# Yarra Valley Water: A Successful Change Programme for a Corporatised Water Utility

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## Abstract

*Yarra Valley Water, a corporatised water utility achieved the significant efficiencies that are promised from the move towards privatisation. At the same time it substantially improved the quality of service delivery to its customers. It demonstrated that substantial benefits can be achieved with a minimal investment through leveraging existing information systems. The use of enterprise modelling that contributes to an "holistic" view of the organisation's information and processing in Customer Services contributed greatly to successful integration of these existing systems. Crucial to all of this was the willingness of the organisation to transform itself to one dedicated to "best" customer service and asset management. The experience of Yarra Valley Water provides lessons relevant worldwide, but especially for developed economies. First, achieving efficiencies and improving service quality are not mutually contradictory. Second, these benefits can be accomplished with a minimal investment by leveraging off existing systems. Third, the use of enterprise modelling gives the necessary "holistic" view of the relevant information flows and processes to enable successful integration of disparate systems. Finally, realisation of the benefits of corporatisation ( privatisation) requires a paradigm shift in the business culture of the former utility.*

## 1 Introduction

There exists a worldwide trend towards corporatisation and privatisation of public enterprises [6, 10, 12]. Government is divesting itself of these enterprises which include utilities like electricity, gas and water. This trend is

partially driven by the ascendancy of the "market rationalist" economics ideology. Governments seek to reduce their role in the economy to a few fundamental areas. Many activities that government has performed for many decades are passed to the private sector. Usually this divestment is justified by reference to the benefits of exposure to the competitive market, which may be regional or national, and increasingly global. Lower costs and improved service quality are usually identified as the major benefits.

There are those who express concern about privatisation of government enterprises. They claim that reducing costs and improving service quality is often mutually contradictory [3, 4, 17, 23]. To allay these concerns government usually imposes regulatory controls on the "new" enterprise. This takes the form of performance criteria by which the operations of the privatised business is evaluated. The criteria embrace efficiency and service quality. Failure to meet the criteria incurs some form of penalty, and in extreme cases, withdrawing the operator's licence.

The Australian experience is similar to that of Europe and to a less extent North America. Successive governments of "right" and "left" persuasion have privatised a whole range of public enterprises. These include rail transport, water, electricity, telecommunications, and prisons. The southern Australian state of Victoria has been very active in this area, especially over the last decade [5, 14, 22, 24]. The case study of Yarra Valley Water reported here is from that state. It is one of five separate businesses "carved out" of the former Melbourne Water Corporation. Melbourne is the capital city of Victoria. Melbourne Water was the public water utility that served the sprawling Melbourne metropolitan area.

Much has been written about how information technology can transform an organisation whether it is public or private. Seminal works include [9, 15, 16, 18, 19] A few spectacular success stories are well known which include American Hospital Supplies, American airlines and the JIT applications [8, 13]. There is a need to add to the case study literature for those of a less spectacular nature, as they are useful to researchers and practitioners alike. Not surprisingly there exists a paucity of case study literature for projects that have failed. However, there have been some investigations undertaken of why projects fail [11, 20].

Yarra Valley Water is an example of a success story. Its "telling" may prove useful to other organisations not only in Australia but also worldwide.

## 2. Yarra Valley Water

Nation-wide Australian utilities manage AUS$143 billion of assets [1]. Yarra Valley Water owns assets with a replacement value of AUS$3 billion. It was formed in 1995 when Melbourne Water, a retail distributor, was divided into five separate businesses. This was a state (Victoria) government initiative in corporatising and privatising public utilities and public businesses in a diverse number of industries. In common with other types of utilities Yarra Valley Water's operations are monitored and assessed by the Office of the Regulator General (ORG).

In 1996, it was recognised as having the lowest operating costs of a water utility in Australia [25]. It was also the first water utility to obtain the ISO14001 Environmental Certification for its environment management systems. This is despite inheriting systems that were outmoded and lacked integration.

