

NSW DEPARTMENT OF INDUSTRY

Ten year review of the Snowy Water Licence: draft report

For consultation

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Ten year review of the Snowy Water Licence: draft report

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More information

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Opportunity for further comment

The Department of Industry is inviting written submissions on this draft report by 6 pm, 6 July 2018.

Department of Industry will consider all comments, whether based on scientific, technical, historical, anecdotal or other origins in preparing the final report.

Please clearly mark written submissions with, 'Submission to the 10 year Review of the Snowy Water Licence' and send it to Department of Industry via:

Email: snowylicence.review@dpi.nsw.gov.au; or

Mail: Snowy Water Licence Review
Intergovernmental and Strategic Stakeholder Relations
Department of Industry—Lands & Water
Locked Bag 5123
Parramatta NSW 2124

Unless otherwise requested, Department of Industry will publish all submissions on the Department of Industry website - www.industry.nsw.gov.au/snowy-water-licence.

Direct enquiries about the review to snowylicencereview@dpi.nsw.gov.au.

Copies of the draft report, together with the Snowy Water Licence and relevant supporting documentation are available from:

- www.industry.nsw.gov.au/snowy-water-licence
- Department of Industry—Lands & Water, Level 10 Macquarie Tower, 10 Valentine Avenue, Parramatta 2150
- Department of Industry—Lands & Water, Government Service Centre, 11 Farrer Place, Queanbeyan 2620

We will make publicly available a summary of submissions and final review report when the review process is completed in the second half of 2018.

Overview

The Snowy Water Licence (the Licence) defines Snowy Hydro Limited's rights and obligations in relation to water in the Snowy Mountains Scheme. Under the *Snowy Hydro Corporatisation Act 1997*, the Licence is subject to mandatory reviews, initially after five years and then at intervals of 10 years.

The review's terms of reference are established under the Licence. In summary, the review is focussed on Snowy Hydro Limited's obligations under the Licence, which fall into three broad categories:

- increased flow requirements (environmental releases)
- water release requirements (predominately water releases to the Murray and Murrumbidgee rivers)
- administrative obligations (for example, compliance, annual operating plans, fees and charges).

It is also considering Snowy Hydro Limited's performance in meeting the conditions of the Licence.

The Department of Industry—Lands & Water administers the Licence on behalf of Water Administration Ministerial Corporation (Ministerial Corporation) and is managing the 10-year review. Department of Industry initiated the review on 28 June 2017, with invitations to stakeholders to lodge submissions.

Approach to the review

Department of Industry's approach to the review involved:

- acknowledging and responding to all issues raised in the submissions
- considering all Snowy Hydro Limited issues in good faith
- only proposing recommendations on issues that fall within the review's terms of reference
- identifying a process to resolve complex issues rather than delay completing the formal review
- seeking independent advice on performance where NSW government agencies are party to implementation.

The draft report is structured to provide important context and meet the review's terms of reference.

Chapters 1 to 5 set the scene by describing the review's scope, the department's approach to undertaking the review, how the Snowy Mountains Scheme is managed, the relevant policy settings and the outcomes of previous reviews.

Chapter 6 discusses the issues raised in the submissions and includes 20 proposals in response aimed at increasing transparency in how the Snowy Mountains Scheme is operated and managed, strengthening compliance and accountability and simplifying licence provisions. It also proposes further investigating numerous amendments to the Licence to improve the delivery of environmental flows, maximise water efficiencies and clarify ambiguous licence provisions. Chapter 6 is structured in accordance with the three categories outlined in the terms of reference.

Chapter 7 provides an initial discussion around Snowy Hydro Limited's performance in meeting the conditions of the Licence, summarising its self-assessment and discussing implementation issues identified on the management of Snowy Mountains environmental water. It includes one proposal in response, being to procure an expert panel to independently review Snowy Hydro Limited's performance to date as part of this review, with reference to the submissions.

Chapter 8 acknowledges the large number of issues raised in the submissions that did not fall within the review's terms of reference. These issues were generally concerned with the implementation of the Snowy Water Initiative and broader water resource management arrangements in the Snowy Mountains region. It includes one proposal in response, being to establish the Snowy Water Advisory Government Officials Committee to jointly oversee and coordinate water management in the Snowy Mountains and ensure partner governments continue to meet agreed outcomes from the Snowy Water Inquiry.

Chapter 9 commits to developing and including a detailed implementation plan in the final report and contains preliminary information on the work streams and governance arrangements.

Issues with the Licence

Department of Industry received 24 submissions from Snowy Hydro Limited; a range of community, environmental, and agricultural groups; government agencies; and individuals.

Snowy Hydro Limited considers the Licence is fit for purpose, but is seeking some changes to the water release requirements to improve operations.

The submissions raised many wide-ranging, water-related issues with the Licence and the management of Snowy Mountains water resources. The key themes include:

- the opaque nature of Snowy Mountains Scheme operations and licence complexity
- a need to better complement management rules between the Snowy Mountains Scheme and Murray and Murrumbidgee water supply systems
- a desire to review the effectiveness of amendments made to the Licence in 2011
- concerns the Licence favours electricity production over water and environmental management
- concerns around NSW's approach to implementing the outcomes of the Snowy Water Inquiry
- a lack of opportunities for community/stakeholder and scientific input to decision-making.

Proposed response

This draft report proposes administrative amendments to the Licence, a plan to improve the delivery of environmental flows and maximise water use efficiencies, and enhancements to how Snowy Mountains water resources are managed.

Proposed administrative amendments to the Licence

The 10 administrative amendments to the Licence will improve transparency, remove redundant licence provisions and fix errors.

The most significant administrative amendment is the proposal to oblige Snowy Hydro Limited to prepare a public version of the annual water operating plan (AWOP), which will summarise the forthcoming year's operations.

Transparency issues were raised in 11 of the 24 submissions to the review, indicating it is a priority for stakeholders. Ensuring transparency in how water is shared, allocated and managed is also a key goal outlined in the *NSW Government water reform action plan*¹.

Publishing a version of the AWOP is a practical way to increase public confidence in the management of the Snowy Mountains Scheme and provide information that will help downstream water authorities and water users plan their upcoming year's water use.

Department of Industry will work closely with Snowy Hydro Limited to scope the increased reporting requirements, ensuring it does not prescribe information that may disadvantage Snowy Hydro Limited on a commercial basis. It is also proposed to review the commercial AWOP to ensure it remains fit for purpose, and to make the reporting process more efficient.

Investigating improvements and reviewing performance

Department of Industry has used the review to scope the more complex issues raised in the submissions and identify a work plan to resolve them. This will enable the review to be completed in 2018, while providing more time to adequately analyse changes to the rules.

The plan aims to investigate issues with environmental water management and inefficient water resource management, amendments made to the Licence in 2011 and licence ambiguities.

¹ The *NSW Government water reform action plan* can be viewed at www.industry.nsw.gov.au/water-reform.

Key proposals include:

- the Office of Environment and Heritage (OEH) partnering with Department of Industry, Snowy Hydro Limited and the Victorian and Commonwealth governments to finalise an investigation into releasing environmental water down the Snowy River from the Mowamba River
- Department of Industry partnering with Snowy Hydro Limited, the Murray–Darling Basin Authority (MDBA), WaterNSW and the Victorian and Commonwealth governments to investigate ways to improve water accounting and water release rules. The aim will be to increase water use efficiencies and improve river health and flood management outcomes.

We expect the full work plan to be delivered by 2020.

Department of Industry is currently responsible for administering the Licence and overseeing the increased flows programs. In recognition of this, it is proposed to procure an independent expert panel to carry out the required review of Snowy Hydro Limited's and the Ministerial Corporations' performances in meeting the conditions of the Licence. The findings of the expert panel, and any necessary response, will be completed in 2018 and incorporated into the final report.

Improved Snowy Mountains water management arrangements

The review's management proposals will improve information sharing, enhance government oversight of Snowy Mountains water management, and enable detailed assessments of any proposed Licence amendments.

