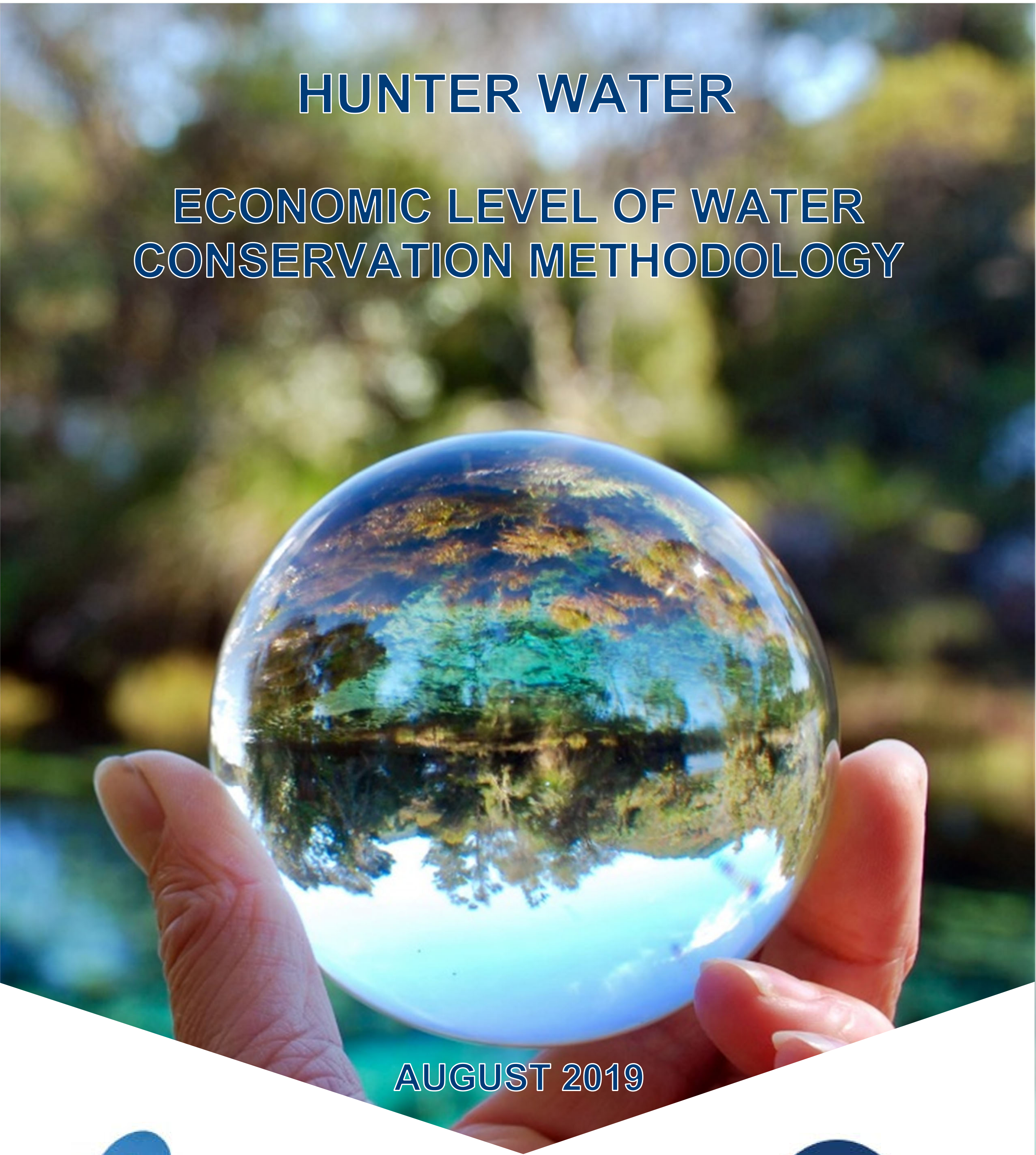
HUNTER WATER

ECONOMIC LEVEL OF WATER CONSERVATION METHODOLOGY



AUGUST 2019

love water

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HUNTER WATER

VERSION CONTROL

Issue number	Date issued	Change Log
1.0	24 January 2019	Proposed methodology submitted to IPART for its approval under the Hunter Water 2017-2022 Operating Licence.
2.0	12 August 2019	Amendment to reflect the Tribunal's conditional approval, subject to setting the 'options value' to zero, as advised to Hunter Water on 7 March 2019.

CONTENTS

1 ABOUT THIS REPORT

Hunter Water's 2017-2022 Operating Licence introduced new requirements for water conservation, which are reproduced below:

2 Water Conservation

2.2 Water treatment plants to tap

2.2.2 By 1 November 2017, Hunter Water must submit to IPART for IPART's approval a report outlining Hunter Water's proposed approach to, and principles for, developing a methodology for determining its economic level of water conservation in relation to (at a minimum) the following elements:

a) water leakage (within and downstream of its water treatment plants);

b) water recycling; and

c) water efficiency (including demand management).

2.2.3 By 1 November 2018, or by a later date as approved by IPART, Hunter Water must submit to IPART for IPART's approval the proposed methodology for determining its economic level of water conservation in accordance with the approach and principles approved by IPART (**Economic Level of Water Conservation Methodology**). IPART may refuse approval of the methodology and require Hunter Water to resubmit it by a specified date after making changes requested by IPART, or approve the methodology unconditionally, or approve the methodology subject to conditions. Hunter Water must comply with any such conditions.

2.2.4 By 1 September 2019, or by a later date as approved by IPART, Hunter Water must develop and submit a water conservation work program using the Economic Level of Water Conservation Methodology.

2.2.5 Hunter Water must obtain IPART's written consent to make any changes to the Economic Level of Water Conservation Methodology (other than changes to correct minor grammatical or typographical errors).