## 3. The Opportunity

### 3.1 Introduction

The Victorian Government's restructuring of utilities is to engender competition, lower costs and increase the service quality. In this, they are no different from governments around the world. To ensure these objectives are met by the corporatised and privatised utility the Office of the Regulator General (ORG) was established. Comparative performance indicators based on indicators set by ORG are used. In addition to approving and monitoring various industry codes and rules the ORG sets customer service performance indicators and requires the water utilities to report against them. These indicators of customer service performance mostly relate to asset management and infrastructure. The link between customer service and infrastructure performance lies with outage management and customer rebates.

### 3.2 Service Quality Guarantees

Proactive outage management and associated customer rebates had become an important "yardstick" for assessing a utility's commitment to customer service. This presented a new challenge to Yarra Valley Water and an opportunity to gain competitive advantage. In January 1996, it promulgated its customer service guarantees in addition to the Customer Charter. It guaranteed a predetermined level of service to its customers backed by rebates should they not be met. This went beyond the outage reporting requirements of the ORG. It was the first of its kind in the Melbourne metropolitan water retail industry. Examples of customer guarantees are provided in table 1 below.

| **Customer Service Type/ Guarantee** | **Circumstances under which a AUS$20 Rebate will be Paid** |
|---|---|
| Planned interruption to the water supply, eg., replace a pipe | · Interruption more than 5 hours<br>· Notice not given<br>· Interruption longer than notified<br>· Interruption is during 5am and 9am or 5 pm and 11pm<br>· |
| Unplanned interruption to the water supply | · Interruption more than 5 hours<br>· More than 5 such interruptions in any twelve month period |
| Acceptable Flow Rate | Unacceptable flow rate unless there is a failure to take reasonable action |
| Authorised Entry to Residential Property | Unauthorised entry to residential property |
| Customer Response | Lack of reply by letter within 6 working days |
| Unplanned Interruption | More than five unplanned water or sewerage interruptions in total during any 12 month period. Rebates are paid for each interruption over five. |
| | **Circumstances under which a AUS$100 Rebate will be Paid** |
| Contain a sewage spill on a customer's property | Lack of containment within one (1) hour |

Table 1
Customer Service Performance Guarantees

### 3.3 A Paradigm Shift

The organisation willingly transformed itself into an organisation dedicated to the "best" customer service and asset management. Among the measures taken to achieve

this transformation was the investigation by senior management of utility businesses in the US, UK and continental Europe. They were confident that the systems architecture envisaged for Yarra Valley Water was not replicated elsewhere. As was mentioned previously the enterprise guaranteed a predetermined level of quality service to its customers well in excess than was required by the ORG.

## 4. The Challenge

Having established service quality guarantees, it was imperative that Yarra Valley Water be better able to meet them and to provide the appropriate rebate when they were not met. The existing manual process was costly, labour intensive, error-prone and involved a number of information "handoffs" across disparate systems. The main difficulties were sourcing the information from the Geographic Information Systems (GIS), the Asset Management and Work System (AIMS) the Customer Information and Billing System (IBIS) and a finance system. These systems were package-based solutions implemented on different software and hardware platforms. This meant that data was not shared and consequently business processes and reporting suffered because of the lack of integration. To illustrate:

- Service interruptions required more than one hour to process each shutoff block whilst the nature of the shutoff and the customers affected were identified.
- No computerised system could provide support for handling multiple sewer stoppages and sub-standard water flow rates
- Water supply service interruptions of more than 5 hours or having occurred more than 5 times in a twelve-month period required thirty-four process steps, nine information "handoffs", nine personnel from different departments and three major application systems with up to nine separate accesses. This could take 3 to 10 days and cost AUS$4.29 per qualifying property.
- A customer complaint about a water supply interruption (as described above) could require up to nineteen steps, nine information "handoffs", seven different people from different departments involving three major application systems, and with up to five separate accesses. This could take 3 to 10 days and cost AUS$10.81 per qualifying property.
- Some customers experiencing service interruptions were not identified, some customers were mistakenly notified, and given rebates they were not entitled to. There existed a lack of uniformity and consistency in relation to rebating customers.