In summary, it is proposed:

- to improve collaboration between Snowy Hydro Limited and downstream water authorities by committing Snowy Hydro Limited, MDBA and WaterNSW to consulting on implementation of the AWOP during a water season
- to re-establish an interjurisdictional committee of senior officials to jointly oversee and coordinate water management in the Snowy Mountains and ensure the NSW, Commonwealth and Victorian governments continue to meet the agreed outcomes from the Snowy Water Inquiry
- that Department of Industry, Snowy Hydro Limited, MDBA and WaterNSW collaborate to improve analytic modelling capability to support the investigations identified in the work plan.

Implementation

Department of Industry will include a detailed implementation plan in the final report. It will contain the following three distinct phases:

1. initial, administrative variations to the Licence.
2. a plan of further investigations and second round of variations to the Licence
3. implementation of improved Snowy Mountains water management arrangements.

The three phases will run concurrently, with priorities recommended by Department of industry after consulting with Snowy Hydro Limited and the project stakeholder groups, and considering the public submissions.

The implementation plan will include project governance and consultation arrangements.

Department of Industry will oversee the implementation plan and carry it out with the support of: Snowy Hydro Limited; OEH; MDBA; WaterNSW; Victorian Department of Environment, Land, Water and Planning; Commonwealth Department of Agriculture and Water Resources; and the South Australian Department for Environment and Water.

Summary of proposed recommendations

Proposed administrative variations to the Licence

The proposed administrative variations respond to issues raised around transparency, redundant provisions, and errors. In summary, it is proposed to:

- increase transparency, compliance and accountability
- simplify Licence provisions
- secure agreements captured in the AWOP
- fix known errors.

Proposal	Pages
<p>1A It is proposed to vary the Licence so that:</p> <ul style="list-style-type: none"> • Snowy Hydro Limited will be obliged to prepare a public version of the AWOP, summarising the forthcoming year's operations, but withholding information that may disadvantage it on a commercial basis • future Water Consultation and Liaison Committee (WCLC) agreements will be published in both the commercial and public versions of the AWOP. <p>The scope of the increased reporting requirements will be recommended by Department of Industry after consulting with Snowy Hydro Limited and the WCLC.</p>	18
<p>2 The Licence will be varied to remove Schedule 5 (Licensed Extractive Users Within Snowy Water Catchment) and update Ministerial Corporation's obligation to provide Snowy Hydro Limited a copy of licensed extractive water users within the Snowy Water Catchment.</p>	19
<p>4 Clause 8.3(2) of the Licence (Contents of the annual water operating plan) will be varied so that Snowy Hydro Limited may have regard to:</p> <ul style="list-style-type: none"> • antecedent conditions, when providing details on a quarterly basis of the likely range of forecast water releases • guaranteed releases. <p>It is also proposed a new provision be added to the Licence that obliges Snowy Hydro Limited to provide the WCLC, upon request from a member, updated projections of quarterly forecast releases in a timely manner if experiencing a wet sequence.</p>	21
<p>5 The Licence will be varied to remove all provisions related to the construction of the outlet works at Jindabyne and Tantangara dams.</p>	24
<p>6 The Licence will be varied to remove all reference to the operation of the Mowamba Borrowings Account.</p>	24
<p>9 Clauses 12.2 and 25.2 of Schedule 3 of the Licence will be varied to clarify that Snowy Hydro Limited may use the following data to demonstrate compliance with daily, monthly and annual flow targets from Jindabyne and Tantangara dams:</p> <ul style="list-style-type: none"> • operational data to report compliance against daily targets • hydrographically corrected data to report compliance with monthly and annual targets. 	28
<p>10 The Licence will be varied to capture the agreement for Snowy Hydro Limited to continue making a riparian release of:</p> <ul style="list-style-type: none"> • approximately 1.4 megalitres per day (0.5 gigalitres per year) from Mowamba River, as part of 9 gigalitres per year Snowy River base passing flow requirement • up to 2.4 megalitres per day from Eucumbene Dam, to maintain a visible flow in the Eucumbene River at Nimmo. 	28

Proposal		Pages
13A	The Licence will be varied to: <ul style="list-style-type: none"> correct the drafting error in the 'Snowy–Tumut relaxation' calculation reflect the WCLC drafting of Clause 10.1, Schedule 4 and definition of 'discretionary ATW release'. 	37
14A	The Licence will be varied to: <ul style="list-style-type: none"> correct the drafting error in the definition of the 'agreed annual release' reflect the WCLC drafting of the definition of 'recovery amount'. 	38
16	Clauses 2.1 and 3.1, Schedule 4 of the Licence will be varied to ensure the method used to calculate the 'water available to each development' reflects any inter-valley water transfers.	41

Proposed work plan

The proposed work plan responds to issues around the delivery, accounting and access to Increased Flows, inefficient water resource management, requests to review the operation of the variations made in 2011 and ambiguities in the Licence. In summary, it is proposed to further investigate ways to:

- increase operational flexibility for delivering Increased Flows
- improve water accounting and water release rules to increase water use efficiencies
- clarify licence arrangements.

It is also proposed to procure an expert panel to independently review compliance with the Licence, the findings of which will feed into the final review report.

Proposal		Pages
1B	The WCLC will review the commercial AWOP to ensure it remains fit for purpose and does not impose unnecessary administrative burden on Snowy Hydro Limited.	18
7	OEH, in partnership with the Department of Industry, Snowy Hydro Limited, the Snowy Advisory Committee and Victorian and Commonwealth Governments will finalise the Mowamba River investigation. This will include: <ul style="list-style-type: none"> evaluating using the Mowamba River as a way to provide environmental water to the Snowy River recommending an environmental flow regime for the Snowy River consisting of a combination of releases from Jindabyne Dam and the Mowamba River. 	25
8	The Department of Industry, Snowy Hydro Limited, MDBA and the Victorian and Commonwealth governments will: <ul style="list-style-type: none"> work together to ensure governments can deliver a long-term average annual flow of 212 gigalitres per year down the Snowy River cost-effectively in accordance with the intent of the Snowy Water Inquiry Outcomes Implementation Deed 	27
11	<ul style="list-style-type: none"> further investigate the trigger for accessing flows under the River Murray Increased Flows (RMIF) 	31
12A	<ul style="list-style-type: none"> seek agreement on the definition of inflows for calculating the dry inflow sequence volume (DISV) 	35
12B	<ul style="list-style-type: none"> further investigate the: <ul style="list-style-type: none"> interaction of DISV with other elements of the Required Annual Release (RAR) effectiveness of the DISV in managing release requirements through the Millennium drought and a changing climate 	35
13B	<ul style="list-style-type: none"> investigate options to improve the relaxation mechanism 	37

Proposal		Pages
	The Department of Industry, Snowy Hydro Limited, MDBA and the Victorian and Commonwealth governments will:	
14B	<ul style="list-style-type: none"> review the operation of the Flexibility and Pre-release provisions, including its interaction with other RAR provisions, and consider opportunities to improve existing arrangements 	38
15A	<ul style="list-style-type: none"> review the effectiveness of spill compensation and flood mitigation arrangements 	40
15B	<ul style="list-style-type: none"> investigate options to improve licence rules around the timing of releases to increase water use efficiency and flood management outcomes 	40
17	<ul style="list-style-type: none"> investigate options to secure commitment of releases from the Snowy Mountains Scheme to support increased early season water allocations for Murray or Murrumbidgee water users 	42
18	<ul style="list-style-type: none"> investigate the effectiveness of the Drought and DISV Reserve accounts and consider options for improving how they support downstream water user requirements 	44
19	<ul style="list-style-type: none"> further investigate and resolve how net evaporation should be shared between bulk water accounts. 	44
21	<p>The Department of Industry will procure an expert panel to independently review performance with the conditions of the Licence to date, including:</p> <ul style="list-style-type: none"> Snowy Hydro Limited's assessment of compliance with its obligations of the Licence the appropriateness of the management approach taken to account for spills of Snowy River Increased Flows (SRIF) and meet Snowy Montane River Increased Flows (SMRIF) targets The systems, procedures and frameworks in place to ensure Snowy Hydro Limited and Department of Industry can demonstrate Snowy Hydro Limited's compliance with the Licence. 	46

Improved management arrangements

The review's preliminary findings respond to issues raised around information sharing, consultation and government oversight of Snowy Mountains water management, and requests to undertake detailed assessments of any proposed variations to the Licence. In summary, it is proposed:

- to improve collaboration between Snowy Hydro Limited and downstream water authorities
- improve analytic modelling capability to support the investigations identified in the work plan
- establish an interjurisdictional government committee to jointly oversee and coordinate water management in the Snowy Mountains.