The purpose of this report is to outline Hunter Water's Economic Level of Water Conservation (ELWC) Methodology to meet the requirements of clause 2.2.3 of the Operating Licence.

The main body of the report contains the methodology approved by IPART. The two appendixes contain supporting material, namely:

- Appendix A Examples of current values for input parameters used in applying the ELWC methodology.
- Appendix B Details of the stakeholder consultation undertaken in developing the methodology, including responses to feedback received.

2 AN ECONOMIC APPROACH TO WATER CONSERVATION

Hunter Water's ELWC methodology incorporates the economic concepts of:

- Cost-benefit analysis
- Externalities
- Short-run marginal cost
- Long-run marginal cost
- Levelised cost (as a proxy for the marginal cost of water conservation)
- Option value

The ELWC methodology is based on a cost-benefit analysis framework where the costs and benefits are assessed in marginal terms from a societal perspective. A water conservation measure is considered to be economically viable if the benefits are at least equal to the costs. The benefits are assessed in terms of the value of water conserved and the costs are assessed in terms of the levelised cost of implementing the water conservation measure, both of which are expressed as a present value of dollars per kilolitre of water.

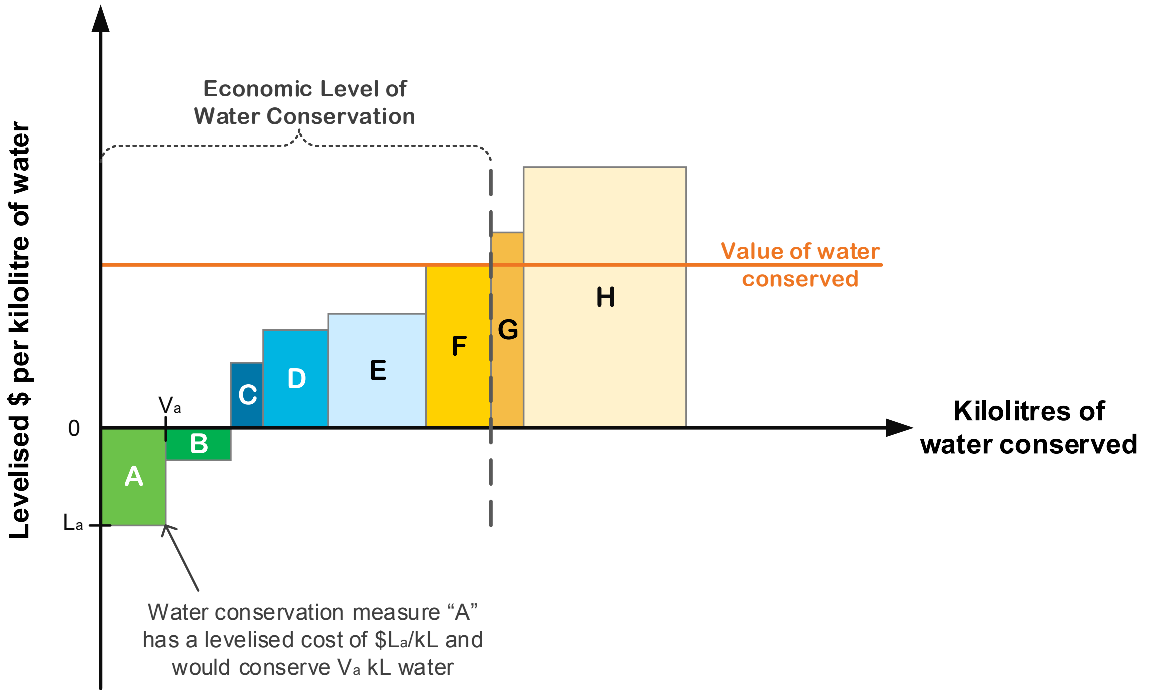
The value of water conserved depends on the timing and durability characteristics of the water conservation measures being assessed (i.e. short or long-term).

For conservation measures with short-term benefits, the short-run value of water reflects the short-run marginal cost including direct operating costs, the social costs of water restrictions, and the alternative drought measures and supply options. Additional consideration is given to the extent to which investments are 'locked-in'. This approach provides flexibility to adapt to changes in circumstances, such as increasing water conservation programs during water scarcity.

For conservation measures with long term benefits, the long-run value of water reflects the long-run marginal cost plus an option value. The option value recognises the avoided cost, in excess of the direct deferral benefit, from the use of small scale water conservation measures that arises from an ability to take advantage of shock and shifts to the yield-demand balance (e.g. technological change) that further defer the need for a source augmentation. IPART have accepted the 'options value' concept, however their approval of this ELWC methodology is conditional on the option value of water being set at zero, and maintained at zero, until IPART decides otherwise (e.g. when the implications are more fully analysed).

The ELWC is calculated by adding the volume of water conserved from all new water conservation measures that are assessed as being economically viable. That is, our investment in new water conservation activities could increase (depending on available projects and funding) until the marginal benefit of saving an extra unit of water is just equal to the marginal cost of supplying an extra unit of water. The economic level of investment is achieved when the marginal values are equal. This can be explained with the assistance of Figure 2.1.

FIGURE 2.1 DETERMINATION OF THE ELWC



The horizontal axis represents the volume of water saved through implementing water conservation measures, while the vertical axis represents the cost per kilolitre. Each new water conservation measure (e.g. A to H) can be characterised by an estimated *volume of water conserved*, which is shown by the horizontal width of each rectangle, and a *levelised cost*, shown by the height of each rectangle. The levelised cost of a water conservation measure can be negative (measures A and B) or positive (measures C to H). A negative levelised cost means the water conversation measure results in a levelised benefit (even before taking into account the value of water conserved). For example, in Figure 2.1 water conservation measures A and B have negative levelised costs and are shown below the horizontal axis. Measure A could be a water efficient showerhead giveaway to customers that enables the customer to save more money on electricity costs for water heating than the financial cost to Hunter Water to buy the showerheads.

