

Submission to
Essential Services Commission
"Water Tariff Structures Review"
by
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Summary

The purpose of this submission is to demonstrate how rainwater tanks can be a cost-effective source of additional drinking water supply for Victoria. Melbourne is the case study.

Melbourne has one million separate houses. Using a new design of low cost, mass-produced rainwater tank, an average house can obtain 70 KL of rainwater from the roof each year at a cost of \$1.42/KL. The cost over 30 years is \$2975 and the yield is 2100 KL.

These estimates are based on Melbourne receiving 85% mean annual rainfall for the next 30 years. Research in South Australia and Western Australia shows that there is a 3% decline in water inflow into dams for every 1% decline in rainfall. This suggests that a 15% decline in Melbourne's rainfall due to climate change can lead to a 45% decline in water stored in dams.

Rainwater supply can be installed and plumbed into one million separate houses within seven years, at the rate of 400 per day. Demand for mains drinking water will reduce by 70 GL a year when one million houses use rainwater tanks.

The Victorian Government announced that the price of Melbourne's mains drinking water may approximately double over the next five years. For example, the price rise by Southeast Water will be from \$0.82/KL \$1.64/KL. This means that rainwater, at \$1.42/KL, will be the lowest cost source of household drinking water within five years.

Melbourne's water utilities have applied for substantial price rises for 2008/09. For example, Yarra Valley Water is seeking a 22% rise. Over half (12.4%) is made up of Melbourne Water charges, but nearly one-fifth (4.2 per cent) is made up of reduction in demand.

It is possible that Melbourne's water utilities have not budgeted for customers reducing demand for mains drinking water by 70 KL/year. Consequently, it may be necessary for the water utilities to re-consider their long-term pricing strategies, should the Government support the use of rainwater tanks by all Victorian households, where cost-effective, as described in this submission.

Over the next four years, the Government has budgeted to provide rebates for rainwater tanks. Rebates are necessary because rainwater tanks currently fail to provide a cost-effective source of water supply. If the Government supports the approach described in this submission, it is difficult to imagine any scenario where a rainwater tank rebate is appropriate.

The Government is able to support a State-wide rainwater tank program for delivering a sustainable rainwater supply at a lower cost than mains drinking water, without paying rebates for rainwater tanks.

Concept of the 670 Litre Rainwater Tank

Rainwater can be obtained for \$1.42/KL using a 670 litre rainwater tank that is mass produced by plastic injection moulding at a wholesale cost of \$150. The tank weighs 20 KG, stands 150 CM tall, and is 80 CM diameter.

An injection moulding machine makes 150,000 tanks per year. Manufacturing capacity is a function of the number of machines used.

This tank can be safely handled by one person and can be installed next to almost any downpipe with ease. The assumptions underpinning the cost/yield estimate are:

- four 670 litre rainwater tanks can be connected to three or four house downpipes to receive water from 175 square metres of roof
- water stored in linked tanks can be gravity-fed to a single pressure pump
- the pressure pump is connected to an automatic switching valve for delivering mains water when the rainwater tanks are empty
- all water is removed so that the tank is clean and dry when empty
- rainwater supplies toilet cistern; clothes washing machine; hot water service
- annual rainfall is 555 MM (85% of mean annual rainfall of 653 MM)
- rainwater collection efficiency is 85%
- overflow from four 670 litre tanks into the stormwater system is 16 KL/year
- cost of a 670 litre rainwater tank (wholesale) is \$150
- cost of a pressure pump (wholesale) is \$200, total of three pressure pumps over 30 years
- cost of electricity is \$3.50/year
- cost of automatic switching valve (wholesale) is \$200
- cost of installation and plumbing is \$1200

Building regulations require all roofwater to be discharged into downpipes connected to the stormwater system. Typically, one downpipe is required for 60 square metres of roof and a house will have at least four downpipes. The flexibility of a 670 litre tank means that a combination of downpipes can be selected to harvest water from a minimum 175 square metres of roof.

Every Melbourne household can use 70 KL of rainwater each year because average indoor consumption of mains drinking water is 150 KL/year or 411 L/day. Collecting rainfall from 175 square metres of roof yields 175 L for every 1 MM of rainfall. It takes 2.4 MM rainfall to yield 411 L. When rainwater tanks are full, tank capacity becomes available at the rate of 411 L/day, or the equivalent of 2.4 MM rainfall.

Automatic Switching Valve

Tank capacity is maximised, and continuity of supply is guaranteed, when an automatic switching valve alternates between tank supply and mains water supply as a function of the presence of water in the tank. The automatic switching valve may be used with any pressure pump.

Pressure Pump

The cost estimate of \$200 for a standard pressure pump is based on the wholesale purchase of pumps. Considerable opportunities would be afforded local manufacturers should every house in Melbourne require a pressure pump within seven years.

Installation and Plumbing

The cost of installing four 670 litre rainwater tanks, and plumbing the supply into the household plumbing system, for one toilet, one laundry tap and one hot water heater, is estimated to be \$1200.

This compares with an estimate by the National Water Commission of \$1275 for installing and plumbing a single 5 KL rainwater tank (April 2007).