Proposal		Pages
3	Snowy Hydro Limited will agree to formal consultation arrangements with the MDBA and WaterNSW to discuss implementation of the AWOP during a water season.	21
20	The Department of Industry, in partnership with Snowy Hydro Limited, the WCLC and WaterNSW, will collaborate to improve modelling capability to support the investigations committed for the next phase of the review.	45
22	The NSW Government will re-establish the Snowy Water Advisory Government Officials Committee to jointly oversee and coordinate water management in the Snowy Mountains and ensure the NSW, Victorian and Commonwealth governments continue to meet agreed outcomes from the Snowy Water Inquiry.	53

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1. About the review

Snowy Hydro Limited, as the operator of the Snowy Mountains Hydro-Electric Scheme (the Snowy Mountains Scheme), was issued with a package of agreements, licences and other regulatory instruments in preparation for corporatisation in 2002. One component of this package was the Snowy Water Licence (the Licence), which was issued on 30 May 2002 under the *Snowy Hydro Corporatisation Act 1997* (the SHC Act).

The Licence defines Snowy Hydro Limited's water rights and obligations and aims to strike a balance between the competing demands for water for hydro-electricity generation, consumptive use and the environment. The Licence allows Snowy Hydro Limited to collect, divert, store, and release water by and from the works of the Snowy Mountains Scheme for the 75-year term of the Licence. The Licence also defines the rules for releases into the Murray and Murrumbidgee rivers and imposes environmental flow release obligations on Snowy Hydro Limited for the benefit of the Snowy River and other montane rivers (the high-country rivers of the Snowy Mountains).

The Licence is subject to mandatory reviews under the SHC Act, initially after five years and then at intervals of 10 years. The five year review was carried out between 2007 and 2009. This is the first mandatory 10-year review.

The Department of Industry—Lands & Water administers the Licence on behalf of Water Administration Ministerial Corporation (Ministerial Corporation) and is managing the 10-year review. Department of Industry initiated the review on 28 June 2017, with invitations to stakeholders to lodge submissions.

1.1 Scope

The review's terms of reference are focused on Snowy Hydro Limited's obligations under the Licence, which fall into three broad categories:

1. **increased flow requirements**—also known as environmental releases—including releases under the Snowy River Increased Flows (SRIF) and Snowy Montane Rivers Increased Flows (SMRIF) programs (see clause 1.1 (34) and Schedule 3 of the Licence)
2. **water release requirements**—predominantly western river releases—including accounting and data provision rules (see clause 1.1 (104) and Schedule 4 of the Licence)
3. **administrative obligations**—including obligations relating to compliance reporting (section 4 of the Licence), the licensee's rights in relation to water (clause 7 of the Licence), the development of annual water operating plans (AWOPs) (clause 8 of the Licence), fees and charges (clause 9 of the Licence), and the requirement to build and/or modify certain works (clause 6 of the Licence and clauses 6, 19 and 20 of Schedule 3 of the Licence).

The review is also considering Snowy Hydro Limited's performance in meeting the conditions of the Licence and whether there are any anomalies or practical issues that need to be addressed.

Importantly, the review is not addressing:

- the overall volumes of environmental flow releases, and whether these are excessive or insufficient
- the transfer of responsibility for designing Snowy Mountains environmental flows from Department of Industry to the Office of Environment and Heritage (OEH)
- issues relating to the Commonwealth Government's announcement about the possible expansion of the Snowy Mountains Scheme
- town water supply issues.

1.2 Approach to undertaking the review

The following principles are guiding Department of Industry's approach to carrying out the review:

- Comply with relevant legislation.
- Legislate administrative changes previously agreed by NSW, Victorian and Commonwealth governments and Snowy Hydro Limited.
- Identify opportunities to clarify and simplify Licence provisions.
- Ensure timely completion of the review.
- Draw on stakeholder and expert knowledge.

1.2.1 Legislative requirements

The relevant legislative requirements are set out in the SHC Act and the Licence. The SHC Act prescribes the requirement for the Ministerial Corporation to review the obligations under the Licence and the need to do so every 10 years after the first five-year review. It also prevents the Licence being amended to reduce the volume of environmental releases for the Snowy montane rivers, outlines consultation requirements and provides for the NSW Government and Snowy Hydro Limited to agree on compensation arrangements for variations to the Licence that have adverse financial impacts Snowy Hydro Limited.

The Licence, in addition to what is covered in the SHC Act, requires Ministerial Corporation to consider all issues raised by Snowy Hydro Limited in good faith throughout the course of the review.

To comply with legislative requirements Department of Industry:

- confined the review's terms of reference to reviewing Snowy Hydro Limited obligations under the Licence and its operational performance (i.e. compliance)
- initiated the review on 28 June 2017, being 15 years after corporatisation
- invited stakeholders to lodge submissions by 13 October 2017²
- Liaised directly with Snowy Hydro Limited to ensure its issues were understood and considered.

1.2.2 Previous agreements

The Water Consultation and Liaison Committee (WCLC) is established under the Snowy Water Inquiry Outcomes Implementation Deed³ (SWIOID) and is responsible for advising Snowy Hydro Limited on the preparation and implementation of each annual water operating plan (AWOP). More information on the WCLC is contained in section 3.2.3.

Since 2002, the WCLC has agreed to numerous accounting and operating arrangements that are not explicitly set out in the Licence and captured them in the AWOP. The review provides an opportunity to secure these agreements in legislation, providing certainty for Snowy Hydro Limited and the WCLC and visibility for the public, who do not have access to the AWOP.

1.2.3 Simplification

The Licence is undoubtedly complex and includes many one-off starting provisions that are now redundant. Department of Industry has identified redundant provisions and committed to actively seek opportunities to simplify arrangements where possible.

1.2.4 Timely completion

Completing the formal review in 2018 will provide certainty for Snowy Hydro Limited and stakeholders that rely on water released from the Snowy Mountains Scheme. However, the complex interactions between the various water release obligations set out in Schedule 4 means detailed analysis will be required to understand the consequences of any proposed variations and ensure third parties are not inadvertently impacted.

² The first round submission period was originally scheduled to close on 28 August 2017. Department of Industry extended the date to provide stakeholders more time to prepare their submissions following the public stakeholder briefings.

³ Refer to section 3.1.3 of the report for more information on the SWIOID.

There are numerous administrative improvements and enhancements to the management of increased flows that can be considered now. Rather than delay implementing these improvements until all issues are thoroughly investigated, Department of Industry has used the formal review to scope the more complex issues and identify a work plan to resolve them.

It is expected the full work plan will be delivered by 2020. The final report will provide more detail on implementation and consultation arrangements.

1.2.5 Stakeholder and expert knowledge

Department of Industry sought stakeholder input by inviting public submissions to the review over a fifteen week period between 28 June 2017 and 13 October 2017. There were 24 submissions lodged in response to the first invitation, from a range of community, environmental, and agricultural groups, government agencies and individuals. A list of submitters is provided at Appendix 1. Department of Industry will invite further consultation on this draft report and any formal variations proposed to the Licence.

Department of Industry has also called on the expertise of an inter-jurisdictional group and committed to engaging an independent Expert Panel and establishing a technical working group to support the ongoing development and implementation of the review. It has also consulted with Snowy Hydro Limited.

It is proposed the independent Expert Panel be engaged to advise Department of Industry on the performance of Snowy Hydro Limited and Ministerial Corporation to date in meeting the conditions of the Licence. Responses to the Panel's findings will be incorporated into the final report. Department of Industry will also publish the Panel's report on the Snowy Water Licence webpage. More information on the proposed Expert Panel is contained in section 7.1.

Approximately twenty per cent of issues raised in the submissions fell outside the review's strict terms of reference. Department of Industry has used the review process as an opportunity to respond to these key issues and clarify NSW's current management approach.

1.3 Process to complete the review

This draft report presents proposals for further consultation with Snowy Hydro Limited, key stakeholders and the general public.