## 5. The Solution

### 5.1 Alternative Solutions

Three alternative strategies for exploiting the opportunity were considered. They were:

- manually extract the relevant data from the existing systems
- develop a new system
- integrate the existing systems

### 5.2 Manual Extraction

Asset and work management information was manually extracted from the Asset Management System (AIMS) to identify service interruptions. This data was then linked to customers' properties affected that was obtained from the (GIS) known as PHOENIX. Customer data to enable calculation of rebate entitlements was obtained from the Customer Information and Billing System (IBIS). The rebate transactions and the associated customer rebate letter were manually generated.

This solution was inadequate as a long-term solution as it was very labour intensive, costly and prone to errors. Such a process was judged inconsistent with the desired corporate image as progressive, dynamic, and innovative.

### 5.3 A New System

The development of a new outage management and customer rebate system eliminated reliance on convoluted manual extraction of customer data from multiple systems. This meant duplication of customer data in multiple places and all the attendant problems of maintaining integrity within an acceptable period. This solution was unacceptable because it would exceed the budget provided for the project.

### 5.4 Systems Integration

The preferred solution involved the integration of the existing systems through computerisation. The integrating system was called the Customer Outage Reporting System (CORS). It represents the leveraging of existing systems but eliminates the inefficient and error-prone manual extraction of data. The need for integration was first identified by analysing the information flows described in the Customer Services' Enterprise Model. The Enterprise Model was used as the primary basis of project planning. It helped define the scope of the project up-front including the identification of all information flows into and out of

this new system (CORS). Hence, all interface requirements were defined up-front.

The Enterprise Model was used extensively in the analysis and conceptual design phases of the project providing a holistic view. Up to this point in time information had been used disjointly. The Enterprise Model clearly showed that the main difficulties lay with having to pull in information from many disparate sources - geographic information, asset information, work order information, customer and property information, billing information and financial information.

The need for integration was of paramount importance to the business. How could we provide, seamlessly, information important to the customer concerning such things as:

- The pipes in the ground connecting to a customer's property - its performance in terms of flow rate, burst pipes, and other outages.
- The number of properties and relationships of the customer to those properties - owner or occupant.
- The number and type of services provided and service level agreements made with the customer.

Each of these information, managed in disparate systems, was vital in determining a customer's entitlement to a rebate. This information had to be integrated to obtain a whole of customer view and to provide the level of service that customers were now demanding in a competitive marketplace.

The Enterprise Model showed the benefits of sharing information in an integrated manner and defined, at least conceptually, the integrating system, CORS.

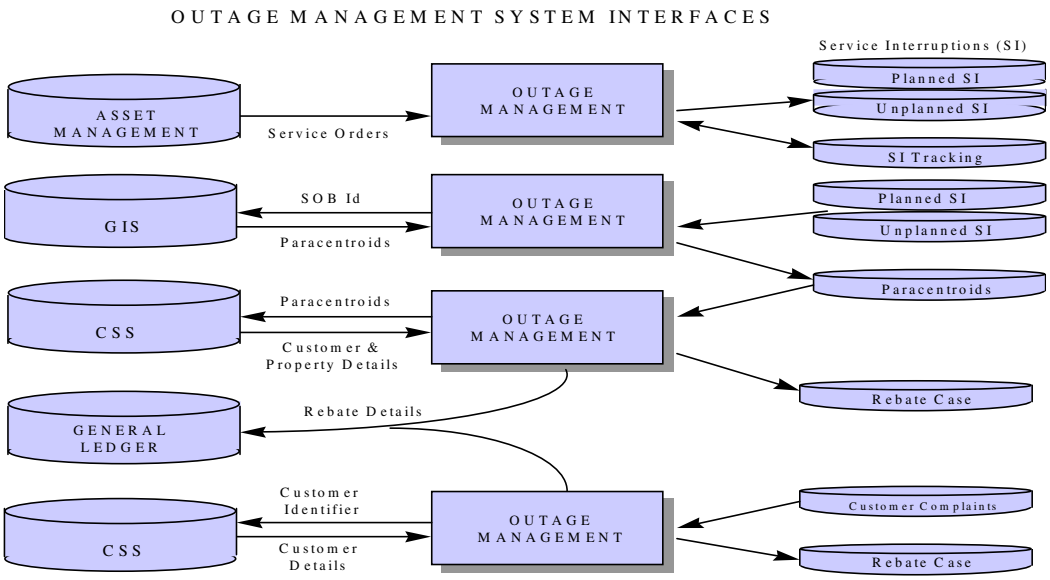
## 5.5 CORS

Successful integration of different application systems operating on disparate software and hardware platforms proved a challenge. Five main challenges were identified and addressed. They are:

- data access across disparate systems
- automating shutoff block processing
- insulation of CORS from changes in other application systems
- flexibility in managing customer entitlement rules and rebate rules
- timeliness in reporting

The data access issue was resolved by implementing a software mechanism known as a data access layer. It allows data to be shared across different application systems on disparate software and hardware platforms using data gateway technology. Oracle-Ingres gateway was used. Figure 1 represents the main interfaces of CORS.

Figure 1



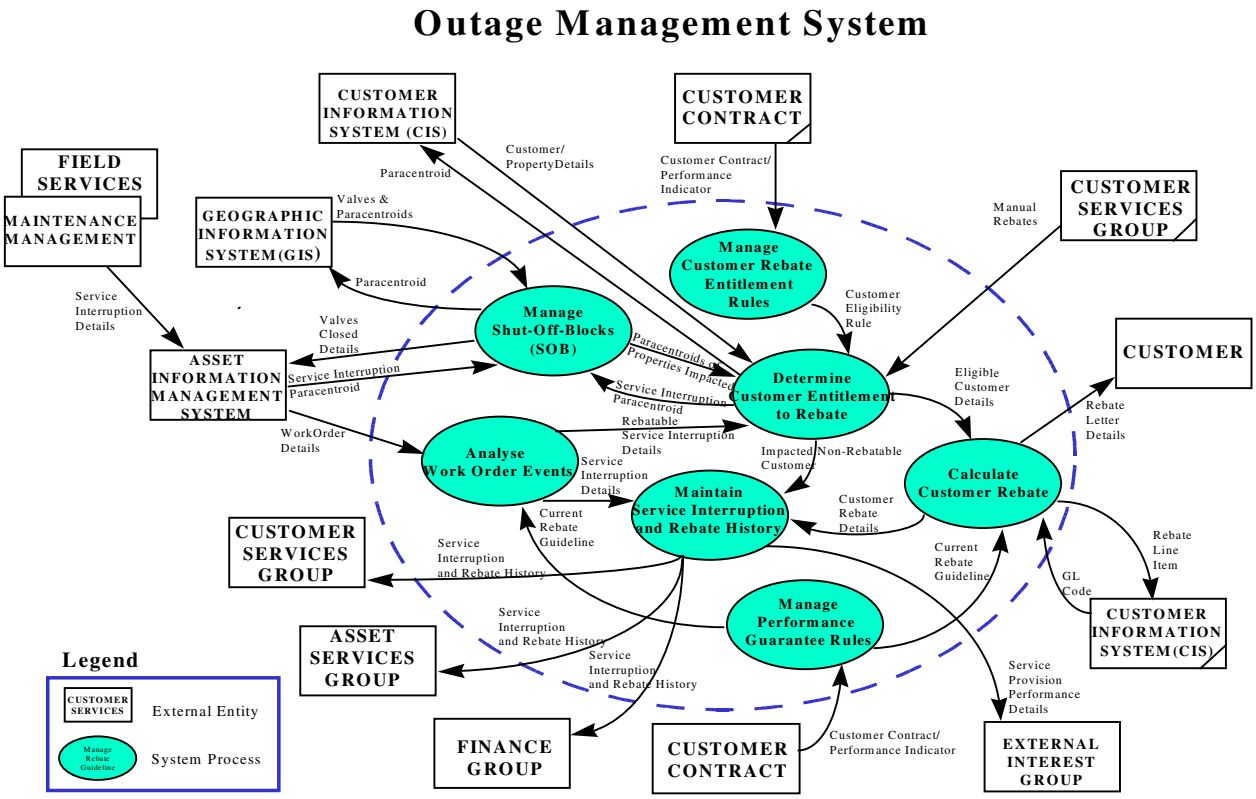
An innovative feature was the implementation of a Shutoff Block (SOB) subsystem that interfaces with the GIS, PHOENIX. It enables properties that are affected by service interruptions to be automatically identified. This allowed "speedier" SOB processing and reduced costs by elimination of high labour costs.