In this conceptual example, the projects are ordered by increasing levelised cost from left to right. That is, projects towards the left of the figure are more economically beneficial than those towards the right of the figure. Adopting this convention, the shape formed by the levelised costs of all measures assessed is similar to a marginal cost curve - the cost to save one kilolitre of water rises as we try to save more and more water.

The orange horizontal straight line - "value of water conserved" - reflects the marginal costs of supplying water. It is assumed to be constant at a given point in time, under specific assumptions about balancing supply and demand in the short and long terms.

Using the ELWC methodology, all water conservation measures with a levelised cost less than or equal to the value of water are considered to be economically viable. The volume of water that could be saved if Hunter Water implemented all of these measures is the Economic Level of Water Conservation. In Figure 2.1, measures A to F are economically viable. In other words, the vertical height of the rectangles for A to F are all no taller than the orange horizontal line representing the value of water conserved. Reducing water use any further (e.g. implementing measures G and H) would not be economically beneficial.

3 THE ELWC METHODOLOGY

3.1 QUANTIFYING THE ELWC

The Economic Level of Water Conservation is the level of water conservation achieved when the additional social benefits from water conservation activities are equal to their additional social costs, seeking to maximise net social and environmental benefits.

Our ELWC methodology applies to the following types of water conservation activities:

- water leakage (within and downstream of each water treatment plant);
- water recycling; and
- water efficiency (including demand management).

The ELWC is therefore quantified as follows:

$$ELWC_{HWC} = ELWC_{WL} + ELWC_{WR} + ELWC_{WE} \quad (1)$$

Where:

Parameter	Definition	Units
$ELWC_{HWC}$	Aggregate ELWC for Hunter Water	ML / day or GL pa
$ELWC_{WL}$	Sum of estimated water savings from all economically viable water leakage projects	ML / day or GL pa
$ELWC_{WR}$	Sum of estimated water savings from all economically viable water recycling projects	ML / day or GL pa
$ELWC_{WE}$	Sum of estimated water savings from all economically viable water efficiency projects	ML / day or GL pa

A project is assessed as economically viable where the levelised cost (refer section 3.2) is less than or equal to the value of water (refer section 3.3).

The ELWC represents an estimate of the amount of water that could be saved if Hunter Water implemented all potential water conservation projects that are assessed as economically viable.

3.2 ESTIMATING THE LEVELISED COST OF PROJECTS

The levelised cost of an individual water conservation project, expressed in dollars per kilolitre of water saved, is defined as:

$$Levelised\ cost = \frac{PV(Project\ costs) - PV(Avoided\ and\ deferred\ costs) - PV(Externalities)}{PV(Volume\ of\ water\ saved)} \quad (2)$$

Where:

Parameter	Definition	Units
Levelised cost	The present value of net project costs divided by the present value of water saved, measured over the life of the project. The life of the project is set by the total length of time that water conservation benefits are expected to be realised from the project investment, with an upper limit of 30 years used for the analysis period of projects expected to deliver enduring ('permanent') water savings.	$ / kL
PV	Present value equivalent of a future stream of costs, avoided & avoidable costs, externalities, and/or water savings.[1]	$ for costs Kilolitres for water savings
Project costs	Direct implementation costs to Hunter Water over the life of project, including capital costs and operating costs, plus Any direct costs to customers to participate in the project, unless it would involve double-counting (e.g. transfer payments).	$
Avoided and deferred costs	Cost savings from delaying or averting the need for augmentation of a Hunter Water's potable water and/or wastewater systems as a result of the water conservation project, excluding variable water supply costs.[2,3]	$
Externalities	Environmental, health and other costs and benefits that might not be priced in markets and may accrue to entities that are not directly involved in the transaction.[3]	$
Volume of water saved	Estimated annual water savings over the life of the project. Refer to *levelised cost* for a definition of project life.	kilolitres

Table notes:

1. The discount rate used to convert future values into their present value equivalent will be the prevailing real pre-tax weighted average cost of capital (WACC) in the prevailing final retail price report issued by IPART.
2. Variable water supply costs are already included in the value of water, therefore including this amount in the levelised cost of a project would represent double counting.
3. Where these terms are defined in an IPART price determination or have a specific meaning in a public IPART document (e.g. final report or guidelines) that applies to Hunter Water, the terms shall adopt IPART's definitions.