Department of Industry will finalise the report in the second half of 2018 based on feedback provided in the second round of submissions and the findings of the Expert Panel's independent review of Snowy Hydro Limited's performance.

The final report will also include arrangements for implementing and consulting on the recommended work plan and any amendments to the Licence.

2. The Snowy Mountains Hydro-Electric Scheme

2.1 Overview of the scheme⁴

The Snowy Mountains Scheme is an integrated water and hydro-electric power utility operated and maintained by Snowy Hydro Limited.

The Snowy Mountains Scheme was designed to produce electrical energy, but one of the objectives was to provide an annual, reliable source of water for agriculture in NSW and Victoria. The scheme collects and stores water, including water that would otherwise flow east down the Snowy River, diverts it through trans-mountains tunnels and power stations and then release it west of the Snowy Mountains into the River Murray and Murrumbidgee River where it can be used for town water supply, irrigation and environmental purposes.

The Snowy Mountains Scheme was designed to provide around 1,000 gigalitres of water to each of the Murray and the Murrumbidgee valleys each year. This annual supply of reliable, high-quality water enabled the expansion of irrigation development in the inland areas. The Snowy Mountains Scheme was designed to be able to provide the annual supply through the most severe drought on record, which was then the period 1938–45.

To generate electricity Snowy Hydro Limited must release water from the Snowy Mountains Scheme, and to release water, Snowy Hydro Limited must generate electricity. In this way, water releases and electricity generation are inseparably linked.

Snowy Hydro Limited must operate the Snowy Mountains Scheme to first meet its water release obligations and then to maximise electricity market opportunities within the constraints imposed by the Snowy Water Licence.

Snowy Hydro Limited must fund both the debt and operating costs of the scheme through its participation in the highly competitive National Electricity Market (NEM). Those electricity revenues pay for the increasing costs of maintaining and operating the Snowy Mountains Scheme, including the costs associated with making environmental flows.

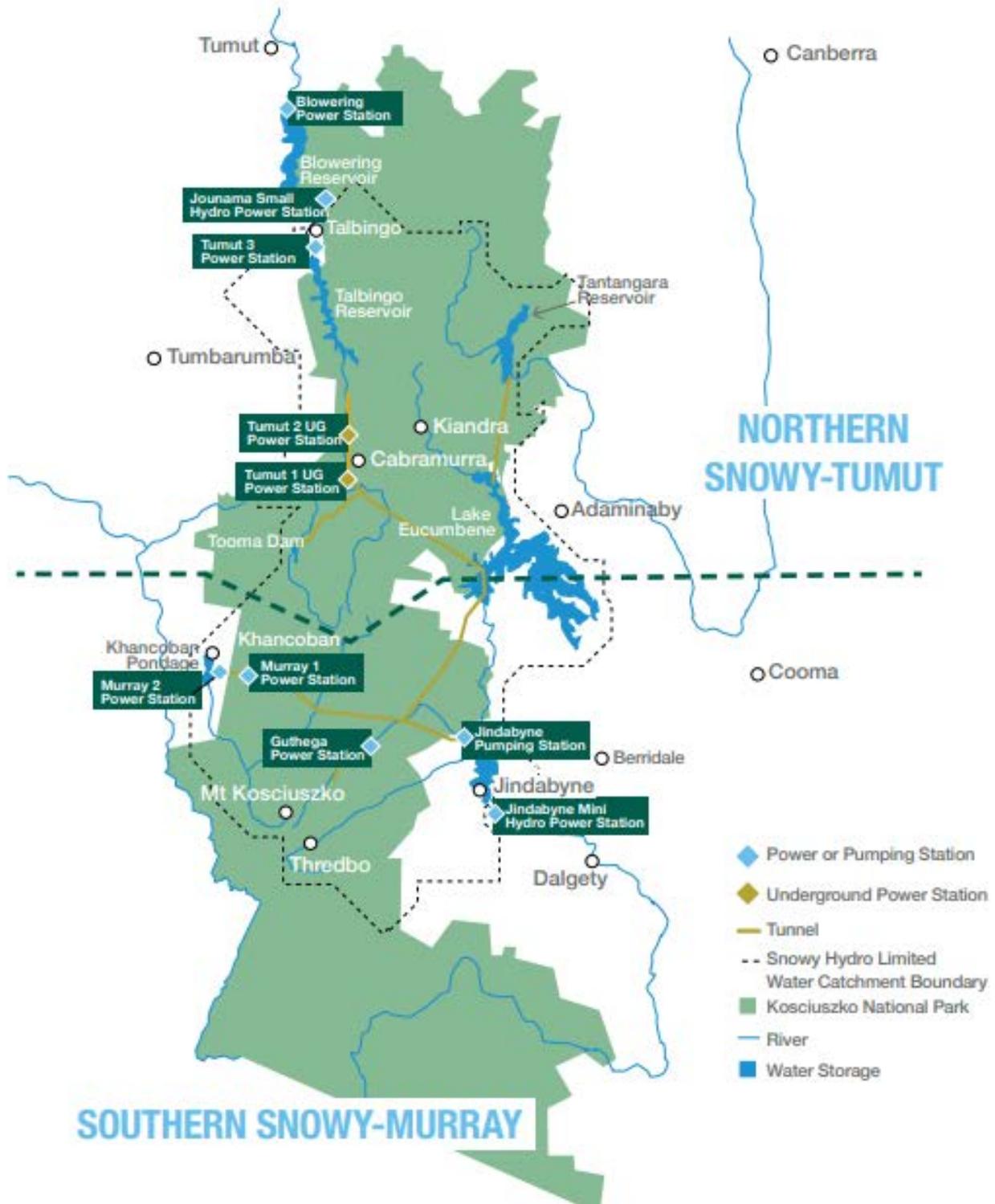
Approximately 99% of all flows in the Snowy Mountains is captured and diverted through a complex, integrated infrastructure that includes:

- nine power stations—Murray 1, Murray 2, Blowering, Guthega, Tumut 1 (located 366 metres below ground level), Tumut 2 (located 244 metres below ground level), Tumut 3, Jounama Small Hydro Power Station and Jindabyne Mini Hydro Power Station
- one pumping station at Jindabyne and a pump storage facility at Tumut 3 Power Station
- 16 major dams with a total storage capacity of 7,000 gigalitres, more than 12 times the volume of Sydney Harbour.
- 145 kilometres of interconnected tunnels and pipelines and 80 kilometres of aqueducts
- 33 hydro-electric turbines with a generating capacity of 4,100 megawatts.

The Snowy Mountains Scheme comprises two major developments: the Northern Snowy–Tumut Development and the Southern Snowy–Murray Development. The water in Lake Eucumbene, the scheme's large, long-term storage, is split between the two developments based on where the water was collected. Figure 1 shows a map of the Snowy Mountains Scheme.

⁴ Snowy Hydro contributed information to this section.

Figure 1 The Snowy Mountains Scheme⁵



⁵ Source: Snowy Hydro Water Report for 2014–15 (www.snowyhydro.com.au/wp-content/uploads/2016/10/Snowy_Water-Report_14-15.pdf)

2.1.1 The Snowy-Murray Development

The Snowy-Murray Development (Figure 2) consists of four power stations with 17 generating units and one pumping station. Water in the upper Snowy River is diverted at Guthega Dam through Guthega Power Station and back into Island Bend Dam. Inflows into the relatively small Guthega Pondage are seasonal and spills of the reservoir are common, particularly during the spring snowmelt period.