A state-of-the-art technique called "wrapper" software was used to build interfaces between CORS and other application systems. It insulates CORS from changes in those systems. It also allows CORS to be reusable in other environments by changing the "wrapper" interfaces. This represents a commercial opportunity for sale to other utilities.

A sophisticated rule-based management module was implemented to ensure flexible up-dating of the customer service performance guarantee rules. This reduced the maintenance cost of CORS and further enhanced the reusability of the system.

To ensure timely and efficient outage reporting to the Office of the Regulator General and internally, the relevant reports are generated on the internet and intranet. The major processes of CORS and its relationship with the relevant external entities are summarised as Figure 2.

Figure 2



## 6. The Outcomes

By sharing the data and enabling business processes to be integrated, the following outcomes can be illustrated:

- Service interruptions now only required two to three minutes to process each shutoff block (previously one hour).
- CORS provided support for handling multiple sewer stoppages and sub-standard water flow rates.
- Water supply service interruptions of more than 5 hours or having occurred more than 5 times in a twelve-month period were processed automatically by the system. Previously they required thirty-four process steps, nine information "handoffs", nine personnel from different departments and three major application systems with up to nine separate accesses. The processing time fell from 3 to 10 days under the old system to less than one hour under CORS!
- A customer complaint about a water supply interruption can now be satisfied in less than 5 minutes with one enquiry in CORS. It had previously required up to nineteen process steps, nine information "handoffs", seven different people from different departments involving three major application systems, and with up to five separate accesses. Prior to CORS being implemented this would take 3 to 10 days.
- By introducing CORS, it enabled uniformity and consistency in relation to rebating customers. Prior to CORS being implemented, some customers experiencing service interruptions were not identified, and some customers were mistakenly notified and given rebates they were not entitled to.

Hence, by leveraging existing systems, coupled with innovation and ingenuity, the implemented solution produced impressive benefits for a minimal investment:

- Lower costs due to increased efficiency and higher productivity from automating outage management and customer rebate processing. The recurring annual financial benefit is 4.4 times the recurring annual cost. The payback period is 2.3 years.
- Enhanced customer satisfaction. Yarra Valley Water recently won an Australian Customer Service Association (ACSA) National Medium-Business Award for excellence in the delivery of customer service. In fact, Yarra Valley Water was the only Victorian utility to reach the national finals and the only utility to win a national award.
- Improved asset renewal and valve inspection programs. Yarra Valley Water won the Asset Management Quarterly (AMQ) international award for CORS in the Utilities category.
- Accurate and timely reporting to the ORG via the internet.
- Accurate and timely internal reporting.

It has been generally accepted by line management and technology management at Yarra Valley Water that the Enterprise Model provided a holistic view of the organisation for the first time. This in turn, enabled it to plan, manage and build the degree of integration required to achieve Yarra Valley Water's strategic business objectives.

## 7. Conclusions

There are lessons that may prove useful for corporatised and privatised utilities worldwide from the experience of Yarra Valley Water. Specifically:

- Substantial benefits can be accomplished with a minimal investment by leveraging existing systems even if they were not integrated. Different systems implemented on separate software and hardware platforms with the attendant problems of data sharing and data integrity are common. Solutions that are more radical are often constrained by budgetary and technical considerations.
- The use of an Enterprise Model and the recognition by management of the need for integration is crucial in identifying possible solutions to strategic business problems. The Enterprise Model also assisted in identifying existing resources, which could be leveraged. It provided a holistic view of the business. It provided the enterprise-wide view of customer services for the first time. This was important in achieving the cultural change required. It also depicted to all levels of management the degree of integration required to achieve strategic business solutions.
- Substantial benefits will not be experienced without willingness for the organisation to undergo a paradigm shift. The shift is from a regulated protected public monopoly, to one, which is corporatised (and privatised) and exposed to domestic and increasingly global competition. It especially requires the adoption of a customer focus and the guarantee of quality service provision.

