# DOING WATER EFFICIENCY WELL – A GUIDE TO THE NSW BEST PRACTICE FRAMEWORK

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ABSTRACT

The NSW Water Efficiency Framework provides a consistent and thorough approach to all aspects of water efficiency, including planning, delivery, and ongoing improvement. The Framework consists of five elements across three phases: establishing strategic context, analysing current situation, developing response, designing and delivering options, and monitoring, reporting, and adapting. Underpinning these elements are strategic questions to provide practical guidance on what needs to occur at each stage. This Framework builds on earlier demand management guides to holistically outline all dimensions of water efficiency planning and will be instrumental to the future of water efficiency planning across NSW and Australia.

## INTRODUCTION

The NSW Water Efficiency Framework (the Framework) provides best-practice guidance for developing and delivering water efficiency programs across a range of contexts.

### The case for water efficiency

Water efficiency forms an important part of ensuring secure and resilient water supplies are maintained and can provide low-cost ways to balance supply and demand by reducing the usage of finite water resources. Water efficiency, done well, will reduce the use of water without impacting the service the water provides. In supply-demand planning, reducing demand should be treated similarly to increasing supply. Water efficiency can also provide a level of drought readiness by enabling a better understanding of water demands and identifying demand management opportunities that might be deployed in dry periods. In times of increasing climate uncertainty, investing in water efficiency may also allow decisions to invest in expensive supply augmentations to be deferred.

While water shortages can help to highlight the importance of water efficiency in managing finite water resources, the real value in water efficiency lies in sustained effort and investment.

Water security is critical to economic, social and environmental sustainability. Population growth, climate change, climate variability and drought are ongoing challenges for the urban water sector in Australia. Recent severe climate variations across NSW have reinforced the importance of long-term supply demand planning and investment across the full spectrum of options.

Ongoing investment in water efficiency drives sustained reductions in average and peak water demands (Willis et. al. 2011; Gurung et. al. 2014). Reduced average demand helps to increase water security within current supply limits and delay the need for short term water restrictions or longer-term infrastructure augmentations.

Despite water efficiency often providing one of the most cost-effective options (Skinner & Satur 2020, Cooley & Phurisamban 2016), the near decade long period of limited action between 2009-2019 has left a gap in water efficiency capacity and capability across most states of Australia, including NSW.

### Why a Framework?

The NSW Government wants to ensure that water is being used efficiently before imposing the cost of additional infrastructure on the community. The efficient use of water contributes to the sustainability of long-term supplies as population increases, helps to manage drought and supports readiness to respond to climate extremes. Water efficiency is integral to supporting resilient, prosperous, and liveable towns and cities, as recognised by Action 6.6 in the 2021 NSW Water Strategy which committed to developing a Framework and Program.

The NSW Water Efficiency Framework has been developed as part of that commitment to help support an effective and consistent response to water efficiency across the state. Overall, current policy, governance, resourcing and funding are inadequate to support water efficiency programs that align with the Framework. Without these structures in place, it is unlikely that future water efficiency investment will be effective or efficient, as they underpin every step in the water efficiency process.

When starting to plan for water efficiency it is easy to prematurely select and implement options. However, for a successful, long-term water efficiency program, the options design and implementation are only a part of a comprehensive suite of activities.

The Framework first asks water efficiency planners to consider their current strategic landscape before looking forward to reviewing their options. It then provides clear steps for the design, delivery, and review of water efficiency programs. State and local governments, water utilities, and large businesses will find guidance on implementing water efficiency initiatives no matter their level of maturity.

The best practice elements allow the consistent design, implementation, management and review of water efficiency programs across NSW, while also allowing flexibility to meet local conditions.