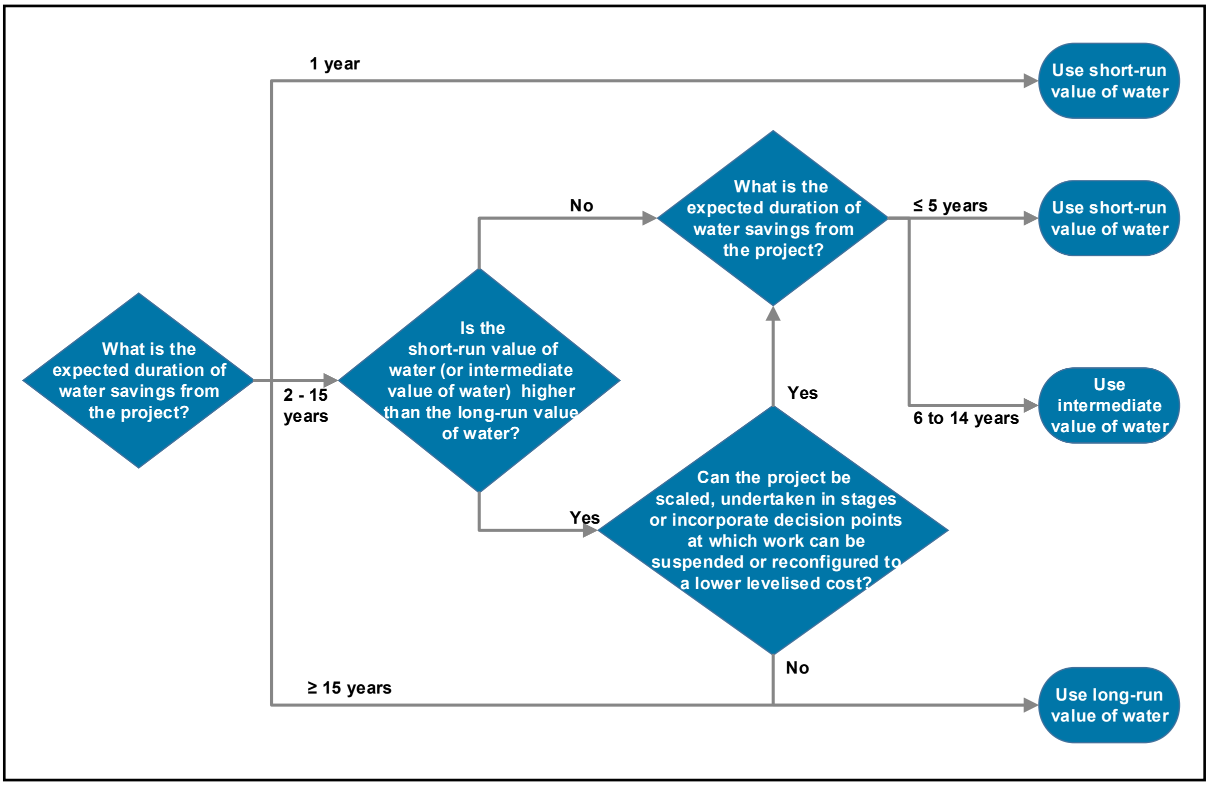
3.3 ESTIMATING THE VALUE OF WATER

The life of the project is set by the total length of time that water conservation benefits are expected to be realised from the project investment, with an upper limit of 30 years used for the analysis period of projects expected to deliver enduring ('permanent') water savings. The relevant value of water to apply depends on the life of a project, as follows:

Life of project	Comparison value of water
5 years or less	Short-run (SRVW)
6 – 14 years	Intermediate (IVW)
15 years or more	Long-run (LRVW)

The delineation between short-term and long-term water conservation measures could lead to a temporal issue if the longer term outcomes of the measures are not factored into the assessment. A decision to implement water conservation measures at lower water storage levels (based on a higher short-run value of water) could lead to ongoing cost commitments where the value of savings are less favourable over time if storage levels recover (and therefore compared with the long-run value of water). We propose a refinement to selection of the comparison value of water for projects with short-run or intermediate water savings, such that the appropriate comparison value also takes into account the potential scalability or reversibility of the water conservation project, as shown in Figure 3.1.

FIGURE 3.1 DECISION TREE FOR SELECTING THE VALUE OF WATER TO COMPARE WITH THE LEVELISED COST



3.3.1 The short-run value of water

The short-run value of water, expressed in dollars per kilolitre of water, is defined as:

$$VW_{SR} = Direct\ water\ supply\ cost + Drought\ response\ cost + Scarcity\ value + Externalities \quad (3)$$

Where:

Parameter	Definition	Units
VW_{SR}	The short-run value of water. It represents the benefit to Hunter Water and the community that would occur from conserving an additional kilolitre of water for a project with short term benefits.	$ / kL
Direct water supply cost	Costs to Hunter Water, in the short-term, for the supply of an additional kilolitre of water. Refer to equation 4.	$ / kL
Drought response cost	The cost of implementing alternative drought response measures, including planning and constructing temporary water supply options, initiated under the Lower Hunter Water Plan. Refer to equation 5.	$ / kL
Scarcity value	The social costs (welfare losses) that occur as a result of customer and community loss of choice about how, when and how much water can be used due to mandatory drought water restrictions. Refer to equation 6.	$ / kL
Externalities	Non-scarcity environmental, health and other costs and benefits that might not be priced in markets and may accrue to entities that are not directly involved in the transaction.[1] In this equation the externalities are associated with the supply of water that are not already captured in the scarcity value term (to avoid double counting). Refer to section 3.4.	$ / kL

Table notes:

1. Where this terms is defined in an IPART price determination or has a specific meaning in a public IPART document (e.g. final report or guidelines) that applies to Hunter Water, the terms shall adopt IPART's definition.

Direct water supply operating costs

The direct water supply operating cost, expressed in dollars per kilolitre of water, is defined as:

$$Direct\ water\ supply\ operating\ cost = \sum_{d=0}^{100} P_d \times (BW_d + WT_d + WD_d) \qquad (4)$$

Where:

Parameter	Definition	Units
P_d	The probability of dam storage level 'd' occurring over the short term, given the current total water storage level.	%
BW_d	The variable cost of purchasing one additional kilolitre of bulk water from Water Administration Ministerial Corporation, plus the variable cost incurred by Hunter Water in sourcing one additional kilolitre of bulk water, at total water storage level 'd'.	$ / kL
WT_d	The variable cost of treating one additional kilolitre of bulk water at total water storage level 'd'.	$ / kL
WD_d	The variable cost of distributing one additional kilolitre of treated water to customers at total water storage level 'd'.	$ / kL
d	The total water storage level measured across all Lower Hunter dams and aquifers.	%

