The Economic Level of Water Conservation (ELWC)

Plain English Summary

October 2022

Sydney WATER

Why do we use the Economic Level of Water Conservation?

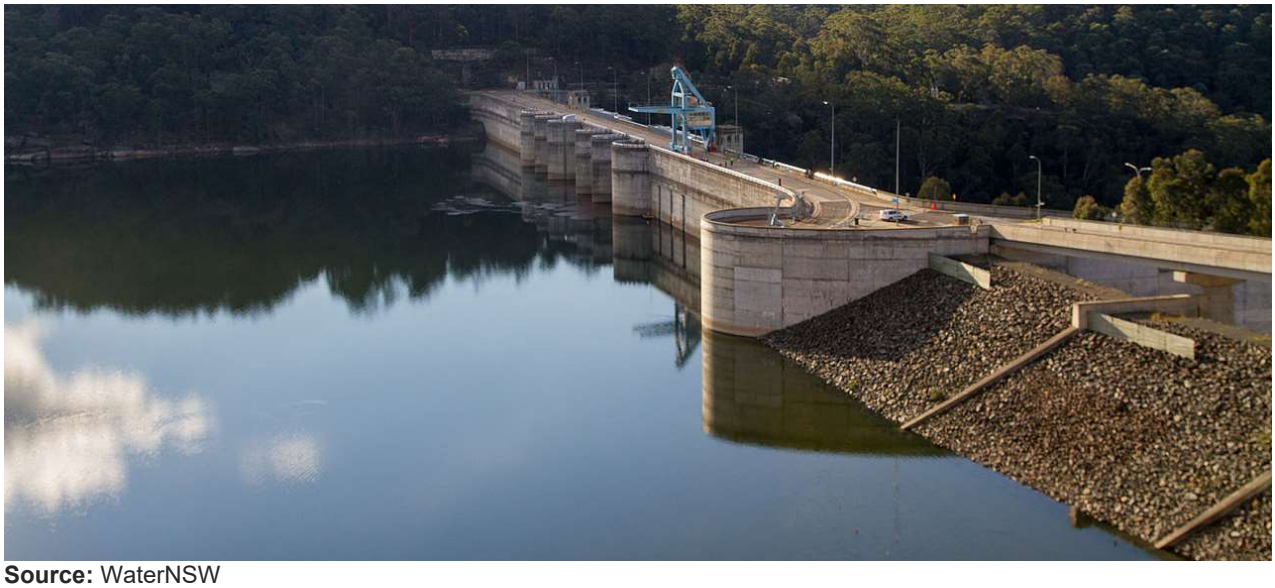
Sydney Water supplies over 1.5 billion litres of water a day to over five million customers across Greater Sydney and the Illawarra. It is important we do this efficiently and effectively.

Before 2016, we had fixed targets for reducing drinking water use. The targets were successful, and we have been able to serve more than one million extra customers since the 1980s, without increasing the city's total water use.

However, the old targets were not flexible. For example, we had to invest even if the dams were full and there was plenty of water. The Economic Level of Water Conservation (ELWC) was proposed as a new way of deciding how much water to save. It was developed by Sydney Water and approved by the Independent Pricing and Regulatory Tribunal (IPART) in December 2016.

Under our Operating Licence 2019-2024, we must:

- Implement water saving projects that have been assessed as 'economic' using the method
- Update and publish key outputs of the method each month (value of water and estimated water savings)
- Publish a Plain English summary of the method



Source: WaterNSW

Changes to the ELWC method can only be made by the Minister responsible for Sydney Water.

How does this approach work?

The method says we should invest to save water if the benefits are more than the costs. For example, if we could spend $100 on fixing a leak and the benefits are $200, we should fix it. If fixing that same leak instead costs $250 we should not proceed with the investment,

An important feature of the approach is that the benefits of saving water can change depending on rainfall and dam levels. For example, if dam levels are very low the benefits will be greater, and we should invest more to save water.

Whose costs and benefits are included?

We consider the costs and benefits to the whole community, not just the financial impacts on Sydney Water. For example, water restrictions apply in times of drought and customers need to change how they use water – so if we can save enough water at the right time, this could delay restrictions. The ELWC method tries to capture the value of these changes.

How do you compare different programs?

Some programs save a lot of water and others only a small amount. A program may take years to deliver savings, while others might save high volumes of water right away. We need to make sure all programs are compared fairly.

To properly compare things that happen in different years, we need to convert future costs, benefits and water saved into their equivalent values of today – known as their *present value*. We do this by multiplying future values by a *discount factor*.

The discount factor works a bit like the adage ‘a dollar today is worth more than a dollar tomorrow’. We also apply this approach to the volume of water saved, because we prefer water savings earlier than later.

