SA Water

ASSET MANAGEMENT AS A QUEST
1984-1993

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Chapter Two: Looking Ahead:

Question 2: When will we need to renew our current infrastructure and how much will it cost?

Life cycle modelling

When we had a handle on our total asset portfolio, its size, age distribution, and estimated economic lives, we realised that we could go further than simply determining how much it cost us now - we could look ahead.

The engineering study that the department had commissioned for its underground assets had concluded that there would be no major renewal needed for its underground assets for about 15 years. The True Cost modelling confirmed this and extended it to the above ground assets as well. But our modelling enabled us to look beyond the 15 year mark and to determine that around the year 2,000 the amount of renewal falling due would start to increase and would then continue to rise.

At this stage only the city's pipes and sewers had been replaced, and that was not because of age but because the city was increasing beyond the system's initial capacity. Just about all other assets were in their first 'asset life'. That meant that not only did we really not know how long they would last, but that over time a larger and larger proportion of the portfolio would be coming due for renewal.

The initial commissioned report, that had examined the underground assets, had given the department some comfort in knowing that they were fit for the next 15 years, and since this was a long time away, most extrapolated this to everything and for all time, certainly for their working lives. So I took to dramatically illustrating our results by sweeping my hand across the table saying, "There is no problem for the next 15 years" - and then allowing my hand to fall off the edge!

Life cycle modelling had long been a technique for comparing proposed investment projects with different cost and benefit time frames. We would simply discount all the amounts back to the present and compare the net present values (NPV). It was well known to the department, so to project likely renewal I took the life cycle framework - but instead of discounting back to the present to get a figure at one point of time, I focused on developing the most reliable distribution of future component renewal costs. Since we were not funding the future, merely trying to establish what it would be, no discounting was needed or applied.

The importance of asset age distributions

But of course, our assets were not new, so we could not assume, as we would if we were doing an NPV comparison, that all were at the beginning of their cycles. We needed to allow for where each system, and component, was in its own life cycle. To do this we sought to establish when each pipeline, sewer, or above ground structure was established.

Fortunately, as we saw in Chapter 1, the engineers in charge had been with the department many years and we were able to make reasonable judgements on these start dates. We also knew when major changes affected asset life profiles. For example, during the war years, most of the first class materials and workmen were taken up in the war effort and the assets constructed during those years were already showing signs of earlier renewal requirements than the pre-war assets.

And again, later when pipes and sewers for the new suburban developments began to be designed and constructed by developers, to be then handed back to the department for ongoing maintenance, it was discovered, not surprisingly, that these assets also had shorter time frames.   So we segmented the asset distribution into pre-war; war-time, post war but before suburban development, and more recent years and then constructed model variations for each.

We modelled in five year segments. To pretend to be any more precise than this would have been ridiculous. Sometimes we could be quite accurate in knowing which five year bracket applied, sometimes we knew only within say ten or twenty years and would need to take an educated guess. The appropriate life cycle model was then applied to each five year age cohort within each asset class, allowing for the model variants.

The complete model, with all data, assumptions and details, along with discussion and recommendations, can be found in the *PAC Report on Water Asset Renewal*.

Modelling assumptions

A number of assumptions were made to support the modelling. We aimed at making as few controversial judgements as possible. So the first thing we did was to model everything in terms of current values. These we knew. Of course prices would be expected to change over the course of the projection but there was no way of knowing how. We certainly didn't want the logic of our model to be lost in a fruitless discussion of what future inflation was likely to be.

Next, we assumed that everything we had we would replace, and what's more we would replace it like for like. Now this was clearly not a good practice for actual renewal, but this default simplified the modelling.

We also assumed the same maintenance and renewal practices that we were currently using. Moreover we would not assume that some miracle would occur with technology that would solve our future renewal problems or that prices would marvellously change in our favour. We also kept those factors constant.

In other words, we didn't want to assume away the future problems we were likely to face.

One other thing we did which was exceedingly important, and that was, whenever there was any doubt about a future cost, we would take the lowest figure. This we stated upfront. We knew that the projections would be scary enough, even when understated, and we didn't want the results to be dismissed as overstatement.

The 'abatement factor'

This is not to say that there was not considerable dispute along the way before we settled on these assumptions.

One of the arguments favoured by a section of the engineers was the 'abatement factor'. They argued, reasonably, that it was quite likely that over the next 15 years and more there would be technological improvements and there would be price changes. Moreover, these could reduce the future price by as much as 20% said some, others argued as much as 50%.

My response was, "While we are guessing, what about 100%?"

That, however, was considered truly absurd.

The important point was that if we were to write down the size of our future renewal problem by assuming lots of technological change applying to renewal would take place anyway, why would we bother to undertake the technical research to make it happen?

Moreover, as we looked around at that stage, most technology seemed to be applied to new assets, rather than replacement.

Fortunately, the renewal problem was not written away on paper, and new and exciting techniques of renewal were developed as the extent of future demand became clearer.

The point of future renewal projections is not to be accurate predictors but to provide useful guidance so that decision-makers can change the default future. If the renewal projections were to 'come true', then clearly they would have failed to do their job!

Asset consumption

The most difficult parts of the model to estimate were the rate of asset consumption and the opportunity cost. The reason these were difficult is that they ran afoul of current financial practice.

