Fresh thinking and a real change

The main objectives in the document 'PR24 and Beyond' are climate change, meeting increased customer expectations, the environment and the ability of customers to pay. In the same document it forecasts an additional 4000 Megalitres per day will be required by 2050.

None of these objectives will be achieved by the current water resources plans.

It may well be that using high energy schemes, such as desalination, wastewater recycling and long distance transfer, will solve the short term water shortage problem, but they do nothing to solve the longer term environmental and economic problems. Water companies will continue to abstract as much as possible from the aquifers (at the very start of the environmental path) and, once increases in demand use up the manufactured water, we will be back in the same position – but now causing the emission of hundreds of thousands of tonnes of carbon dioxide.

As I pointed out before PR19, we are effectively in an environmental battle between allowing water to flow down into the river estuaries or pump hundreds of thousands of tonnes of carbon dioxide into the atmosphere.

We are at a critical fork in the road.

Choose to go down the high energy path and the industry will never meet low carbon, will cause huge increases in costs and will, as I have said, not improve the environment.

I have devised an alternative path.

One that uses the rise and fall of the tide to overcome the problem of allowing perfectly usable and scarce freshwater to flow down the river estuary into the sea.

There are 200 rivers in England and Wales. At the important 95%ile flow **23,000** Megalitres per day flow into the sea.

The European Water Framework Directive, as introduced by the United Kingdom Technical Advisory Group (UKTAG) shows that the natural flow into an estuary can be reduced by up to half without affecting the quality. Taking the UKTAG criteria, at least 11,500 Megalitres per day could be abstracted for 95% of flows. There is more than enough to meet the increased demand.

In order to protect the freshwater environment of inland water, legislation gives authority to set minimum flows which ban abstractions for much of the summer and controls the flow into the estuary. I have suggested that any new abstractions (and where possible some existing abstractions) should be moved downstream to the tidal interface. This would remove any interference in the river flow above the tidal limit, advice originally introduced by the Water Resources Board back in the 1960s.

It is then necessary to ensure the rate of flow down the upper estuary is maintained.

To use the Ofwat idea of '*fresh thinking and real change*' I have devised a way of achieving this requirement by storing a small amount of tidal water at high tide and steadily releasing it through

the low tide period. It is a very cheap and easily installed solution and because it uses the tide it uses little or no electricity.

Once adopted the fundamental advantages come into play. Because it is cheap it can be used on much smaller rivers. Using a minimum 5 Megalitre unit of water treatment, at least 5600 Megalitres per day could be made available to water supply, spread around the country. Even some minor rivers in the dry east of the country could be brought into the equation.

This idea can also be used to reduce the cost of some existing schemes where water is pumped around to fill existing reservoirs. It therefore starts with a big saving to offset future increases.

Economically, the present water resources plans go completely in the wrong direction. Much of water company costs are either fixed or 'quasi fixed'. If they are allowed to go down the route of telling customers to reduce their per capita demand and they then build these large high energy schemes, the unit cost of both water and wastewater treatment will increase. And because the plans will still include the caveat that 'water restrictions are a possibility' customer satisfaction will not be achieved.

Furthermore, once these dissatisfied customers find out that far more water than is needed is being allowed to run out to sea, - while they queue at a standpipe, - there will be zero customer satisfaction.

On the overall front, my calculations using a unit costing system show that my proposal is much cheaper than the existing plans and meets the environmental targets, as follows.

Once introduced the water at the tidal limit is available for the whole year, less the very occasional extremely low flow period. Because it is abstracting at around the 95%ile flow this allows abstraction from the base flow. The base flow is water emanating from the aquifers which are recharged by winter rain. Therefore, abstraction at the tidal interface will only be adversely affected by low winter rain, a much rarer event.

Therefore the '***real change'*** I propose is to reprioritise abstraction. Abstraction from the rivers at the tidal interface first and then abstraction from rivers generally, should be the priority.

'Use it or lose it'.

The remaining quantity should then be abstracted from aquifers on a 'top up' basis. Any water not used will be stored in the aquifer until needed, possibly for the result of any dry winter.

At the end of the plan period , assuming an Environment Agency reduction in aquifer abstraction and a reduction due to global warming plus the increased demand from population growth, my idea gives a saving of 30%+.

We are at a critical decision point in the pathway to the future. If the industry opts to ignore the water flowing into the sea, in a decade or so we finish up exactly where we are now. Still abstracting too much water from the aquifers, still saying the potential remains for water restrictions and spending a fortune on manufacturing water

or

we can decide to make use some of the water flowing out to sea, reduce the amount taken from aquifers and start the return of the ecology. It is a simple choice!!

Bill Cutting C.Eng, MICE. MCIWEM.