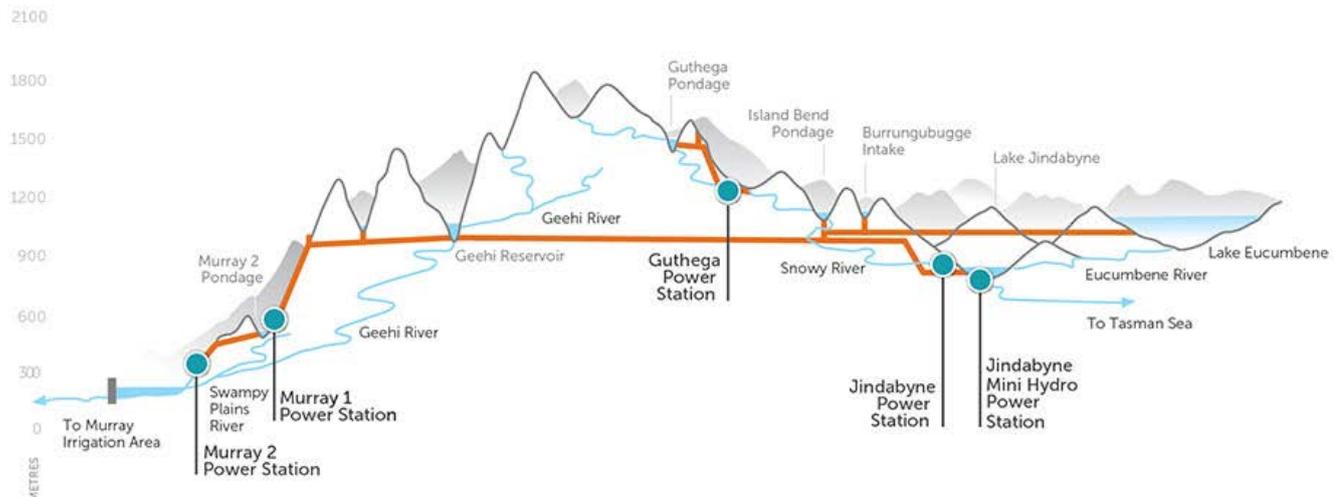
During times of high inflows, water flowing into Island Bend Pondage is diverted to Lake Eucumbene for storage and then transferred to the River Murray catchment at a later time. At times of low inflows, water from Island Bend Pondage is diverted to Geehi Reservoir through a trans-mountain tunnel, together with water transferred back from Lake Eucumbene.

The Jindabyne Pumping Station pumps water from Lake Jindabyne (normally at off-peak times such as nights and on weekends) into Geehi Reservoir. Water from Lake Jindabyne cannot be pumped back to Lake Eucumbene or to Island Bend Dam.

The Jindabyne Mini-hydro Power Station allows Snowy Hydro Limited to recover a small amount of electricity from some of the environmental releases made from Jindabyne Dam into the Snowy River.

From Geehi Reservoir, with additional water from the Geehi River, the water from Island Bend and Eucumbene passes through Murray 1 and Murray 2 power stations. Khancoban Dam regulates water released from Murray 2 Power Station down the Swampy Plains River, which is a tributary of the upper River Murray.

Figure 2 The Snowy–Murray Development⁶



2.1.2 The Snowy–Tumut Development

The Snowy-Tumut Development (Figure 3) consists of five power stations and 16 generating units. It collects the headwaters of the upper Murrumbidgee, Tooma and Eucumbene rivers. Those waters are diverted through trans-mountain tunnels to Tumut Pond Dam where they join the waters of the Tumut River and flow through Tumut 1 and Tumut 2 underground power stations and then into Talbingo Reservoir. Water stored in Talbingo Reservoir then passes through the Tumut 3 Power Station and into Jounama Pondage.

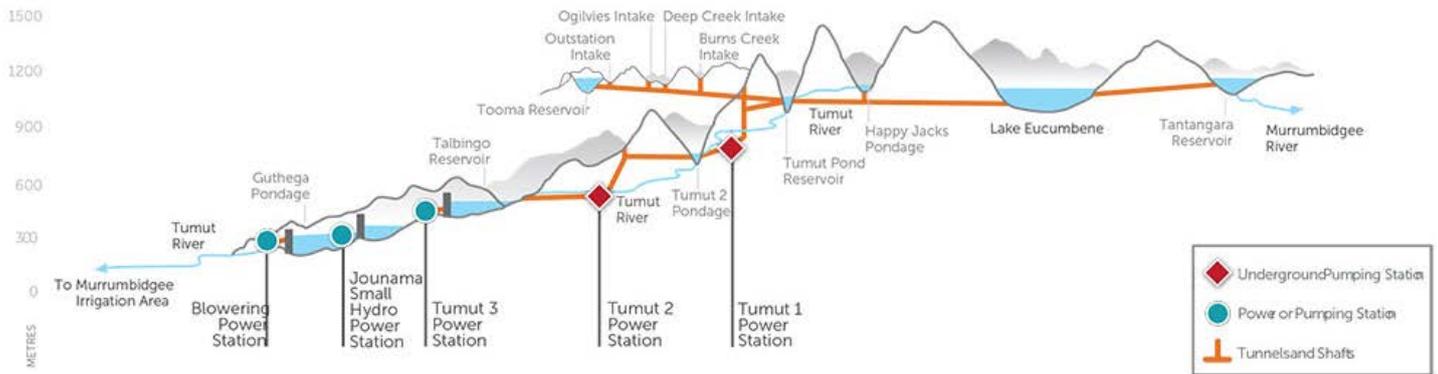
Three of the six generating units at Tumut 3 Power Station also have large pumps that can be used to pump water from Jounama Pondage back up into Talbingo Reservoir, thereby 'recycling' water. Water cannot be pumped any further uphill than Talbingo Reservoir.

Water is released from Jounama Dam into Blowering Reservoir either through the Jounama Small Hydro Power Station or through the radial release gates at Jounama Dam.

⁶ Source: Snowy Hydro Limited website, www.snowyhydro.com.au/our-energy/hydro/the-assets

Blowering Power Station is located on Blowering Dam and is leased from WaterNSW. Blowering Power Station is a 'run of river' plant that operates as WaterNSW releases water from Blowering Dam into the Tumut River, which joins the Murrumbidgee River near Gundagai.

Figure 3 The Snowy-Tumut Development⁷



2.2 Downstream of the Snowy Mountains Scheme

Snowy Mountains Scheme releases, and the other River Murray and Murrumbidgee River catchment inflows, are re-regulated by Hume Dam on the River Murray and Blowering Dam on the Tumut River.

Water releases for consumptive and environmental uses along the River Murray are managed by the Murray–Darling Basin Authority (MDBA), principally through releases from Dartmouth and Hume Dams.

Water releases for consumptive and environmental uses along the Murrumbidgee River are managed by WaterNSW, principally through releases from Blowering and Burrinjuck Dams.

⁷ Source: Snowy Hydro Limited website, www.snowyhydro.com.au/our-energy/hydro/the-assets

3. Policy context

3.1 Snowy water management reforms

The Snowy Mountains Scheme's current regulatory framework is the product of major energy market and water reforms implemented by the NSW, Victorian and Commonwealth governments in the 1990s. These reforms resulted in the corporatisation of the Snowy Mountains Hydro-Electric Authority and an inquiry into the environmental impacts of the scheme. Driving these reforms was the desire to secure the commercial viability of the Snowy Mountains Scheme, while delivering environmental benefits to the Snowy River, Snowy montane rivers and River Murray⁸.

3.1.1 Snowy Water Inquiry

The Snowy Water Inquiry was commissioned in 1998 to investigate the 'environmental issues arising from the pattern of water flows in rivers and streams...caused by the operation of the Snowy Mountains Hydro-electric Scheme and report on options for dealing with the issues and the environmental, economic, agricultural and other impacts of those options'. In its final report in 1998, the inquiry identified a series of flow options to address its terms of reference. The inquiry also recommended that increased flows should not adversely affect water supplies to irrigators.

In 2000, the NSW, Victorian and Commonwealth governments agreed to implement the outcomes of the Snowy Water Inquiry in the *Heads of Agreement on the Outcomes of the Snowy Water Inquiry*.

The Heads of Agreement was subsequently given effect through the SWIOID entered into by the NSW, Victorian and Commonwealth Governments in 2002. It is a legally binding agreement between the parties on the outcomes of the Snowy Water Inquiry.

The SWIOID codifies agreements on the institutional arrangements governing the acquisition and management of increased flows, including the Joint Government Enterprise and funding. It also establishes and prescribes the functions of the WCLC and provides for arrangements on the transfer or revocation of the Licence.

3.1.2 The Snowy Water Initiative

The Snowy Water Initiative was established to deliver the water recovery commitments set out in the SWIOID. Initially, the NSW, Victorian and Commonwealth governments and Snowy Hydro Limited invested \$1.2 billion in water recovery infrastructure upgrades, water management and science to allow the recovered environmental water to be released as increased flows to the Snowy, Snowy montane and Murray rivers.