## PROCESS

### Developing the Framework

The Framework has been developed in collaboration between the Department of Planning and Environment (DPE) and the Institute for Sustainable Futures at the University of Technology Sydney (UTS-ISF). The draft framework was initially constructed based on previous demand management and integrated planning frameworks including:

- AWWA Water conservation programs - a planning manual ed 2 (Maddaus, Maddaus & Maddaus, 2017)
- US EPA Best practices to consider when evaluating water conservation and efficiency (EPA 2016)
- Water Conservation Guide for British Columbia. (Belzile et al 2013)
- International Water Association (IWA) Preparing urban water use efficiency plans (Medaus, Medaus & Medaus, 2013)
- Advisory on Next Gen Water Efficiency in Sydney, for DPE (ISF 2013)
- Guide to Demand Management and Integrated Resource Planning by ISF from the NWC and (WSAA 2010)
- Natural Edge Project 2009 Chapter 5: Integrated Water Resource Planning in a Changing Climate (Smith 2010)
- International Demand Management Framework (ISF 2006)
- Regional NSW: IWCM Guidelines for NSW LWU (DoE 2004)
- DLWC (2000) NSW Water Conservation Strategy

The elements of the Framework were adapted from these comprehensive guides for the NSW context and simplified where possible. The Framework was reviewed for completeness by water efficiency experts and practitioners from across NSW as well as the Australian Water Association (AWA) Water Efficiency specialist network. To finalise the Framework for public release, the feedback on the Framework from stakeholders was integrated.

### Applying the Framework

For each of the elements in the Framework a series of guiding questions have been developed. The questions provide practical prompts to guide what needs to occur at each step. Evaluation criteria have also been developed for each element, to help utilities or organisations identify where they sit in relation to water efficiency best practice and provide guidance where further support or resources may be required for their organisation.

Reviewing progress of a variety of utilities across the state has: identified examples of best practice from individual utilities or organisations; identified specific elements of the Framework where centralised support or additional resources would assist broader progress towards best practice; and been useful in assessing state-wide performance against the Framework to help develop state-wide water efficiency programs and support.

Further, an Excel tool has also been developed to aid in a self-evaluation. In the tool the criteria can be rated qualitatively on a five-point scale and these are aggregated into overall ratings.

## THE FRAMEWORK EXPLAINED

Water efficiency is a core component of supply-demand planning and integrated water cycle management (IWCM). However, the Framework recognises that water efficiency is sometimes conducted in parallel or independently of supply planning or IWCM.

Shown in Figure 1, the final Framework identifies the critical touch points between water efficiency strategies and supply-demand planning or Integrated Water Management, specifically in setting the objectives, identifying risks and opportunities, developing and evaluating options packages, and program evaluation and review. The figure shows the 3 overarching phases, 5 elements, sub-steps and includes guiding questions for self-evaluation. These are illustrated by the example in Figure 2.

The five elements of the Framework are:

| | | |
|---|---|---|
| 1 | Setting and defining the strategic context | including setting the objectives, establishing the scope of the water efficiency process both geographically, in time and the process. Within this step the objectives should align with |

| | | |
|---|---|---|
| | | the broader integrated planning framework. |
| 2 | Analysing the existing situation | including understanding the supply / demand balance and identifying risks and opportunities. This step, done well, will ensure the objectives and outcomes of the water efficiency strategy align with the integrated planning process. |
| 3 | Developing the water efficiency response | the options are identified, designed and assessed, and then portfolios of options are developed and evaluated. The portfolios should be assessed against the overall objectives of the water efficiency strategy. |
| 4 | Design and deliver the water efficiency response | including establishing the demand management team to deliver the program, developing an options evaluation/reporting plan, undertaking pilots and R&D and then the fuller implementation of the options program. |
| 5 | Monitoring, reporting and adapting | including program evaluation, reporting and making adaptations |

**How to use the Framework**

For an individual water utility or other organisation implementing water efficiency, there are several benefits of the Framework, including to identify:

- progress towards water efficiency best practice
- where further support or resources may be required.