Drought response measures triggered under the Lower Hunter Water Plan

The drought response cost, expressed in dollars per kilolitre of water, is defined as:

$$Drought\ response\ cost = P_{DRMi} \times \left(\frac{PV(K)+PV(OM)}{PV(Volume\ of\ water\ saved\ or\ produced)}\right) \quad (5)$$

Where:

Parameter	Definition	Units
Drought response cost	The cost of implementing alternative drought measures, including planning and constructing temporary water supply options, initiated under the Lower Hunter Water Plan.	$ / kL
P_{DRMi}	The probability of drought response measure 'i' being triggered under the current Lower Hunter Water Plan in the short term, given the current total water storage level measured across all Lower Hunter dams and aquifers. [2]	%
PV	Present value equivalent of a future stream of costs, avoided & avoidable costs, externalities, and/or water savings.[1]	$ or kilolitres
K	The capital costs needed to implement a drought response measure 'i' triggered under the Lower Hunter Water Plan.	$
OM	The additional operating and maintenance costs of a drought response measure 'i' triggered under the Lower Hunter Water Plan.	$
Volume of water saved or produced	Estimated annual water saved or produced by drought response measure 'i' triggered under the current Lower Hunter Water Plan, over the life of the drought response measure.	kilolitres

Table notes:

1. The discount rate used to convert future values into their present value equivalent will be the prevailing private, real pre-tax weighted average cost of capital (WACC) in the prevailing final retail price report issued by IPART. This is that same discount rate used to estimate the levelised cost of water conservation projects (per equation 2).
2. Drought response triggers are defined by total water storage levels therefore this parameter is calculated in the same manner as P_d in equation 4.

Scarcity value

The scarcity value is the social cost of mandatory drought water restrictions, expressed in dollars per kilolitre of water, which is defined as:

$$Scarcity\ value = \sum_{d=0}^{100} P_d \times (SCL1_d + SCL2_d + SCL3_d + SCL4_d) \quad (6)$$

Where:

Parameter	Definition	Units
$SCL1_d$	The social cost of reducing water use by one kilolitre as a result of level 1 water restrictions at total water storage level 'd'	$ / kL
$SCL2_d$	The social cost of reducing water use by one additional kilolitre as a result of level 2 water restrictions at total water storage level 'd'	$ / kL
$SCL3_d$	The social cost of reducing water use by one additional kilolitre as a result of level 3 water restrictions at total water storage level 'd'	$ / kL
$SCL4_d$	The social cost of reducing water use by one additional kilolitre as a result of level 4 water restrictions at total water storage level 'd'	$ / kL
d	The total water storage level measured across all Lower Hunter dams and aquifers	%

The specific methods and assumptions used to estimate the social costs of water restrictions will be explained in the annual Water Conservation Report, and do not form part of the ELWC Methodology.

3.3.2 The long-run value of water

The long-run value of water, expressed in dollars per kilolitre of water, is defined as:

$$VW_{LR} = LRMC + Option\ value + Externalities \qquad (7)$$

Where:

Parameter	Definition	Units
VW_{LR}	The long-run value of water. It represents the benefit to Hunter Water and the community that would occur from conserving an additional kilolitre of water for a project with long term benefits.	$ / kL
LRMC	Long-run marginal cost of water supply, which is the cost to Hunter Water, in the long-term, for the supply of an additional kilolitre of water. [1]	$ / kL
Option value	The avoided cost, in excess of the direct deferral benefit, from the use of small scale water conservation measures that delay source augmentation. The additional avoided cost arises from the ability to take advantage of both 'shocks' (i.e. unforeseen events like the loss of a major customer) and deliberate policy interventions or 'shifts' (e.g. user-pays pricing, Water Wise Rules and the BASIX code) that affect the yield-demand balance leading up to the next major source augmentation. That is, small scale water conservation measures give rise to an additional deferral benefit, the magnitude of which can be estimated probabilistically. [2]	$ / kL
Externalities	Non-scarcity environmental, health and other costs and benefits that might not be priced in markets and may accrue to entities that are not directly involved in the transaction.[1] In this equation the externalities are associated with the supply of water.	$ / kL

Table notes:

1. This value shall be the most recent estimate adopted by IPART in a public document that applies to Hunter Water for the purposes of estimating avoided or deferred water supply costs (e.g. final determination, report or guidelines for recycled water pricing or pricing of wholesale services). The retail water usage price shall be used until such an estimate of the LRMC value has been published.
2. The option value will be set to zero, and maintained at zero, until IPART decides otherwise.

3.3.3 The intermediate value of water

The intermediate value of water will be calculated as a linear interpolation between the short-run and long-run value of water. The value of water in any given year (year 't') is therefore given by the following:

$$VW_t = VW_{SR} + (Y_t - Y_{SR}) \times \left(\frac{VW_{LR} - VW_{SR}}{Y_{LR} - Y_{SR}}\right) \quad (8)$$

Where:

Parameter	Definition	Units
VW_t	The value of water in year 't'	$ / kL
VW_{SR}	The short-run value of water	$ / kL
VW_{LR}	The long-run value of water	$ / kL
Y_{SR}	The number of years that defines the end of the short-run, starting at year 0 (ie, 5)	#
Y_{LR}	The number of years that defines the start of the long-run (ie, 15)	#
Y_t	A sequential number that defines, as at the start of year 't', the number of years that have elapsed since the start of year 0, where $Y_{SR} < Y_t < Y_{LR}$	#

The relevant value of water depends on the length of estimated water savings. For example, if the water savings from a project are anticipated to accrue for 10 years, the parameter Y_t in equation 8) would be set to a value of 10 in order to estimate the benchmark value of water.

3.4 EXTERNALITIES

Externalities will only be included in the ELWC as monetized values when the there is a causal link between the identified impact and the project. That is, for a cost or benefit to be included in the levelised cost of a water conservation project, we need a reasonable level of confidence that implementing the project would cause the cost or benefit to occur.

