, because all we've got to do is go and build this thing. Life probably isn't quite like that. So more often we end up with sort of a strategy that looks something like this, where we try and do a combination of both. So we're trying to reduce demand, and then we might have what we call a suite of options or a number of different options that we can join together and put in at different points in time.

There's a few benefits of that, so we can... that second option gives us more time to allow us to get that right, for example. It means that we can really, really plan for that. We might be able to do a different mixture of options. We might be able to get a more [00:19:00] resilient overall approach by having some different options with different characteristics or different benefits, and overall you come up with a strategy like this, that's a bit more flexible maybe, so that you can... if something changes - remembering our crystal ball - we don't exactly know how much demand

we're going to produce. We don't exactly know how population's going to grow. So this allows us to focus in on... or give us some flexibility about when we do things, that it might end up being more cost effective, might be cheaper, because we can offset some of the costs, we can delay some of that spend - that's typically what you end up seeing when you do this exercise.

And it's my last slide. So, how do you choose that best strategy? The main [00:20:00] thing is, the main thing we must look at, is that we need a source, or a group of options, like we just talked about that meet that required yield of 150 megs or whatever it is that you're working with. If you don't have the benefit in terms of the water, then there's no point.

Typically we might look at things like cost, and that means the capital cost - that means the cost to build something - and also the cost to operate it over time. We usually look now at carbon - how much carbon does it cost to build? And how much carbon does that emit over time as well? If you've got a very high, power-hungry source, like desalination, there's going to be a lot of carbon emitted over the lifetime of that scheme. [00:21:00] And of course the environmental impacts, social impacts of any option, and the cultural impacts. And what we tend to do is to try to set objectives to say, this is what we're trying to achieve.

And then we look at how that option, or those combinations of options achieve that objective, both in terms of the water supply, and meeting those other types of things like carbon cost. So that's what we do. And then we come up with a strategy and then we try and convince the Environment Court, usually, that we should be able to build it. So that's me.