Targets for the increased flows programs included returning the following volumes of water each year:

- Snowy River: a) 212 gigalitres
b) if applicable, up to 294 gigalitres
- Murray River: 70 GL
- Snowy montane rivers: up to the equivalent of up to 150 gigawatt hours of forgone electricity generation, which equates to 117.8 gigalitres.

The partner governments agreed that the increased flows would be delivered in a four-stage process, with increasing volumes of water being released after each stage, and with the maximum amount being delivered within 10 years of corporatisation (28 July 2012).

Water for Rivers was the joint government enterprise established to develop water efficiency projects and other measures, including licence purchases, to recover the water for the three increased flows programs. The

⁸ Source: Vanderzee, M. & Turner, G. (2002): *The Snowy Flows Again—Intergovernmental Cooperation on Water Reform*, 4th Water Law and Policy Conference, Sydney.

Water for Rivers enterprise completed its task of securing the licensed water entitlements from the Murray, Murrumbidgee and Goulburn rivers in July 2012.

3.1.3 Snowy Scientific Committee

The Snowy Scientific Committee (SSC) was established by the NSW Government under the SHC Act as a body corporate. The operation of the SSC and its support was funded by the NSW Government and included both NSW and Victorian nominees.

The SSC was formally established in 2008⁹ and advised the NSW Government on environmental releases up until the 2012–13 water year. These recommendations were adopted, except for some minor changes for operational reasons and for some flow trials undertaken by the then NSW Office of Water. The SSC also produced two reports on the adequacy of environmental flows to the Snowy River in 2008 and in the upper Murrumbidgee River in 2010.

In 2013, the NSW Government reviewed the structure and function of the SSC to ensure the management of Snowy River environmental water remained fit for purpose and up to date. The review recommended a new Snowy Advisory Committee (SAC) be established to advise on the pattern and timing of environmental releases for the Snowy River, governed by a more contemporary framework that could better respond to community and government needs. It was recommended that the new committee be expanded to provide a greater range of water expertise and necessary technical skills and include Aboriginal and community representation.

Legislation establishing the SAC commenced in January 2018. The SAC will begin operating in 2018 and will advise the Ministerial Corporation on the pattern of increased flows from the 2019–20 water year onwards.

3.2 Current water management regulatory framework

3.2.1 Snowy Hydro Corporatisation Act 1997

Three complementary Snowy Hydro Corporatisation Acts made by each of the NSW, Victorian and Commonwealth Governments in 1997 provide the legal foundation for the Snowy water management reforms discussed above in section 3.1.

NSW's SHC Act:

- provided for an inquiry examining the environmental impacts of the Snowy Mountains Scheme
- established Snowy Hydro Limited as a corporatised entity to operate and maintain the Snowy Mountains Scheme through a water licence (i.e. the Snowy Water Licence)
- established a scientific committee to advise on the pattern of environmental releases.

3.2.2 The Snowy Water Licence

Through corporatisation, the Snowy Mountains Scheme's water operations were brought under NSW's regulatory regime and the Snowy Water Licence became the principle instrument through which Snowy Hydro Limited's water operations are governed.

The Licence is a NSW water licence issued and administered by the Ministerial Corporation. It reflects two key principles of corporatisation, being that the water regulated by the scheme is not an asset of Snowy Hydro Limited and that it contains, for the most part, the prior water rights and obligations of the Snowy Mountain Hydro Electric Authority.

These rights and obligations aim to strike a balance between competing demands on water for hydro-electricity generation, the environment and consumptive use in the Murray–Darling Basin. Put simply, the Licence specifies the minimum volume of water that must be released from the Snowy Mountains Scheme each year as 'required annual releases' and 'increased flows'. Nominally, these release obligations equate to 2,088 gegalitres per year shared between the Murray, Murrumbidgee and Snowy rivers.

⁹ Establishing the SSC was delayed due to a combination of factors including resourcing and operational arrangements and because little water was actually available for the environmental releases prior to 2008.

The Licence also contains numerous obligations on Snowy Hydro Limited giving effect to agreements made in response to the Snowy Water Inquiry and captured in the SWIOID, including:

- volumes of increased flows over time
- the water accounting treatment and delivery obligations associated with increased flows
- environmental objectives for the management of increased flows
- the construction of works to support the delivery of increased flows
- increased flows monitoring requirements
- how compliance is assessed and force majeure provisions
- WCLC consultation in the preparation of the AWOP.

3.2.3 Annual water operating plan

The Licence obliges Snowy Hydro Limited to prepare and comply with an AWOP approved by the Ministerial Corporation on an annual basis.

The purpose of an AWOP is to provide the Ministerial Corporation and the WCLC with details as to how Snowy Hydro Limited proposes to operate the Snowy Mountains Scheme in the forthcoming water year, within the parameters set by the Licence around increased flow requirements and water release requirements.

Under the Licence, Snowy Hydro Limited must:

- prepare a first draft AWOP and provide it to WCLC for review
- consider WCLC's comments and provide a revised plan to Department of Industry (as the Ministerial Corporation).

3.2.4 Water Consultation and Liaison Committee

The WCLC is established under the SWIOID and is responsible for advising the Ministerial Corporation on administering the Licence during the preparation and implementation of each AWOP.

Currently the WCLC comprises representatives from Department of Industry, the Victorian Department of Environment, Land, Water and Planning and the MDBA. The Commonwealth Government is not currently represented but is a member under the SWIOID.

3.2.5 Snowy Advisory Committee

The SAC is established by the NSW Government under the SHC Act and will provide the Ministerial Corporation advice on key issues and help progress the next stage of the long-term watering strategy of the Snowy River. Specifically, it will be responsible for providing community and expert input to the design of the timing and pattern of the release of environmental flows to the Snowy River and Snowy montane rivers. The SAC will be made up of at least six members representing Aboriginal, local community and environmental interests, alongside NSW and Victorian government specialists.

3.3 Murray–Darling Basin Agreement and Basin Plan

The water released west of the Snowy Mountains Scheme to the Murray and Murrumbidgee rivers increases water availability in the Murray–Darling Basin.

Releases secure the reliability of allocations against water licences issued by NSW, Victoria and South Australia in the Murray and Murrumbidgee systems for both consumptive and environmental purposes. In doing so they reduce the volume of water that would otherwise have been diverted from Murray–Darling Basin water sources to support this level of development. For the River Murray, the rights of NSW and Victoria to releases from the Snowy–Murray Development are secured in the Murray–Darling Basin Agreement. Water made available under these rights support the obligation of these states to deliver South Australia's entitlement.

The Basin Plan became law in 2012 and has set limits on how much water can be diverted from the Murray–Darling Basin for consumptive use. The limits, known as sustainable diversion limits (SDLs) come into effect in 2019 and have set a recovery requirement across the basin of 2,750 gigalitres from a 2009 baseline.

Modelling of the Basin Plan water recovery target assumes the Snowy Mountains Scheme continues providing inflows to the Murray and Murrumbidgee systems.

The Basin Plan also includes provision to adjust the SDLs if a basin state can demonstrate environmental outcomes can be reached with less water. NSW and Victoria have jointly proposed to seek an SDL adjustment from changes made to the Licence in 2011 that provide environmental managers more opportunities to access River Murray Increased Flows to target improved environmental outcomes.

3.4 NSW Water Reform Action Plan

In December 2017, the NSW Government released the *Water Reform Action Plan* in response to the *Independent investigation into NSW water management and compliance*, conducted by Ken Matthews, AO (the Matthews Report) and the Murray–Darling Basin Water Compliance Review.

The plan will deliver on the state’s responsibility to ensure an equitable and transparent approach to the management of water for current and future generations. The NSW Government’s water goals are to:

- introduce best practice for water management
- build a compliance and enforcement regime that ensures strong and certain regulation
- ensure transparency in how NSW shares, allocates and manages water
- build capability to support implementation of water reforms.

3.5 National Electricity Market¹⁰

Snowy Hydro Limited is the leading provider of peak, renewable electricity and innovative risk management financial hedge products to the NEM.