At a state-wide level the Framework can be used to:

- help identify best practice examples from individual utilities or organisations to share and improve capacity and capability across the state
- identify specific regions where centralised support or additional resources would assist broader progress towards best practice
- assess state-wide performance against the framework to help develop state-wide water efficiency or support programs.

A key feature of the Framework is that it includes criteria that can be rated qualitatively on a five-point scale based on these descriptors.

- Best Practice – Organisation is meeting all requirements and is leading and innovating in this area.
- Good Practice – Organisation satisfies close to all requirements in this area. CThe organisation has considered what it will take to meet best practice.
- Emerging Practice – Organisation has made some start towards developing this area. The organisation has given some consideration given to what meeting good practice will take.
- Not done – Element not currently addressed.
- Not applicable – Element not required for particular context.

While the Framework covers all potential aspects of a water efficiency strategy and program at full maturity, when starting out, an organisation would not attempt everything covered in the Framework. However, by having an idea of the 'full picture' of activities should, in the fullness of time be considered, for a best practice program, this allows organisations to purposefully decide on what elements to take on now and what they might leave for the future.

## THE FRAMEWORK APPLIED

The Framework has been applied over several NSW utilities and strategies to date. The criteria and questions were worked through to map out each organisation's progress in each step and then reflected upon to highlight gaps and areas for improvement and some practical recommendations to take forward.

The reviews highlighted strengths across programs and where it would be helpful to share approaches as best practice with other utilities. The review process also identified where there were relative weaknesses or gaps across the Framework. Having a visual display of strengths and gaps across the full spectrum of activities for water efficiency was seen as a good way to help advocate for additional funding or resourcing (see Figure 3 and Figure 4 for theoretical examples of the tool displays).

Some insights gather from across the multiple applications included:

- Water efficiency was generally seen as important but there was the potential to strengthen alignment of a program's strategic drivers, design and assessment. These strategic drivers were often broader than just ensuring long term water security and could include carbon neutrality targets and delivering on customer expectations.

- Roles and responsibilities were often not clearly defined or adequately resourced,

particularly in relation to governance, data analytics, reporting and adaption.

- Programs often considered limited range of options that lacked alignment with demand data and strategic drivers, with programs having multiple options for some end uses or end users and no programs for others.

- There is a lack of robust data available to test the implications of assumptions – for example, the long run and short run marginal costs estimations used, option savings decay, program costs and overheads, funding splits between participants and estimates of water saved. This is exacerbated by the lack of monitoring and evaluation established before a program began to provide justification for the adaption, expansion or the closure of a program.

- There were challenges with justifying and securing long term sustainable funding for programs to allow them to mature. This was true for options delivery and even more so for the non-delivery aspects of the Framework including data analytics, governance, reporting and adaption. the challenges in incorporating considerations beyond water security, particularly in relation to carbon neutrality and wastewater reduction.

**Commonly asked questions**

Some areas that required further explanation regarding setting the context, the purpose, and use of the Framework include:

- An iterative or a linear process? It is important to note that the process of using the Framework will be an iterative rather than linear. The purpose of the Framework is to display the steps that need to be addressed to achieve a consistent and robust approach to water efficiency.
- A reactive or proactive approach? It is acknowledged that sometimes water efficiency responses are required to be reactive in times of drought. However, decision makers are urged to consider the benefits of starting a water efficiency response before an extreme event occurs. This Framework is designed to aid in the development of a proactive and thorough approach to developing a water efficiency plan or program.
- More than water efficiency? While the focus of the Framework is on developing an approach to water efficiency, which covers improve end-use efficiency and reducing leakage or non-revenue water, the elements do touch on water conservation and mechanism for scheme water savings in general such as through education or rainwater tanks. These are considered to sit within the umbrella of the Frameworks considerations.
- Only water efficiency? As mentioned in the introductory section on 'The case for water efficiency', water efficiency forms an important part of ensuring a secure and resilient supply-demand balance. Water efficiency should be part of an IWCM approach including potable supply, rainwater, wastewater recycling, and stormwater management and does not replace these other approaches. When planning for water efficiency using the Framework, some of these other approaches may form part of the response.
- A prescriptive or outcomes focused approach? The guiding questions and criteria of the Framework have been designed to prompt councils and water utilities to strive for best practice approaches relevant to their context and situation. They are not designed to be prescriptive but rather recognise the need for an outcomes focused approach that addressed unique circumstances for every city, town, and village across NSW.
- For every utility? Ideally every utility should be working towards developing a best practice water efficiency utilising the guidance provided in the Framework. In practice resourcing, funding, and capability constraints mean that chooses on were best to act are inevitable, particularly for smaller councils.