Infrastructure assets at that stage did not feature in the financial accounts and were not depreciated. Nevetheless, they still wore out or became obsolete and we needed to account for this when we calculated what it cost to supply water and sewer services to South Australians. It was, of course, equally critical in determining future costs.

At the time, asset consumption was represented by a sinking fund. However, the sinking fund was calculated in historic cost terms, and when we looked at the amounts that were being set aside (generally as a gentlemen's agreement between the Finance Section of the EWS and Treasury) the figure would only be appropriate if all of our assets lasted more than 350 years! Our own modelling figures were based on the engineer's expected life figures, and on replacement costs.

Opportunity costs

Opportunity costs were even more difficult, principally because, if you weren't an economist, you probably didn't know what they were. These are the costs that we were incurring for South Australia by investing in large scale water infrastructure rather than investing in whatever the next best opportunity would have been.

Now we didn't know this figure, but we did know that it wasn't zero. For the EWS, the figure that came closest to this (although not really very close) was the interest amount that Treasury charged on their allocation of debt to us. This was loosely informed by the interest rates that the Treasury was using in its cost-benefit analyses for new projects. This was also a matter for dispute with the engineers.

In the first few weeks with the Department I had attended an Engineering Society meeting that was being addressed by a former Economics Lecturer of mine, who had subsequently become Minister for Education and in whose electoral campaign I had participated. At this meeting he argued that the discount factor (i.e. the interest rate that the Treasury was using) was too high and it should be down around 2%. My engineering colleagues loved it and agreed.

At the time I thought this was wrong and preferred the Treasury's higher figure, but now I am inclined to believe he might have had right on his side. I am still not entirely convinced because the lower the interest rate, the more infrastructure projects are likely to be accepted and investment could be overdone - if this were the only, or key, deciding factor. Later we will argue it should not be the only factor, but that is for a later volume in this series.

The size of the asset portfolio

As we calculated the size of the asset portfolio, the engineers got excited by it. A sort of shadow, unstated, but well-known competition was taking place and I was always being bailed up as I waited for the lift, or ate in the cafeteria, to know what the 'latest figure' was, and the CEO and deputy CEO were not immune from the fun of seeing the figure rise. The larger the amount, the happier they were. It reflected well on their importance to the organisation.

The same, however, was not true of Accounting and Finance. Their situation, of course, was entirely different. The larger the replacement value, the more difficult their future financial problems would be. It also became harder, even impossible, to reconcile our figures with those in the financial records.

Finance sought to defend what they had been doing rather than recognising that we now had a chance to fill in some of the gaps in our knowledge. Moreover, the 'true cost' study made it clear that a lot of what we had been taking for granted as 'costs' were, in fact, merely a cosy and long-standing gentleman's agreement between our Finance people and those in the State Treasury, so it was to be expected that in presenting the results of our work to the executive committee we would get a lot of opposition from Finance.

Presentation to the executive committee

When it eventually came time to present the new True Cost approach to the executive, I ran a rehearsal with my corporate planning colleagues. Every few minutes they would stop me and say, "But if you say that, then the CFO will…." I realised that I could be walking into a mine field.

However, I took notice of everything that they said and, on the day, I anticipated the CFO's reaction by saying, whenever I came to one of the points that I had been warned about, "Well, of course, a possible reaction might be… but clearly this can be addressed by …." Or, "Some might say … but we can readily recognise that this cannot be the case because…." Or something similar.

My colleagues had done a wonderful job in identifying all of the CFO's objections, and he was getting more and more frustrated as I moved through the argument until at last he couldn't take it anymore and he burst out, "But if we do what you suggest, we will become more efficient and have to sack people." I meekly confessed that I had not foreseen this outcome! But by this time there were grins all around the room and I knew we had won.

(Incidentally, a few years later, the CFO made a presentation to the Engineering Society claiming that he had been responsible for the entire approach - and was then rather sheepishly embarrassed when he realised I was in the audience. But I didn't mind. If he could boast about it, at least he would take it on board.)

We are not alone

After the results of our modelling had been accepted by the Executive, showing we had a period of grace of about 15 years before our renewal requirements would start to rise, I suggested to the CFO that we could use that time to plan our renewal funding strategy.

He told me that he had his own strategy: "When we need extra funding I simply ring the Treasury and say 'Fred, we need another $50 million', and Fred says, 'OK, You've got it'."

I was astonished and said that it was likely there would come a time when no matter how much Treasury was on side, Fred would be financially unable to say 'You've got it', but the CFO just shook his head at my woeful ignorance. This confirmed my understanding not only of the gentlemen's agreement but also how much it was leaving the department, and indeed the State, unprepared for future change.

It led directly to my next questions. We would obviously not be the only department experiencing ageing infrastructure, so what demands, and when, would other departments be putting on Fred's largesse?

Question 3 thus became *What is the future cost and timing of all of the State's infrastructure?* with a natural follow on as **Question 4:** *What can be done to manage this cost?*

I started to do a few 'back of the envelope' calculations based on conversation with engineers from other departments, when an opportunity arose that I would have been mad not to take - although at the time, I did my best to avoid it! But we will continue this in Chapter 4. Let us look now at the reactions to the True Cost Study within the department and within the water industry.

I would like to acknowledge Kerry McGovern, Gregory Punshon, Bob Ritchie and Ruth Wallsgrove for their improvements to this chapter.