

Recycled Water Business Case

Executive Summary

Background

The experience of ongoing drought and a climate change future is driving a new reality for Victorian water users, water managers and infrastructure planners. Our reliance on traditional rainfall-dependent sources of water is no longer sustainable.

The uncertainty and variability of rainfall patterns is impacting upon the reliability of our water supply systems across the State. Furthermore, Victoria's strong population growth and economic expansion are placing increasing demands upon existing water supplies.

The Garnaut Climate Change Review released on 30 September 2008 concedes that the form and extent of climate change are uncertain, but refers to the weight of scientific evidence that the likely impacts are insidious and long term. Its effects cannot be ignored.

The Victorian Government released *Our Water Our Future – the Next Stage of the Government's Water Plan* in June 2007. The plan responds to the decline in inflows and identifies how to provide water security across much of the State, by investing in a variety of approaches to meet Victoria's future water needs.

The issues and opportunities considered in this report, the Recycled Water Business Case, rely on a strong suite of policy responses and actions being undertaken by the Government. Within this context the options presented in this Business Case provide an important contribution to further securing Victoria's water future, should they be required.

Recycled Water from Eastern Treatment Plant (ETP)

The Victorian Government has committed to the upgrade of Melbourne's Eastern Treatment Plant (ETP) at Carrum to tertiary standard, to provide more than 100 GL a year of Class A recycled water by 2012.

This Business Case

The options for the use of ETP recycled water and the requirement for this Business Case were foreshadowed in *Our Water Our Future*. This Business Case compares the costs and benefits of taking the tertiary treated Class 'A' water and recycling for one of two options:

- **Substitution of recycled water for river water being used by the power generation industry in the Latrobe Valley** ('the Latrobe Valley Option') – recycled water could be delivered to power generators in the Latrobe Valley, which currently use about 100 GL of river water a year (mostly for evaporative cooling in power plants) drawn mainly from the Latrobe River, Blue Rock Reservoir and Moondarra Reservoir. This would secure water supplies for this critical industry as well as release water for the environment, Gippsland and Melbourne.
- **Substitution of recycled water for environmental flows in the Yarra River** ('the Yarra River Option') – recycled water could be pumped into the Yarra River slightly downstream from Yering Gorge (the point where water is transferred from the Yarra into Sugarloaf Reservoir for Melbourne's water supply). This would allow more water to be transferred to Melbourne's water storages.

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Summary of Recycling Options

Latrobe Valley Option

The Latrobe Valley Option utilises water from ETP which will undergo further advanced treatment prior to being transferred to the Latrobe Valley for power station cooling. This enables river water currently used by the power stations to be reallocated, while also providing the power stations with improved security of supply under adverse climate change scenarios.

The option will directly make available 67 GL pa from the Latrobe River to mitigate against water shortfalls generated through population and industrial growth and climate change. A proportion of water made available through this option may be allocated to help meet environmental water requirements of rivers. Ocean outfall discharges would be reduced by about 60% in volume and nutrient loads will also be reduced.

The Latrobe Valley Option comprises the Recycled Water Scheme and the Release Water Scheme. This option may be staged, with the Release Water Scheme implemented at a later date.

Recycled Water Scheme

The Recycled Water Scheme will supply Class A recycled water to meet the specific needs of the Latrobe Valley generators (Loy Yang A & B, Yallourn, Hazelwood and Energy Brix) and en route agricultural users via the Koo Wee Rup aquifer.

The Recycled scheme comprises the following main components:

- ETP process upgrades and advanced water treatment plant designed to meet the asset management requirements and health exposure criteria for use in power stations.
- Recycled transfer system to deliver treated water to the Latrobe Valley including managed aquifer recharge at Koo Wee Rup for other potential reuse.
- Saline waste transfer system to deliver waste to an ocean outfall at McGaurans Beach.
- Onsite works at the power stations.
- Changes to supply arrangements for existing recycled water customers on the South East Outfall.

Release Water Scheme

The Release Water Scheme will transfer a share of the river water made available by the Recycled Water Scheme from Blue Rock and Moondarra Reservoirs to the Thomson Reservoir, the main storage for Melbourne's water supply.