## WHAT'S NEXT FOR THE FRAMEWORK

**Recommendations for taking the Framework forward**

Through the consultation process gaps or needs were identified and this has helped to shape the NSW Government's water efficiency program including:

- Provide best practice evaluation guidance. Setting expectations about level and certainty of assessment as well as minimum reporting expectations across program over time.
- Create tools to help use the Framework. An excel tool to help utilities work through the framework and track their progress is available on the NSW Government website.
- Guidance around business case for utilities. DPE are developing material to aid in the economic evaluation of water efficiency.
- Understand how framework sits within current regulation and what needs to change.
- The need to support building economies of scale in the delivery of programs. The NSW Government in conjunction with Sydney Water and Hunter Water have successfully trialled a

collaborative approach to delivering the state-wide NSW washing machine rebate program.

- Building water efficiency literacy generally. The NSW Government has developed a suite of education resources designed to encourage students to investigate what makes water such a precious resource.
- Developing guidance documentation clarifying the role and design of a pilot. A pilot is underway across 5 regional NSW councils to understand more about the water use and potential water savings available from residential evaporative air coolers.
- Building case study resources Create library of best practice knowledge sharing and communities of practice with champions. Clearly define a pathway for sharing knowledge and experiences. The NSW Government has established a website for water efficiency information and has published an options scan (UTS-ISF 2021) to support a broader range of options considerations in programs across NSW.

## CONCLUSION

The development and subsequent application of the Framework has shown that it holistically covers all potential aspects of a water efficiency strategy and program at full maturity.

When starting out, an organisation may not attempt everything covered in the Framework. Having an idea of the 'full picture' of activities should, however, is useful for a program at any maturity. This allows organisations to purposefully decide on what elements to take on now and what they might leave for the future, continually moving towards more robust water efficiency approaches.

Reviewing progress of a variety of utilities across the state or region can help to build capacity by identifying examples of best practice regions where centralised support as well as identifying where additional resources or a centralised program are most needed. The results of applying the framework have been used to develop and target NSW's water efficiency program.