Externalities will be included in:

- the value of water, when
    - the externality is associated with the supply of water and is not already captured in the scarcity value term (to avoid double counting),
    - applies across the whole water supply system, or
- the levelised cost of the water conservation project, when
    - the externality applies to a particular geographic location or to a specific type of water conservation measure.

The ability to estimate the value of externalities will necessarily depend on the availability of robust source data. Depending on the specific data source, different methods and assumptions may be needed to derive estimates of social costs in the required units (ie, $ per kilolitre). The specific methods and assumptions used will be explained in our annual Water Conservation Report, and do not form part of the ELWC Methodology.

Where the value of an externality is adopted in an IPART price determination or a public IPART document (e.g. final report or guidelines) that applies to Hunter Water, that value shall also be adopted in applying the ELWC Method.

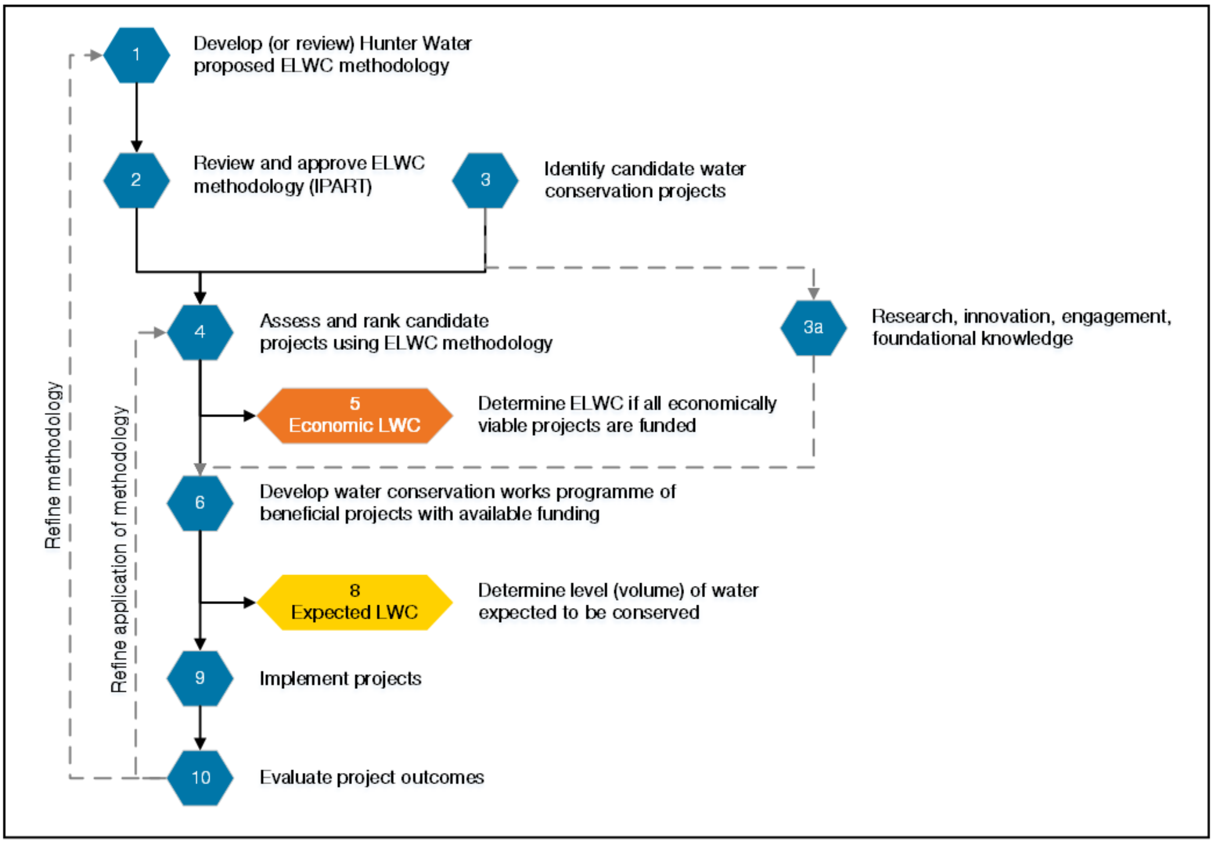
4 APPLYING THE ELWC METHODOLOGY

In addition to the requirement to develop a methodology for determining the ELWC, Hunter Water's Operating Licence also includes a complementary requirement to develop a five-year rolling water conservation works programme that transparently reports:

- which projects Hunter Water plans to deliver,
- how the projects were assessed using our ELWC methodology, and
- the relationship between the economically optimal volume of water saved (ELWC) and the estimated volume of water we expect to save.

The process for applying the ELWC methodology and developing the water conservation works programme is shown diagrammatically in Figure 4.1.

Figure 4.1 The process for applying the ELWC methodology



A list of potential water conservation projects will be generated in various ways, depending on the type of program (i.e. water efficiency, recycling or managing leakage). The methods of identifying potential projects will be outlined in the Water Conservation Report.

The ELWC methodology will be applied to each potential project that:

- has water conservation as the primary objective, and
- targets water conservation within Hunter Water's area of operations, and
- is partially or fully funded by Hunter Water.

Projects or activities that aim to build capacity such as knowledge management will be assessed by other means.

Where a potential project is partially funded by Hunter Water, the ELWC methodology will be applied on a pro rata basis i.e. the levelised cost will be calculated based on Hunter Water's relative contribution towards project costs and a proportionate share of the total water savings from that project. The pro rata share of water saved will be counted towards the ELWC.