The Release Water Scheme comprises the following main components:

- Blue Rock Reservoir to Moondarra Reservoir transfer system.
- A new water treatment plant near Moondarra Reservoir.
- Moondarra Reservoir to Thomson Reservoir transfer system, including a tunnel and pumping system to allow return flows.

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Yarra River Option

The Yarra River Option utilises the water from ETP, which will undergo further advanced treatment before being transferred to the Yarra River downstream of Yering Gorge for substitution of environmental flows.

This allows for additional river water to be harvested at the Yering Gorge Pumping Station and stored in Sugarloaf Reservoir before treatment and distribution to the Melbourne network.

Implementing the project will make up to 60 GL pa of water available for consumptive use. A marginal increase in environmental flows of 10 GL pa is achieved but it may involve increased risks from water quality impacts downstream. Discharges to the ocean would be reduced by about 60% in volume and nutrient loads will also be reduced.

This option comprises the following main components:

- ETP process upgrades and advanced water treatment plant.
- Recycled transfer system to deliver treated water from ETP to the Yarra River including provision for en route offtakes.
- Constructed wetland and river discharge infrastructure.
- Changes to supply arrangements for existing recycled water customers on the South East Outfall.
- Water treatment plant at Sugarloaf Reservoir and distribution network upgrades.

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Option Evaluation

Both the Latrobe Valley and the Yarra River options deliver social, environmental and economic benefits to the Victorian community.

The Yarra River Option provides improvements to water security, with the environmental and social benefits to Melbourne's water users.

The Latrobe Valley Option:

- Provides the flexibility to deliver the project in a two part approach and consequently the Recycled scheme may be delivered first with the Release Scheme completed later consistent with the forecast service need in Melbourne.
- Increases potable water supplies for Melbourne and the Latrobe Valley communities, with associated social and economic benefits.
- Interconnects the Melbourne and Latrobe water supply systems, increasing the flexibility of water supplies between these regions and enhancing the associated social and economic benefits.
- Secures alternative 'fit for purpose' water supplies for the power generation industry in the Latrobe Valley and Victoria generally, to the further benefit of the Victorian economy.
- Provides 'fit for purpose' water supplies in support of agricultural industry development around the Koo Wee Rup aquifer.

The Latrobe Valley Option without the Release Scheme delivers all these benefits except those arising from the provision of water for consumptive use in Melbourne but facilitates the provision of increased environmental flows to the benefit of the increasingly distressed Latrobe River, the Gippsland wetlands and lakes.

Table 1 : Option Comparisons

Option	Beneficiary	Water Released	Capex (P95) real	Opex (P95) real	Nature of Benefit		
					Economic	Social	Environmental
Latrobe Valley Recycle only	Power stations, Latrobe Valley Rivers, Agricultural Industry	67 GL pa	\$2,955M	\$75M pa	✓	✓ ✓	✓ ✓ ✓
Latrobe Valley Recycle and Release	Power stations, Latrobe Valley Rivers, Agricultural Industry, Melbourne water users	67 GL pa	\$3881M	\$105M pa	✓ ✓ ✓	✓ ✓ ✓	✓ ✓
Yarra Option	Melbourne water users, Yarra River	60 GL pa	\$2167M	\$113M pa	✓ ✓	✓ ✓	✓

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Financial Assessment

Realisation of the economic, environmental and social benefits requires investment in capital infrastructure and associated operating costs.

From a purely financial perspective, the Latrobe Valley Option (with Recycled and Release Scheme) incurs the higher investment cost compared with the other options.

The tables below provide a summary comparison of the expected and plausible worst-case capital and annual recurrent costs of delivering the options, expressed in real terms (2008 dollars).