Once we have converted everything to present values, we add up program-specific costs and benefits and divide by the volume of water saved. The result is the *levelized cost*, which is expressed in units of dollars per kilolitre (1 kilolitre – 1,000 litres). This allows us to prioritise programs, based on their cost-effectiveness.

What kind of costs and benefits do you consider?

The NSW Government's Greater Sydney Water Strategy (GSWS), and the Greater Sydney Drought Response Plan, outline how we plan and manage water for Greater Sydney in both the short and long term.

Our method tries to capture the following actions and their associated costs, because saving drinking water could potentially help to avoid or defer each of these costs.

Table 1: Costs that can occur at different dam levels

Description	When applied	Valuation method
Raw water from WaterNSW	All dam levels	IPART determined price
Water filtration and treatment	All dam levels	Sydney Water costs Weighted average across all plants
Distribution of treated water	All dam levels	Sydney Water costs Weighted average across all systems
Initial transfer of water from the Shoalhaven River	Drought developing	IPART determined price
Additional transfers of water from the Shoalhaven River	Extreme drought expected	IPART determined price
Higher production at the Sydney Desalination Plant	Drought developing	IPART determined prices
Planning for an expansion of the Sydney Desalination Plant	Extreme drought expected	Planning estimates
Construction of an expansion of the Sydney Desalination Plant	Extreme drought expected	Planning estimates
Water restrictions	Extreme drought expected	Customer willingness-to-pay
Construction of other drought response measures	Extreme drought expected	Planning estimates for Government-endorsed options

Image: Sydney Desalination Plant

Since they apply to any possible water saving program, the costs in Table 1 add together to determine what we call the '*value of water*'.

However, we can also count other costs and benefits that are specific to a water conservation program. For example, saving water can reduce the volume of wastewater we need to manage,

avoiding wastewater treatment costs. Programs that target outdoor water use will not change our wastewater costs. We count these program-specific costs and benefits in the levelized cost of a program, but not in the value of water.

We also count costs and benefits felt by customers, such as a reduction in energy costs for heating water after we have installed water-efficient showerheads.

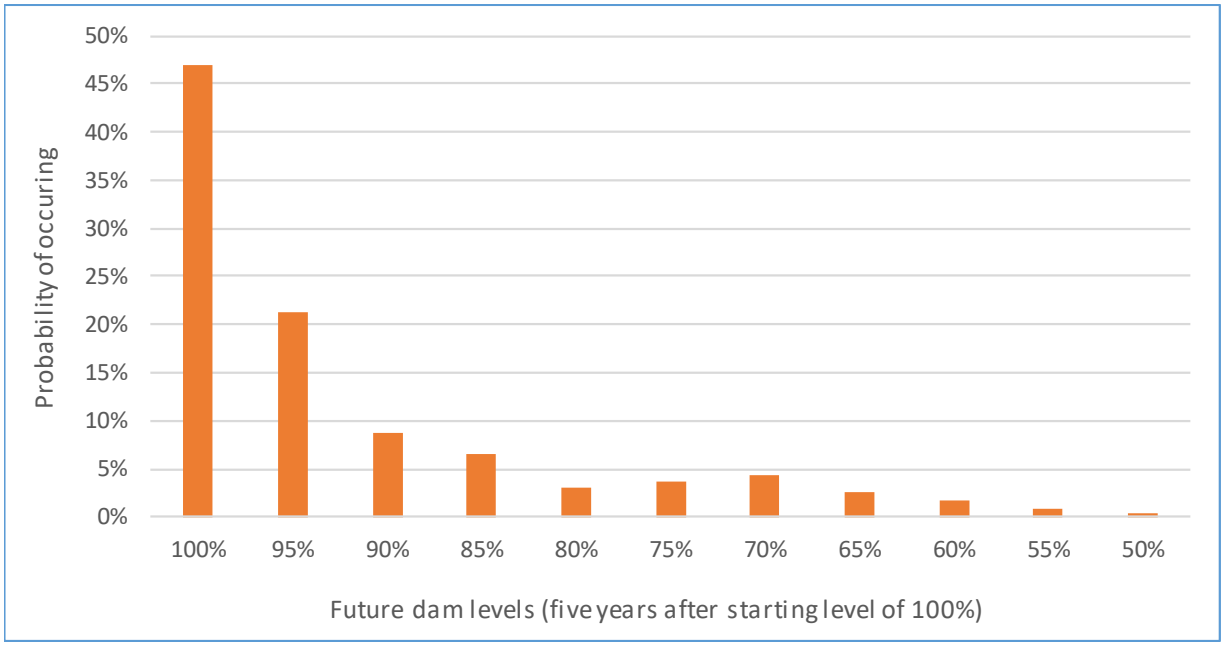
How do you know when to invest?