Following assessment using the ELWC method, all economically viable projects will be collated into a draft water conservation works programme and used to calculate the ELWC. The complete list of projects assessed using the ELWC methodology will be reported each year in the Water Conservation Report, including the levelised cost of each project and the relevant value of water used to assess economic viability.

The ELWC a forward-looking methodology therefore only new potential water conservation projects would be assessed using the ELWC methodology. Ongoing savings from projects already underway, or previously implemented, will not be counted towards the ELWC volume. For transparency, Hunter Water may elect to report on these projects as part of our Water Conservation Report.

There may be valid reasons for Hunter Water delivering more or less water conservation projects than indicated by applying our ELWC methodology, such as funding constraints (given other competing needs and priorities). These reasons will be outlined in the Water Conservation Report.

The Water Conservation Report will also provide details of projects that were implemented in the preceding year and estimates of the water savings achieved, where practicable.

APPENDIX A – INPUT PARAMETERS

<table>
<tr><th>ELWC Input Parameter</th><th>ELWC Methodology</th><th>Example of current value (2019-20)</th></tr>
<tr><td>Analysis period
a. Short-run projects
b. Intermediate projects
c. Long-run projects</td><td>a. 5 years
b. 15 years
c. 30 years</td><td></td></tr>
<tr><td>Discount rate</td><td>WACC in IPART's Final Report accompanying the prevailing periodic price determination</td><td>5.9% (real, pre-tax)</td></tr>
<tr><td>Short-run value of water</td><td></td><td></td></tr>
<tr><td>Direct short-run water supply cost</td><td>Variable costs of:
a. Bulk water, plus
– Purchase cost from Water Administration Ministerial Corporation, plus
– Chemicals and energy cost incurred by Hunter Water
b. Water treatment costs (chemicals and energy), plus
c. Water distribution costs (chemicals and energy),
Divided by the volume of water supplied</td><td>$0.11 / kL across all water systems</td></tr>
<tr><td>Cost of alternative drought measures and supply options</td><td>a. Inter-regional transfers – Central Coast
b. Temporary desalination – detailed design
c. Temporary desalination – construction and operation</td><td>a. $0.70 / kL
b. $0.50 / kL
c. $10.14 / kL</td></tr>
<tr><td>Short-run scarcity value: social cost of water use restrictions
a. Restrictions level 1
b. Restrictions level 2
c. Restrictions level 3
d. Restrictions level 4</td><td>Foregone consumer surplus (opportunity cost) due to restrictions on the volume and/or end use of water consumed. Calculated as the incremental reduction in consumer surplus compared to the previous level of restrictions (e.g. the social cost of level 2 restrictions would be the incremental change in consumer surplus for the reduction in water use over and above the savings already achieved at level 1 restrictions).</td><td>a. $3.82 / kL
b. $11.44 / kL
c. $9.61 / kL
d. $21.55 / kL</td></tr>
<tr><td>Overall SRVW</td><td colspan="2"><table>
<tr><th>Total water storage level</th><th>Short-run value of water</th></tr>
<tr><td>80 – 100%</td><td>$0.46 / kL</td></tr>
<tr><td>70 – 79%</td><td>$0.48 / kL</td></tr>
<tr><td>60 – 69%</td><td>$3.55 / kL</td></tr>
<tr><td>50 – 59%</td><td>$8.37 / kL</td></tr>
<tr><td>40 – 49%</td><td>$18.28 / kL</td></tr>
<tr><td>30 – 39%</td><td>$35.83 / kL</td></tr>
</table></td></tr>
</table>

ELWC Input Parameter	ELWC Methodology	Example of current value (2019-20)
	<30%	$47.10 / kL
Long-run value of water		
Long-run marginal cost	The most recent estimate adopted by IPART in a public document that applies to Hunter Water for the purposes of estimating avoided or deferred water supply costs. The retail water usage price shall be used until such an estimate of the LRMC value has been published.	$2.37 / kL
Option value	In accordance with IPART's conditional approval, the option value of water is set to zero, and maintained at zero, until the concept is better understood and its implications more fully analysed, which would enable the Tribunal to decide otherwise.	$0 / kL
Overall LRVW		$2.37 / kL

APPENDIX B - STAKEHOLDER CONSULTATION UNDERTAKEN IN DEVELOPING THE METHODOLOGY

Our approach to developing an ELWC methodology, as approved by IPART, included offering genuine opportunities for customers, consumers and the community to participate.

In September 2018, we released a discussion paper inviting feedback from customers, the community and external stakeholders. The paper was published on Hunter Water Your Voice, our online forum to facilitate two-way conservations to help shape our region's water future.

We also wrote to a range of stakeholders with a specific interest in water conservation, regulatory economics and community representation (see Table A).

TABLE A – DISTRIBUTION OF DISCUSSION PAPER

Stakeholder Group	Detail
Customer and Community Advisory Group	Members were also asked to circulate the information to the groups they represent.
Department of Industry (Water)	Lower Hunter Water Plan
Central Coast Council	Lower Hunter Water Plan
Interagency working group on a water sensitive region	Newcastle City Council, Lake Macquarie City Council, Port Stephens Council, Central Coast Council, Maitland City Council, Dungog Shire Council Hunter Development Corporation Department of Planning & Environment
Institute for Sustainable Futures	
Water Services Association of Australia (WSAA)	Posted to Economic Regulation Forum on the members area of WSAA website
Sydney Water	
IPART	

Stakeholders were invited to provide feedback on seventeen questions or any matter within the scope of the discussion paper. The consultation period ended on 26 October 2018. We granted an extension of time to one stakeholder, however they did not make a submission.

We only received one written submission – from IPART. A meeting was subsequently held with DoI Water, who did not express any concerns. The online feedback focused on suggestions for water conservation measures or education programs rather than the ELWC methodology.