Plausible Capital and Recurrent Costs P95 estimates (Real)

	Latrobe Valley (Recycled and Release)	Latrobe Valley (Recycled Only)	Yarra River
	\$ ('mil)	\$ ('mil)	\$ ('mil)
Raw Capital Cost	2,853	2,189	1,629
Risk adjustment	1,028	766	538
Risk-adjusted Capital Cost	3,881	2,955	2,167
Average Annual Recurrent Cost	85	60	82
Risk adjustment	20	15	31
Risk-adjusted Annual Recurrent Cost	105	75	113

Risk Management

The Latrobe Valley Option and the Yarra River Option each have a unique set of risks:

- The Latrobe Valley Option has more commercial risks because it relies on finalising agreements with power generators to release bulk water entitlements and accept recycled water.
- The Yarra River Option has water quality and environmental risks primarily associated with the function of artificial wetlands taking recycled water before discharging into the Yarra River.

A large number of risks and opportunities have been identified and analysed for both options in this Business Case. There is an opportunity in the first phase of the implementation plan to mitigate several risks and potentially reduce the risk-adjusted costs for the Latrobe Valley option. This is primarily around optimisation of the advanced water treatment plant at ETP (in conjunction with Melbourne Water tertiary trial studies), and finalisation of commercial negotiations with the power generators

From an overall infrastructure planning risk perspective, one of the key challenges for the future will be deciding when and how to proceed with the next Victorian water supply augmentation and what factors should drive the associated decision-making. Government, rather than suppliers or customers, is best placed to manage this risk.

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Commercial Arrangements (Recycled Water Customers)

The feasibility of the Latrobe Valley Option depends on the generators' acceptance of recycled water and their willingness to move from their existing supply arrangements. Discussions with generators have been positive and there is in-principle acceptance of the water quality specification, with the outstanding issues to be resolved largely commercial in nature. Proceeding with this option will require further commercial negotiations with the generators prior to any considerations to implement.

The generators have indicated that they will need incentives to voluntarily switch from their existing supply arrangements and an estimate of the amount required has been taken into account in the project costs.

The arrangements put in place between the Project and generators (customers) will need to be aligned with the arrangements between the Project and Melbourne Water for the supply of water from ETP. This will require consideration within current processes to review trade waste regulatory arrangements and the agreements between Melbourne Water and retailers. Regulatory amendments to protect the volumes of wastewater (from sewer mining) being transferred to ETP may be required.

Supply of recycled water to other customers along the project pipeline would be managed by the local water retailer and agreements put in place to reflect this.

Community and Stakeholder Considerations

More than 90 stakeholders, including groups and individuals, have been briefed in developing the Business Case, with the objective of gaining a thorough understanding of community perceptions regarding the recycled water options.

Importantly, the feedback has been used to inform the Business Case.

Recycled water is now seen as a valuable resource and an important element of sustainable water management. What has emerged through the briefings is a growing understanding of water as a precious and finite resource that must be managed responsibly, and this is resonating with people especially through their experience of water restrictions.

Despite general overall support for recycling water, there are specific concerns related to each option. For the Latrobe Valley Option, stakeholders in Gippsland are concerned that the Government may not provide an equitable share of any 'freed up' water for urban, industrial and environmental needs in Gippsland. There is also lingering concern from unions whether the recycled water will be safe for workers at the power stations.

For the Yarra River Option, environmental groups have concerns about the impacts of releasing recycled water into the Yarra River due to perceived risk to river ecology and marine life.

Implementation and Timing

The Project Implementation Plan has been developed with the understanding that water policy issues in Melbourne and Gippsland are prone to uncertainty due to factors such as rainfall unreliability, accelerated population growth and the onset of bushfires that could dramatically affect our water catchments.

The Implementation Plan has a 'state of readiness' philosophy for a possible service need in the near term in the Latrobe Valley, and in Melbourne in the medium term. It is based on a traditional procurement model. Delivery times could be improved by adopting a Partnerships Victoria approach.

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Should a preferred option be selected by the Government and a decision to proceed with the Latrobe Valley Option made, the Commercial Negotiations and Technical Optimisation phase is necessary and must be successful.

The Planning and Environmental phase will follow once full project funding is approved. It will allow for all necessary approvals to be obtained and investigations to be completed before construction begins. For the Latrobe Valley Option, these activities may be conducted for the Release Scheme but the procurement, design and construction phase should be deferred until there is a service need for the water in Melbourne.

The Design and Construction Phase for the Yarra Option would commence when the requirement is established through regular supply and demand balance reviews within the *Central Region Sustainable Water Strategy*.