Through its hydro, gas and diesel generation assets, Snowy Hydro Limited generates the power that meets the everyday peak power demands of electricity retailers and end-use customers in the NEM.

Snowy Hydro Limited is a leading supplier of electricity price risk hedging contracts such as price caps and similar contracts to other NEM participants (retailers and other generators) who are seeking protection to limit the price risk they face in the NEM spot market. Snowy Hydro Limited’s ability to draw on large-scale generation at short notice means that it is able to offer such contracts, and generally hedge the risk it takes on under those contracts by generating electricity as required.

The NEM has been operating since 1998 and today supplies electricity to more than nine million Australian customers on an interconnected national grid that runs through Queensland, NSW, the Australian Capital Territory, South Australia, Victoria and Tasmania. Approximately \$7.7 billion of energy was traded through the NEM in 2014–15.

The Australian Energy Market Operator operates a wholesale spot market for trading electricity between generators and electricity retailers in the NEM. This means that all the electricity output from generators is pooled and then scheduled to meet electricity demand.

3.6 Snowy 2.0

Snowy Hydro Limited released its feasibility study into the Snowy Mountains Scheme’s expansion in December 2017, which concluded the Snowy 2.0 pumped hydro expansion project is both technically and financially feasible.

Snowy 2.0 is a pumped hydro project that will increase the Snowy Mountains Scheme’s generation capacity by up to 2,000 megawatts and will provide about 350,000 megawatt hours of energy storage at full capacity.

The feasibility study concluded the expansion will not impact downstream water users or environmental flows because there will be no change to Snowy Hydro Limited’s licence.

¹⁰ Snowy Hydro contributed information to this section.

This will be validated in a comprehensive and transparent planning and environmental approvals process, including the preparation of an environmental impact statement (EIS). The EIS will address the environmental, social and economic impacts of the project.

3.7 Commonwealth Government purchase of Snowy Hydro Limited

On 2 March 2018, the Commonwealth Government announced it had reached agreement with the NSW and Victorian governments to take full ownership of Snowy Hydro Limited.

Under the agreement, the Commonwealth Government will increase its shareholding from 13% to 100% by purchasing NSW's (59%) and Victoria's (29%) shareholdings.

Importantly, it was agreed there will be no change to current arrangements on water issues, including licence administration. As such, the sale will have no bearing on the outcome of the review.

4. Snowy water management responsibilities

In addition to Snowy Hydro Limited, numerous government organisations play key roles in the management of water regulated by the Snowy Mountains Scheme. Their roles are described in Table 1.

Table 1 Role of agencies and committees in the management of water regulated by the Snowy Mountains Scheme.

Agency/committee	Responsibilities
Water Administration Ministerial Corporation	<p>The Ministerial Corporation is a statutory body established under the <i>Water Management Act 2000</i> responsible for representing the Crown and carrying out various water management functions.</p> <p>Its role in Snowy water management is prescribed in the SHC Act and Snowy Water Licence itself. Its key functions include:</p> <ul style="list-style-type: none"> • administering the Snowy Water Licence • approving the AWOP • notifying Snowy Hydro Limited of the volume of annual water recovery and increased flows release volumes • preparing a safety management plan in connection with the release of Snowy River flushing flows • calling out releases related to the previous year's Relaxation Volume, drought accounts and River Murray Increased Flows (RMIF) • consulting on various water accounting matters • developing analytical models and providing downstream storage and diversion volume data • verifying data provided by Snowy Hydro Limited. <p>It is also a member of the WCLC.</p> <p>In a practical sense, most of these functions are carried out by Department of Industry, which has been delegated responsibility for the day-to-day operation and administration of the Licence.</p>
Department of Industry	<p>In addition to acting as the Ministerial Corporation's delegate, Department of Industry is also responsible for accounting for Snowy-Tumut Development inflows and releases and, currently, developing strategies for increased flows.</p>
Victorian Department of Environment, Land, Water and Planning	<p>Victorian Department of Environment, Land, Water and Planning is responsible for managing Victoria's catchments and waterways. It represents the Victoria on the WCLC and provides input to the increased flows strategies.</p>
Murray–Darling Basin Authority	<p>The MDBA is responsible for operating the River Murray system and the accounting for Snowy-Murray Development inflows and releases in accordance with the Murray-Darling Basin Agreement. It is also represented on the WCLC.</p>
WaterNSW	<p>WaterNSW operates the Murrumbidgee water system and leases Blowering Reservoir to Snowy Hydro Limited.</p>
Office of Environment and Heritage	<p>OEH delivers water for the environment on behalf of the NSW Government and is scheduled to take over responsibility for developing the increased flows strategies from Department of Industry.</p>
Victorian Environmental Water Holder	<p>The Victorian Environmental Water Holder is responsible for holding and managing Victoria's environmental water entitlements and advises on the development of the increased flows strategies.</p>

5. Past reviews and variations of the Licence

5.1 Mandatory five-year review

The Ministerial Corporation first reviewed the Licence between 2007 and 2009, meeting the legal obligation to carry out a mandatory five-year review into the increased flows provisions described in Schedule 3.

This review addressed issues raised in public submissions. Key outcomes included:

- developing a communication program to ensure that all stakeholders have easy access to all relevant information relating to the Licence, including the various regulatory bodies involved in the management of the Licence and the environmental flow regime
- amending the Licence to require that Snowy Hydro Limited produce an annual report to show how it has complied with matters relating to environmental flows and western river releases relative to targeted volumes
- a recommendation to the SSC to investigate options for better achieving environmental objectives under the low flow conditions that may include the options for decommissioning of Mowamba Aqueduct.

The Licence was subsequently varied in May 2010, and included variations recommended in the five-year review and variations agreed to by the NSW, Victorian and Commonwealth governments, the Murray–Darling Basin Commission and Snowy Hydro Limited during the course of administering and operating under the Licence.

5.2 Post Millennium drought review

In 2011, following a period of variable weather patterns including both extreme drought and above average rainfall, the Ministerial Corporation, along with the Victorian and Commonwealth Governments, identified a need to amend certain conditions of the Licence related to management of water that accumulates in Snowy Hydro Limited's storages following an extreme drought period. The Licence was varied on October 2011 following a public consultation process. Amendments included:

1. removing the requirement to release, as soon as the inflows to the Snowy Mountains Scheme allow, any accumulated dry inflow sequence volume (DISV).
2. establishing a 'drought account' for each valley: 150 gigalitres for the Murrumbidgee Valley and 225 gigalitres for the Murray Valley. The water in these accounts can be used if inflows again reach critically low levels. The accounts are credited with water when a recovery occurs following a period when a DISV is triggered (and at other times at the discretion of Ministerial Corporation)
3. granting an option each year to call out RMIF when above-target water reserves stored in the Snowy Mountains Scheme exceed 800 gigalitres
4. granting an option each year for Snowy Hydro Limited to release water in excess of the required annual release (also known as 'flexibility release or 'flex') and have the additional release treated as an early delivery of the next year's required annual release
5. including a 'wet sequence protection' provision that requires Snowy Hydro Limited to release more water if any flexibility release it made the previous year spilled from downstream storages and was not used to supply consumptive or environmental flow demands.

6. Analysis of issues with the Licence

6.1 Summary of stakeholder issues

Department of Industry recorded close to 240 issues/statements from the submissions made to the review, covering more than 50 topics related to the management and operation of the Snowy Mountains Scheme. Roughly 80% of the topics fall within the review's terms of reference. The remaining issues were generally concerned with environmental management and water allocation policies in the western water supply systems.

Snowy Hydro Limited considers the Licence is fit for purpose, but is seeking some changes to the water release requirements to improve operations.

Some of the key themes raised by stakeholders and community members included:

- the opaque nature of Snowy Mountains Scheme operations and licence complexity
- efficient use of Snowy Mountains water resources, both within the scheme and downstream water supply systems
- the effectiveness of variations made in 2011
- concerns the Licence favours electricity production over water and environmental matters
- concerns around NSW's approach to implementing the outcomes of the Snowy Water Inquiry
- lack of opportunities for community/stakeholder and scientific input to decision-making.