ISSUE	IPART POSITION	HUNTER WATER POSITION
Building the foundations		
1. Do you agree with our proposed definition for the ELWC? What refinements do you suggest? Is there a way that we could describe ELWC that would be more meaningful to you?	The proposed definition is appropriate.	Maintain proposed definition.
Designing the detail – the value of water conserved		
2. What are your views on calculating the SRMC water?	IPART agrees with Hunter Water's approach to estimating the SRMC. IPART notes that the delineation between short and long–term water conservation measures could lead to a temporal issue if the longer term outcomes of the measures are not factored into the assessment. Water conservation measures selected at lower water storage scenarios (based on a higher short-run value of water) could lead to ongoing cost commitments where the value of savings are less favourable over time when subject to higher water storages. IPART requested clarification of how this issue would be addressed in the final ELWC methodology.	See Section 3.3.3 of the methodology and the decision tree in Figure A.
3. What are the advantages and disadvantages of using our current retail water usage price as a proxy for our LRMC?	IPART agrees that the retail price can be used as a proxy for the LRMC when an alternate estimate is not available. IPART recommend allowing flexibility for an alternate LRMC value that may be informed by the outcomes of other IPART reviews.	We agree. See section 3.3.2 of the methodology.
4. What alternative approaches could we use to calculate the LRMC (or a proxy)? Which would you recommend we use for ELWC methodology and why?		

ISSUE	STAKEHOLDER POSITION	HUNTER WATER POSITION
Designing the detail – the value of water conserved		
5. What are appropriate groupings and timeframes (increments) to reflect the duration of water savings benefits for the candidate water conservation projects (e.g. temporary, intermediate, permanent)?	IPART agrees the value of water conserved should depend on the timing and durability characteristics of the water conservation project.	Maintain proposal. See section 3.3.3 of the methodology.
6. What are your views on how to assess projects that are expected to deliver intermediate water savings?	Interpolation method is reasonable.	Maintain proposal. See section 3.3.3 of the methodology.
Designing the detail – the marginal cost of water conservation		
7. What are your views on the most appropriate approach to incorporate social and environmental values into the levelised cost of projects (where they are not already taken into account in the value of water)? 8. Are there any external (social or environmental) costs or benefits that should be included in the levelised cost of all projects? (e.g. cost of carbon) What are appropriate default values for these costs and benefits (if any)?	All economic costs and benefits should be included where they can be accurately calculated. N.B. in order to obtain revenue (through retail prices) to cover the economic benefits utilities need to provide sufficient evidence of customers' willingness to pay.	We prefer that the ELWC method allows for flexibility in valuation method, which would allow us to incorporate improvements to valuation methodologies over time and adopt values consistent with other IPART decisions as they become available (for example, if any values are set for the recycled water review). See section 3.4 of the proposed methodology.
9. What are your views on the most appropriate discount rate to use for calculating present values?	IPART agree with Hunter Water's preliminary position to adopt IPART's WACC in the final price report	Maintain proposal. See section 3.2 and 3.3 of the methodology.

ISSUE	STAKEHOLDER POSITION	HUNTER WATER POSITION
Implementing the methodology		
10. What are your views on incorporating option value into the ELWC methodology?	IPART will consider the merits of incorporating an option value when approving the ELWC method.	A manuscript titled "Investigating the 'value' of keeping options open for water infrastructure in the Lower Hunter" has been submitted to *Utilities Policy* – a peer-reviewed international, interdisciplinary and inter-sectoral journal. Review comments have been received and summaries are provided below: • Reviewer 1: *The paper is an interesting piece of work and generally well put together. It should be accepted by the journal with minor changes.* • Reviewer 2: *The paper is addressing an important challenge of the water sector as it investigates the 'value' of postponing options and keep them open. I see merit in this paper. However, I would like to ask authors to clarify more on their methodology before the paper gets published.* Review comments have been addressed and the manuscript has been revised and resubmitted. Hunter Water acknowledges IPART's acceptance of the 'options value' concept in its conditional approval of the ELWC methodology. Hunter Water accepts IPART's requirement to set the option value at zero, until Hunter Water is able to better demonstrate its impact on decision-making and the Tribunal decides otherwise.
11. Do you agree with our preliminary position on the range of ways that potential water conservation projects could be identified? Are there other sources of potential projects that we should consider (please describe)?	Hunter Water's approach is reasonable and the process for identifying options are beyond the immediate scope of the ELWC methodology.	Noted.
12. Which projects should we assess using the ELWC methodology?	Hunter Water should, in its Water Conservation Report, outline the identification and evaluation	Agreed.

method used to assess water conservation measures.

ISSUE	STAKEHOLDER POSITION	HUNTER WATER POSITION
Implementing the methodology		
13. What do you see as the advantages and is advantages of Hunter Water maintaining a baseline level of investment in water conservation activities?	Agree with Hunter Water that this is outside the scope of the ELWC method and should be assessed by other means.	Noted.
14. If we were to do some of our water conservation activities to build and maintain capacity, how should these activities be funded?		
15. What is your view on reporting an ELWC for each year of the five year water conservation works programme?	No specific preference for how the volume of water saved is expressed, provided that there is sufficient clarity on the key outcomes and measures used.	Agreed. The key outcomes and measures used will be described in the annual Water Conservation Report.
16. Would you prefer us to report the ELWC volume in ML per day or GL per year or another way (please specify)?	Consider providing a plain English summary of the ELWC method and conservation outcomes.	Noted. We support transparency, including providing information in a readily accessible format.
17. What is your view on us considering factors other than the ELWC when deciding our actual level of water conservation? What factors would you like us to take into account?	In reviewing Hunter Water's prices, IPART would assess the prudency and efficiency of actual water conservation expenditure including how the expenditure compares to the ELWC method.	Noted.