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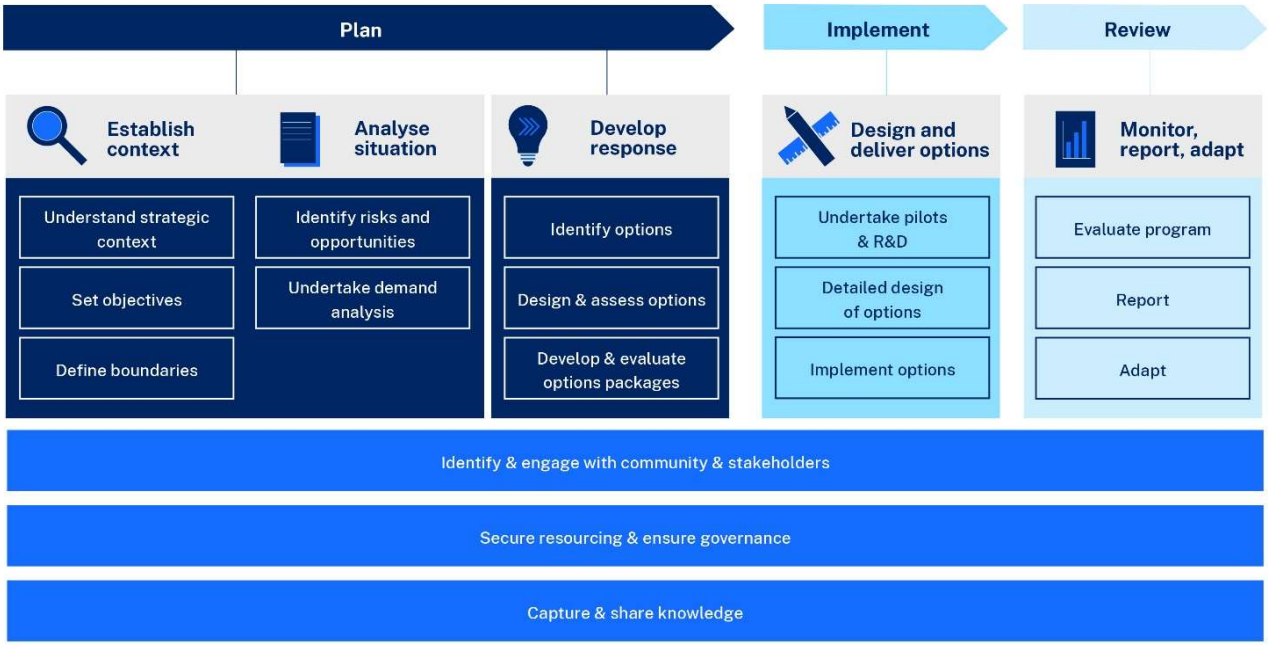


*Figure 1 The Water Efficiency Framework*

## Analyse situation

Understand the current situation and how it supports or constrains water efficiency

| Steps | Guidance | Evaluative criteria |
|---|---|---|
| **Identify risks and opportunities**<br><br>What could limit or support water efficiency outcomes? | **Metering and monitoring:** Is demand measured (metering/by end use)? Can data be extracted easily and broken down into appropriate segments?<br><br>**Data driven decision making:** Is there enough information and resources to do analysis at the level required? For example, is the system well understood (supply–demand balance, water quality, ecosystem, cost structures, future constraints and limitations)? Are the drivers of change (demographics, climate, economy) understood? Are customer and stakeholder preferences understood? Is the information available for different time (now, future) and spatial (differences across service area) scales? Can it be broken down in other ways?<br><br>**Effects of water efficiency:** What are the financial and economic implications of water efficiency across all sectors? Does the customer pricing regime encourage or hinder water efficiency? Have you considered the opportunity for hardship programs to be a driver?<br><br>**Lessons learnt:** What can you learn from past experience (past programs, other jurisdictions, research and development - R&D, pilots)? | • Risks and opportunities have been assessed.<br>• Metering and end use data is accessible.<br>• Data requirements and gaps are identified. |

*Figure 2 Example of the details of the Framework - including guiding questions and evaluative criteria*