Our goal is to invest at the right time, before higher costs are triggered. To plan our investments, we need to make assumptions about dam levels many years into the future.

However, the future is uncertain. The method deals with this by estimating how likely it is we will reach different dam levels in the next five years.

We currently do this by looking at past dam levels, to see how they have changed over time. Using that information, we can estimate a probability of reaching future dam levels. An example is shown in the following graph, which assumes that dam levels start at close to 100% full. History tells us that, after five years, dams are still likely to be almost full. However, there have also been times when dams have fallen significantly, showing us there is about a 10% chance they will fall to 70% or lower.

Will dams rise, fall or stay the same?



Multiplying the value of water by the probability of different future dam levels results in an *expected value of water*. Our method says we should invest in a water saving program if the levelized cost is less than (or equal to) the expected value of water.

How do you deal with programs that save water for a long time?

The costs in Table 1 change with dam levels, and we know that dam levels can rise and fall in the space of a few years. However, some programs, like water recycling, may save water for decades.

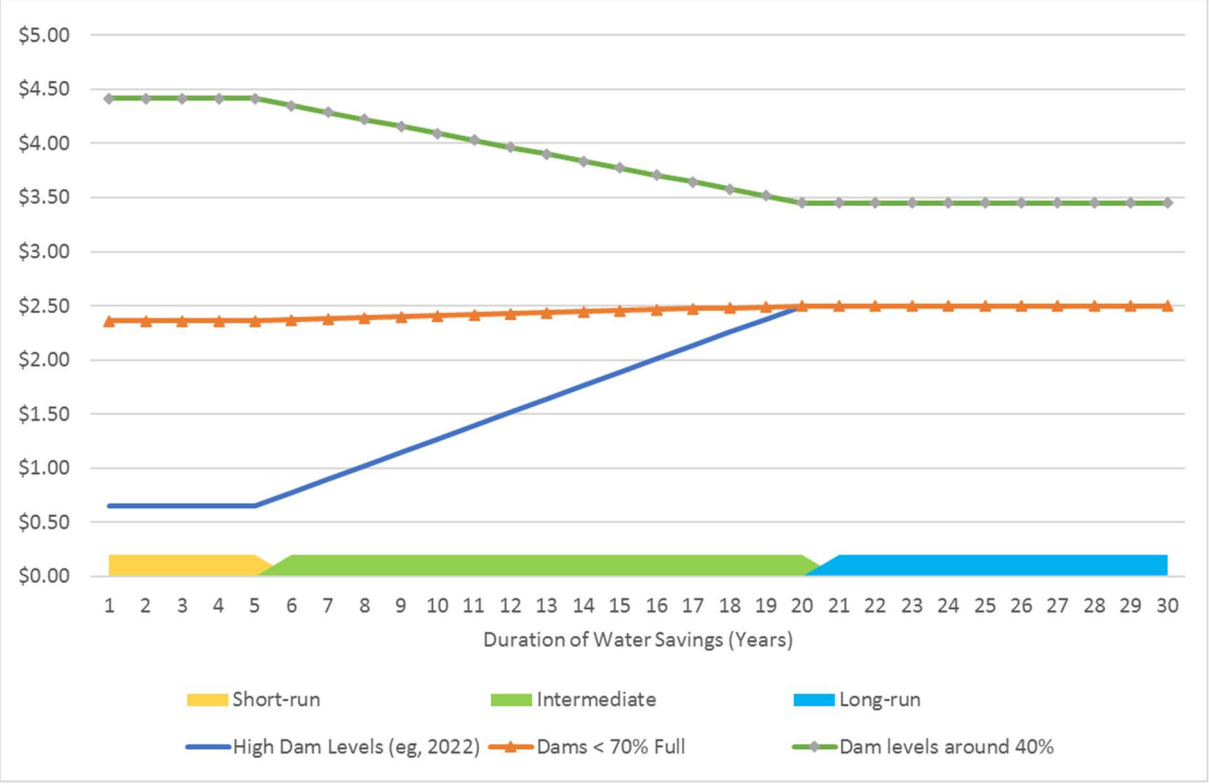
We need to be careful to not spend too much in response to falling dam levels. For example, while the value of water may rise in a deep drought, this is unlikely to last more than a few years. Investing in a long-term program based on an extreme value of water means customers could be left with very high costs long after the drought has broken, and the water may not be really needed.

We deal with this by using a different value of water depending on the length of water savings:

- For programs that achieve water savings for up to five years, we use the short-run value of water to make investment decisions.
- For programs with water savings for more than 20 years, we use the *long-run value* of water. The long-run value of water is based on the costs of all the measures needed to meet water demand in the long term. IPART also uses this information to help set the water usage price paid by our customers, and so we use the retail price to represent the long-run value of water in the method.
- For programs that deliver water savings for more than five, but less than 20 years, we use an *intermediate value of water*. This is calculated on a pro-rata basis for each year of water savings, based on the short- and long-run values.