To achieve one million installations in seven years will require 400 per day for 360 days per year. Considerable opportunities would be afforded plumbing services companies to cater for this level of demand.

Rainwater Tank Rebate Policy

Government policy is to encourage all households to reduce mains drinking water consumption. Substituting rainwater for mains drinking water is actively encouraged by the Government.

Large rebates are paid by the Government for rainwater tanks that are manufactured by plastic rotary moulding, or from steel, but do not provide a cost-effective source of rainwater supply. Rebates are:

- \$150 for tanks 600 L – 2 KL
- \$500 for tanks 2 KL – 5 KL
- \$1000 for tanks larger than 5 KL
- \$150 when a tank is plumbed into a toilet cistern

In April 2007, the National Water Commission estimated the cost of rainwater in Melbourne as \$3/KL using a single 2 KL tank, and as \$2.64/KL using a single 10 KL tank.

Tanks of 2 KL – 10 KL capacity are generally unsuited for existing houses. Where there is room to accommodate a large tank, this is frequently at the expense of competing, more desirable, uses of space. Large tanks are costly to transport and install. It is difficult to direct water from all downpipes to a single rainwater tank.

If the Government supports the approach described in this submission, it is difficult to imagine any scenario where a rainwater tank rebate is appropriate.

Ownership Rights

The Victorian Government's position on ownership of rainwater is, "The water that falls on a person's roof in Victoria is the property of that person."

The Department of Sustainability and Environment (DSE) advised that, "The State's right to the use, flow and control of water in Victoria extends to all water in a waterway and groundwater. The terms "waterway" and "groundwater" are defined in the Water Act 1989. If water falls on a person's roof, it may, after it has left that roof, become water in a waterway or groundwater. For the period that the water remains on the roof, it is not water in a waterway or groundwater. The Act specifically states that a person has the right to use rainwater on his or her land."

DSE's position on plumbing rainwater tanks is that a person may distribute rainwater in their household plumbing system, whereby the plumbing is shared between rainwater supply and mains water supply, providing the plumbing connection complies with the Australian Plumbing Standard AS3500.1:2003.

DSE's position on use of rainwater is that a person has the right to use rainwater collected from that person's roof for any purpose including drinking.

Clause 2 of the National Water Initiative Agreement says, "In Australia, water is vested in Governments." DSE's position is that Clause 2 does not state that "all" water is vested in Governments and consequently that Clause 2 does not apply to water that falls on a person's roof in Victoria.

DSE's position is not in agreement with the Commonwealth Government's position, as explained by the Minister for Environment and Water Resources, Hon Malcolm Turnbull, on 9 August 2007 (Page 150, Senate hansard, 9 August 2007 (Question No. 2971) <http://www.aph.gov.au/hansard/senate/dailys/ds090807.pdf>).

The Commonwealth holds that "all" water in Australia is vested in Governments. Either the Victorian Government's position is correct or the Commonwealth Government's position is correct. Both cannot be correct.

The Commonwealth advocates that the Victorian Government has the right to impose an "entitlement regime" on the use of water that falls on a person's roof in Victoria.

An "entitlement regime" increases the cost of rainwater per kilolitre by reducing the amount that may be used, and is the same as a tax or charge.

The Victorian Government does not claim to have any authority to impose an "entitlement regime" in Victoria. Only the Commonwealth makes this claim.

The Commonwealth is unable to substantiate its claim and is obliged to withdraw it.

The Government can not mandate the use of rainwater that falls on a person's roof, because no rights to that water are vested in the State. This means that the Government can not mandate the use of rainwater tanks.

But the Government is in a position to actively encourage the adoption of low cost rainwater supply by all households who voluntarily choose to do so.

For example, water utilities, and Local Councils, are able to receive purchase orders from their customers, and purchase rainwater goods and services at wholesale prices on their behalf. There is no impediment under the Local Government Act to Local Councils earning a commercial return from this activity.

Government policy is that the cost of rainwater supply is a building cost. When a rainwater supply system is installed in an existing house at point of sale, the cost is included as a building cost. It is the same when a new house is purchased.

Houses change ownership on average every seven years. This means there is considerable opportunity to incorporate rainwater supply into most existing houses within seven years.

Conclusion

This submission demonstrates how every separate house in Melbourne can have its own rainwater supply system installed within seven years, to yield 70 KL a year for 30 years, costing \$1.42/KL, and collectively contributing 70 GL to Melbourne's drinking water supply.

These estimates are based on a 15% decline in mean annual rainfall and a mass-produced 670 litre rainwater tank sold to customers at wholesale cost.

Should Melbourne's mean annual rainfall continue at 653 MM, rainwater tanks will provide 82 KL each year for 1.21/KL compared with mains drinking water costing \$1.64/KL.

If rainfall declines by 15%, and produces a 45% decline in water inflows into the dams, it is obvious that rainwater tanks will be a critically important component of Melbourne's sustainable water supply.

It is a simple matter for the Government to validate the technology and cost involved in mass-producing, installing and plumbing 670 litre rainwater tanks, to achieve the cost and yield described in this submission.
