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DEWI S.r.l.
Developing an Efficient Water Industry

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Investing in Water Infrastructure Projects

Special Report: Performance-Based Contracts & Water Loss Control

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This follows our previously published note in this series dealing with the market conditions and investment potential of performance based contracts for water loss reduction and efficiency improvements, with the principal author being Ing. Dewi Rogers, a world renowned expert in this field of practice.

Summary

Water systems the world over are dire need of rehabilitation. So bad has the situation become, that it is estimated that two-thirds of the networks are unable to provide a reliable service to the customers. Intermittent supply has become the norm rather than the exception, despite all the negative impact on water quality and the structural integrity of the network that this entails. In short: the situation is almost out of control. Bearing in mind the vital importance of water for life, the question is why? This paper sets out the main reasons and how the participation of private sector can provide the solution, for the benefit of all.

Today's Water Industry

Many water systems in the world are incapable of offering even the minimum standard of service to the customers that they supply. Furthermore, due to political pressures to charge the service at an artificially low cost, the funds available to maintain the network have been at best inadequate and, at worst, non-existent.

Consequently, water utilities today are often faced with managing an impossible situation, whereby demand often outstrips supply – hence the need to resort to interrupting the distribution. But this is a very risky approach, particularly on the quality of the water if pollutants infiltrate the water pipes when they are not pressurised. Just as bad is that the water hammer effect when the supply is reopened, which deteriorates even further the structural condition of the network causing even more leaks.

The traditional solution has been to search for a new resource. However, as the easily available water sources have already been exhausted, this task is becoming more and more difficult. Perhaps this explains why desalination has recently become so fashionable. But not only is this a very expensive solution, it has a very high environmental impact.

So what is the optimum solution? A closer analysis of the situation shows that networks subjected to intermittent supply invariably lose more than half of the available resource. Traditionally this is considered to be due to illegal use. Such a view, though very widespread throughout the world's water industry, is misguided. When the average household consumption is applied to the estimated number of illegal consumers, it becomes immediately obvious that the quantity often accounts for only around 20% of the total water lost. The rest is leakage.

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The quantity of water lost from a typical leak is equivalent to ***7 bottles of mineral water every second.***

This same volume can supply the requirements of ***1000 families.***

Leakage control projects undertaken in many countries of the world, including south, central and north America, south and eastern Europe and Asia have directly confirmed the validity of this assertion. And it is not surprising, when it is considered that the quantity lost from a typical leak, which incredibly is equivalent to roughly 7 bottles of mineral water every second, is enough to supply the requirements of 1000 families. So why then does the water industry continue to sustain such an incorrect theory? Probably because it doesn't know any better and anyway it deflects the attention from the inefficient way it currently manages its water systems.

It would be wrong however to criticise too harshly the people who work in the water sector for this sad situation, particularly as their dedication stands comparison with the best. The way they regularly work throughout the night, up to their waists in mud and water, in an effort to limit the disruption to their customers is testimony to their passion. But the fact remains, that such effort unfortunately serves little more than to reduce the consequence of a problem rather than eliminating its cause.

So why are leakage control projects so rare, when it represents such an obvious solution? Probably the answer lies in the complexity of the problem. Finding holes a few millimetres wide in a network stretching hundreds of kilometres, is equivalent to the proverbial needle in a haystack. But experience shows that with skill, patience and dedication, it can be done. The key is to analyse in detail the operation of the network through the use of hydraulic simulation models and apply it to design the division of the network into a number of smaller sectors, each of which is continuously monitored and controlled. In this way, it is possible to identify immediately the presence of leaks and through the application of special acoustic instruments, locate them more easily. Of course, to do so in networks where there are no mains maps and few customer meters is no mean feat and partially explains why such projects are so infrequent.