The long-run value of water is reasonably stable over time, although since 2020 IPART decided the retail price should increase if dam levels fall below 60%. However, as the short-run value of water changes with dam levels, the intermediate value of water will also change, as shown below.

The value of water ($ / kL) depends on dam levels and the length of water savings



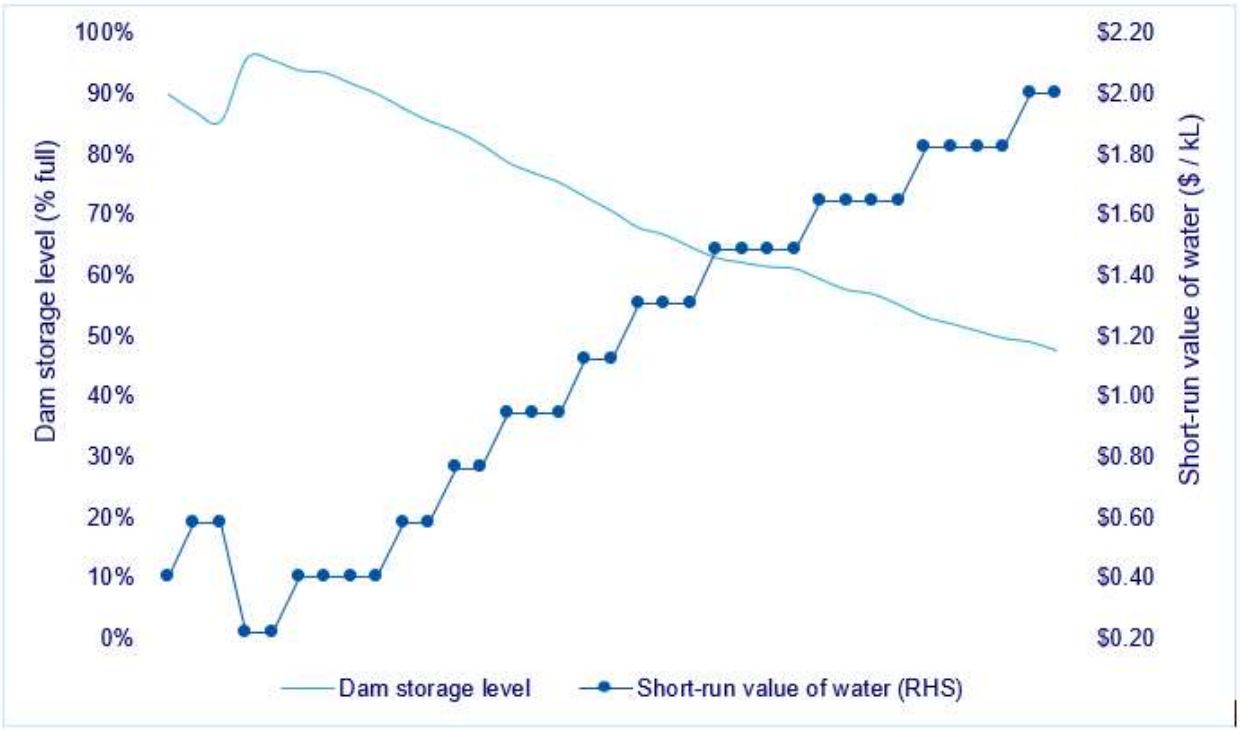
Bringing it all together

So under our Economic Level of Water Conservation methodology we:

- identify potential programs for saving water
- consider the community-wide costs and benefits of each program
- assess each program based on its levelized cost (cost per kilolitre)
- include benefits that apply to all programs in the value for water. Program-specific benefits are counted in the levelized cost
- implement programs where the levelized cost is less than (or equal to) the value of water.

The value of water depends on the forecast length of water savings but can also vary with dam levels. As the value of water rises, we invest more to save drinking water.

What ELWC looks like in practice – short run value of water vs dam levels



The economic level of water conservation is the volume of water we expect to save each year from all programs that have a levelized cost less than (or equal to) the value of water.

Need more info? Talk to us

The full ELWC method is on our website, which provides more detail on different parts of the method.

If you have any questions, please contact us.

Version	Issue Date	Brief description of change
1	December 2019	New document
2	October 2022	Update document to include version control and change history information Minor wording changes throughout the document Update tables and graphs to reflect policy changes arising from: • Greater Sydney Water Strategy • Greater Sydney Drought Response Plan • IPART 2020-2024 price determination for Sydney Water