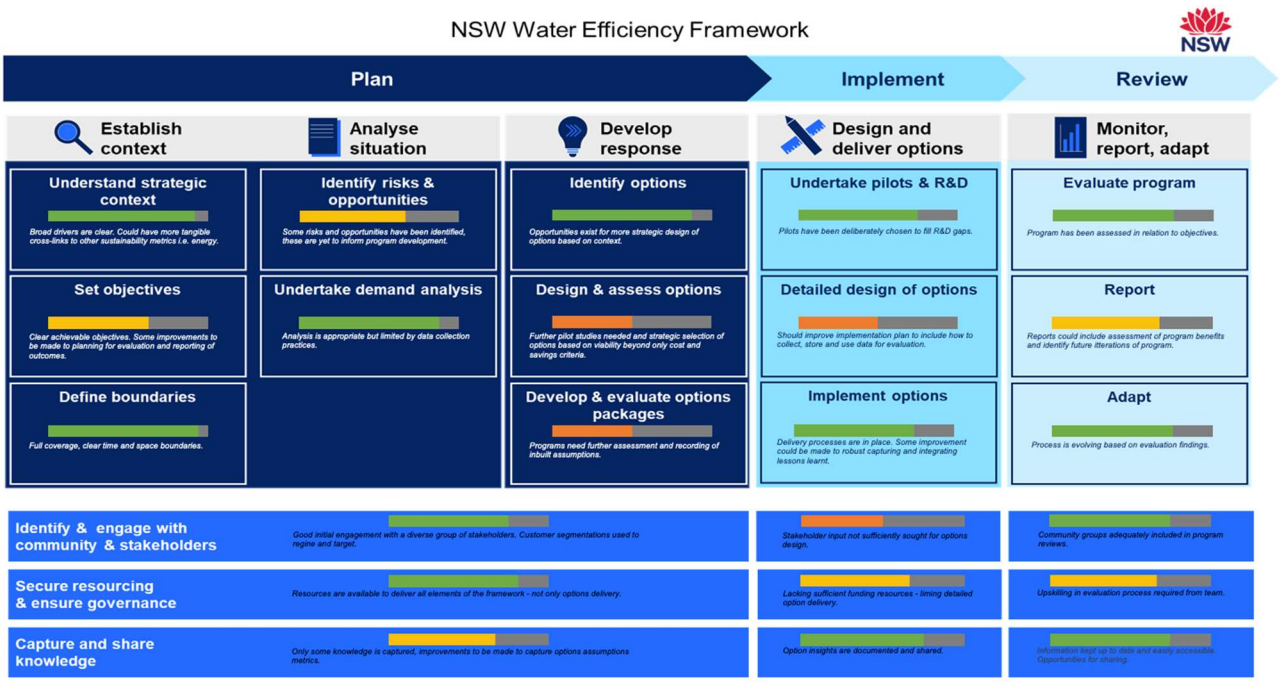


*Figure 3 Example of the Water Efficiency Framework rating tool overview – coloured bars indicating performance in each sub-step*

**Establish context**

| Steps | ? | Evaluative criteria | Rating (drop down) | Justification | Next steps / recommendations |
|---|---|---|---|---|---|
| Understand strategic context | ? | The drivers for water efficiency are clearly identified. | *Best Practice* | Multiple drivers for water efficiency clearly established. | Broad drivers are clear. Could have more tangible cross-links to other sustainability metrics i.e. energy. |
| | | Internal guiding strategies and plans are identified and the linkages to water efficiency are clear. | *Good Practice* | Water plans and strategies thorough, but still in development. | |
| | | External links to broader NSW government objectives are clear. | *Best Practice* | Links are clear in guiding documents. | |
| Set objectives | ? | The water efficiency goals are broad and represent both immediate needs and a long-term vision including relevant input from stakeholders and/or community. | *Emerging Practice* | Goals focus more heavily on addressing immediate and short-term supply needs. | Clear achievable objectives. Some improvements to be made to planning for evaluation and reporting of outcomes. |
| | | The objectives and outcomes are realistic, specific and can be evaluated. | *Good Practice* | Measurable goals tied to current demand. Could be improved by further planning of monitoring and reporting schedule. | |
| Define boundaries | ? | The scope of the water efficiency program is clear. | *Best Practice* | Full coverage. | Full coverage, clear time and space boundaries. |
| | | The geographical boundaries are defined. | *Best Practice* | Well defined. | |
| | | The period for the water efficiency program aligns with strategic drivers (e.g., strategy, plans and regulation). | *Best Practice* | Appropriate period. | |
| | | Each step of the framework is considered. The steps, responsinle parties and resources required are clear. There is clear justification for omitting any steps from the framework. | *Good Practice* | More focus on 'analysing situation' recommended. | |

*Figure 4 Example of using the Water Efficiency Framework tool for 'Establish the context' - coloured bars and rating indicating performance in each sub-step.*