The fact remains though, that there is also an almost total absence of understanding of the problem and its solution at all levels in the water sector – universities included. Organisations like the International Water Association have been actively promoting the approach for a number of years now through their bi-annual Water Loss international conferences and expert-prepared publications, but the truth is that there has been neither the funding nor the commitment to execute such projects. As a result, the number of real, large-scale success stories still remains few and far between which is strange considering the greater sums of money that are available to creating new desalination plants in such diverse places as Trinidad and Tobago, London and southern Italy, despite of the fact these networks often lose well over 30% of the available water. The reason can probably be traced to the fact that digging holes to repair pipes is not as politically enticing as a grand opening of a technological desalination plant. Pity then that the poor customer effectively ends up paying twice for this inefficiency: firstly to pump and treat water, which is then lost through leakage; secondly to invest in the production of even more expensive water to compensate for the shortfall, much of which ends up being lost through the same leaks.

The customer ends up paying twice:

First to pump and treat the water, only to lose it through leakage.

Secondly, to invest in the production of even more expensive water to compensate for the shortfall, much of which is lost through the same leaks.

Performance-Based Contracts

There is hope though in such a scandalous situation and one which is potentially beneficial to all concerned and that is in the application of performance related leakage control contracts. This entails the use of private investment to reduce the leakage, which is then paid for over time by the economic benefits derived from the results obtained. In this way, the utility does nothing more than continue to spend in the same way as it has in the past, whilst the financial saving is passed in whole or in part for a defined period to the organisation that undertook the project. This has the added advantage that as the payment is dependent on maintaining the recovery of the leaks, which is not necessarily a given, as the repair of one leak can easily cause the formation

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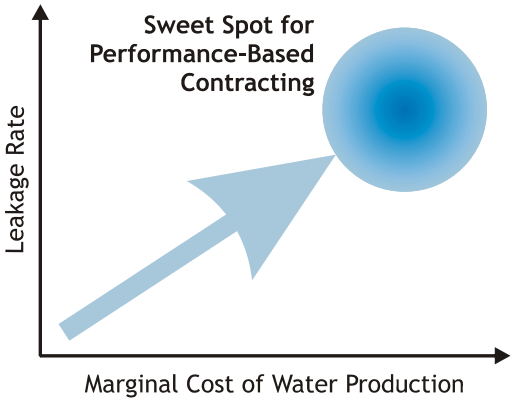

of another a few meters downstream. However, in this way, the utility is given a guarantee of the effectiveness of the solution, which it can continue to exploit once the system is handed over.

There are other knock-on benefits from a contract like this which places the client and contractor on the same side of the fence, as far as objectives are concerned. For example, the need to train the local workforce on the contractor's part to achieve and maintain the results, guarantees the sustainability of the solution for the utility in the future. The external investment also avoids the need for the utility to increase the tariff upfront to achieve the improvement in efficiency and the quality of the service, which otherwise might be highly contentious.

It is clear that the applicability of such an approach is best suited to networks which have a high leakage level coupled to a high production cost. Whilst today most networks fall into the first category, with the predicted future shortages and the social cost that this entails, it won't be long before many utilities fall into the second category too.

The potential return on the investment is estimated to be quite considerable – easily on the order of **2 or 3 times the investment**. Achieving such economic returns in projects having such a compelling social and environmental content would appear to be the icing on the cake. Certainly this appears to be the reasoning of Ms. Shari Arison, Chairman of Arison Investments, which has recently launched Miya with the specific aim of improving the efficiency of the water industry, by promoting performance related leakage control projects. With the scale of the potential market and the real and urgent need for action to avoid a social and environmental disaster, it is unlikely that the Miya initiative will remain unique for very long.

IWA International Water Association | Specialist Group Efficient Operation and Management Water Loss Task Force

Water Loss 2009

The next instalment in the International Water Association (IWA) conference of the Efficient Operation and Management Specialist Group and Water Loss Task Force is taking place this April in Cape Town, South Africa. Further information can be obtained at www.waterloss2009.com.

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