## 8. References

[1] Australian Government, *Government Trading Enterprises Performance Indicators 1990-1991*, Volume 1 Overview, AGPS, 1992.

[2] Boar, B. H. *Practical Steps for Aligning Information Technology with Business Strategies: How to Achieve a Competitive Advantage.* John Wiley & Sons, 1995.

[3] Botsman, P., *The Case Against Privatization and the Challenges of the 90s and 2000s*, Evatt Foundation, 1993.

[4] Collier, B. and S. Pitkin (eds.), *Corporatisation and Privatisation in Australia: A collection of papers examining legal, economic and policy issues*, CCH Australia, 1999.

[5] Cornwall, A., *Reforms to the Victorian Water and Energy Industries: Consumers and the Public Interest*, Consumer Law Centre Victoria, 1994.

[6] Dennis, G. and Goodrich, J. (eds.), *Privatization and Deregulation in Global Perspective*, Pinter, 1990.

[7] Gale, T., Eldred, J. *Getting Results with the Object-oriented Enterprise Model.* SIGS Books, 1996.

[8] Grigsby, D. and M. Stahl., *Cases in Strategic Management*, Blackwell Publishers, 1997.

[9] M. Hammer., Reengineering Work: Don't Automate, Obliterate, *Harvard Business Review*, July-August 1990.

[10] James, C., C. Jones and A. Norton (eds.), *A Defence of Economic Rationalism*, Allen and Unwin, 1993.

[11] KPMG., *What Went Wrong? Unsuccessful Information Technology Projects*, Strategic and Technology Services, 1997.

[12] Lane, J-E. and European Consortium for Political Research (eds.), *Public Sector Reform: Rationale Trends and Problems*, Sage Publications, 1997.

[13] Liebowitz, J. and M. Khosrowpour, *Cases on Information Management in Modern Organisations*, Idea group Publications, 1997.

[14] King, S and R. Maddock., *Unlocking the Infrastructure: The Reform of Public Utilities in Australia*, Allen and Unwin, 1996.

[15] J.L. McKenny and W. F. McFarlane., The Information Archipelago – Maps and Bridges, *Harvard Business Review*, September-October 1982.

[16] J.L. McKenny., W.F. McFarlane. And P. Pyburn., The Information Archipelago- Plotting a Course, *Harvard Business Review*, February 1983.

[17] Officer, R. and J. Quiggin., *Privatisation: Efficiency or Fallacy: Two Perspectives*, Committeee for Economic Development in Australia, 1999.

[18] M.E. Porter., How Information Gives You Competitive Advantage, *Harvard Business Review*, July-August 1985.

[19] J.F. Rokart., Chief Executive's Define their Own Data Needs, *Harvard Business Review*, March-April 1979.

[20] Sequent Computer Solutions., *Revolution and Risk: IT into the Millennium: A Report into the Challenge facing IT Directors in Business*, URL:http:// www.sequent.com/datacenter/survey/ciorisk.htm date accessed 5 August 1999.

[21] Spewak, S. *Enterprise Architecture Planning.* QED, 1993.

[22] Spicer, B., D. Emanuel, and M. Powell, *Transforming Government Enterprises: Managing Radical Organisational Change in Deregulated Environments*, Centre for Independent Studies, NSW, 1996.

[23] J. Quiggen., Does Privatisation Pay?, *Austrlian Economic Review*, 95920, 1995.

[24] Victoria Privatisations and Industry Reform Division, *Government Business Enterprises Reform in Victoria: A Guide to the First Three Years October 1992-September 1995*, Department of Treasury and Finance.

[25] Water Services Association of Australia, The Australian Water Urban Industry Section 13 , *Facts'96*, 1996.