Numerous submissions commented on project management matters, including the need to ensure the recommendations do not impact third parties, undertake detailed analyses of proposals and continue to engage with stakeholders.

These issues are discussed further in this report under the three broad categories identified in the terms of reference. A short summary of out-of-scope issues is also included in section 8.2. Department of Industry will also publish a summary of submissions to accompany the release of the final review report that will document and respond to all issues identified.

6.2 Administrative obligations

The Licence places numerous obligations on Snowy Hydro Limited and Ministerial Corporation in carrying out and administering Snowy Hydro Limited's operations around:

- licence objectives/priorities (Clause 3 and Clause 5.1, Schedule 3)
- compliance reporting (Clause 4)
- Snowy Hydro Limited's water rights (Clause 7)
- the development of AWOPs (Clause 8)
- Snowy Hydro Limited fees and charges (clause 9)
- the requirement to build and/or modify certain works (clause 6 and clauses 6, 19 and 20 of Schedule 3)
- Ministerial Corporation's review of the Licence (Clause 10).

The review's preliminary findings respond to issues raised around transparency, information sharing, consultation and redundant provisions. In summary, it is proposed to simplify provisions of the Licence, increase transparency, compliance and accountability, and provide downstream water authorities and water users more information with which to plan their water use to maximise production.

6.2.1 Purpose of the Licence

The purpose of the Licence is prescribed in Clause 3. It confers rights to water on Snowy Hydro Limited and imposes obligations with respect to exercising those rights, including increased flows and water release requirements.

It is quite literal in its focus, simply reflecting the nature of the Licence as stipulated in the SHC Act.

Some stakeholders have raised concerns with the narrowness of the purpose, suggesting it impacts on the ability to achieve balanced outcomes when operations are not covered by the Licence obligations.

Environmental interests have sought equal prominence for environmental objectives to ensure rivers receive the water they need at the times and volumes required to improve river health. It was also suggested the Licence would benefit from articulating principles used to establish relative priorities for supply and energy production to help guide operations, particularly where interpretation of the Licence is required.

Unlike water sharing plans and comparable water planning documents, management objectives are not established under the Licence. It is not proposed to change this because the Licence is more akin to a water entitlement than a planning document. The obligations on Snowy Hydro Limited give effect to strategies and outcomes agreed by governments through policy planning reforms such as the Snowy Water Inquiry and Snowy Mountains Scheme corporatisation. For example, the Licence replicates the environmental objectives agreed and prescribed in the SWIOD for SRIF.

Policy and management objectives will continue to be considered within the broader framework governing management of the Snowy Mountains Scheme, with changes implemented through variations to obligations in the Licence and other relevant instruments when governments agree.

6.2.2 Compliance and transparency

Two new clauses were inserted into the Licence in 2010 in response to concerns raised in the five-year review about inadequate reporting on licence compliance and a need for improved reporting.

Clause 4.3 of the Licence requires Snowy Hydro Limited to report publicly on its compliance with the Licence. The contents of the report are prescribed in clause 4.4.

The AWOP is also a critical reporting document, the purpose of which is to provide the WCLC details as to how Snowy Hydro Limited proposes to operate the scheme in the forthcoming year. Clause 8 obliges Snowy Hydro Limited to prepare and comply with AWOPs and prescribes what they must contain and the consultation and approval processes Snowy Hydro Limited must follow in developing them.

Snowy Hydro Limited has prepared AWOPs each year as required by clause 8. Each AWOP has included all items set out in clause 8.3, and the timing of first and second drafts has been consistent with the requirements of the Licence, or as otherwise varied by agreement with the WCLC.

Despite improvements in compliance reporting, numerous issues were raised with the transparency of Snowy Mountains Scheme water operations, accounting and release volumes. Transparency issues were raised in some form in 11 of the 24 submissions to the review, indicating it is a priority for stakeholders.

Issues raised around a lack of transparency can be summarised as:

- limited visibility on the volume of water held and/or allocated (credits and debits) to environmental accounts in the scheme
- no access to information on water accounting agreements that affect environmental accounts (e.g. treatment of spills)
- access to daily flow data within the scheme is restricted (e.g. Pats Patch gauge on Mowamba River)
- the main water operations document, the AWOP, is only available to a select few government agencies
- WCLC decisions are only captured in the AWOP.

It is asserted that not publishing this information prevents public scrutiny of Snowy Hydro Limited operations and government oversight and impedes the ability of downstream water users to plan their own water use.

It was also identified that compliance reports have not been prepared since the 2015–16 water year, meaning public reporting of compliance for 2016–17 remains outstanding. This has since been rectified.

The issues raised are generally not concerned with Snowy Hydro Limited's performance in meeting its compliance and AWOP obligations. Rather, the concerns relate to a lack of public information made available by Snowy Hydro Limited and the NSW Government. Stakeholders are interested in having access to more operational information, particularly on matters that directly affect the volume of water they are interested in seeing released from the scheme.

The main reason transparency is an issue is generally considered to be due to the commercial nature of the information stakeholders are seeking to access and that the AWOP is all encompassing, but only available to a select few. The tension is between Snowy Hydro Limited's commercial requirements and what many stakeholders consider to be the public's right to information.

Other constraints include the regulatory burden and costs of presenting and maintaining information and a lack of evidence signalling it is highly valued by large numbers of the community.

A significant amount of information and data on Snowy Mountains Scheme water operations is already published on the internet by Snowy Hydro Limited and Department of Industry. Despite this, most of the published information is annual data from the preceding year produced as part of Snowy Hydro Limited's compliance reporting. Table 2 provides a summary.

Table 2 Information published on Snowy Mountains Scheme water operations

Organisation	Preceding year	Current/real-time	Forecast/future
Snowy Hydro Limited	Annual RAR volume/releases	Daily releases from Jindabyne	SRIF daily release targets
	Net DISV volume for year	Daily releases from Khancoban	SMRIF daily release targets from Tantangara
	Annual flex releases	Daily releases from Tantangara	SMRIF annual release targets
	Annual ATW releases	Jindabyne storage level	
	Total western river release	Eucumbene storage level	
	Catchment inflows	Tantangara storage level	
	Annual, monthly and daily SRIF releases	Snow depths	
	Annual Jindabyne and Mowamba base passing flow releases		
	Annual, monthly and SMRIF releases		
	End of year active storage volume		
	Temperature of Jindabyne dam releases		
Temperature of Tantangara dam releases			
Department of Industry	Snowy water savings summary	Real-time flow data in Snowy, Upper Murray and Murrumbidgee basins (NSW government-owned gauges)	Annual strategy for SRIF & SMRIF (inclusive)
			Safety management plan (SRIF)

Current/real-time data is limited to releases and storage levels for key dams and gauged data from outside the Snowy Mountains Scheme. Information about future operations is limited to the information contained in the SRIF and SMRIF programs annual strategies.

There is very little information in the public domain about forecast releases and the accounting of water destined for the Western Rivers, including RMIF. Water allocations against the SRIF and SMRIF programs are available in the delivery strategies, however simple water account balances, summarising the flow of water in and out of the major environmental accounts, do not exist. WCLC agreements on licence interpretations are also invisible to the public as they are captured only in the AWOP.

There is an opportunity to respond to this and improve public reporting of Snowy Mountains Scheme operations, while protecting Snowy Hydro Limited’s commercial interests. Doing so will increase transparency and accountability, provide downstream water authorities earlier information to feed into water allocation determinations, and provide waters users more information to help plan water use to maximise production.

Proposal 1—Increased public reporting

<p>A. It is proposed to vary the Licence so that:</p> <ul style="list-style-type: none"> ○ Snowy Hydro Limited is obliged to prepare a public version of the AWOP, summarising the forthcoming year’s operations, but withholding information that may disadvantage it on a commercial basis ○ future WCLC agreements will be published in both the commercial and public versions of the AWOP. <p>The scope of the increased reporting requirements will be recommended by Department of Industry after consulting with Snowy Hydro Limited and the WCLC.</p>	<p>Licence variation</p>
<p>B. These actions will be complemented by a WCLC review of the commercial AWOP to ensure it remains fit for purpose and does not impose unnecessary administrative burden on Snowy Hydro Limited.</p>	<p>Work plan</p>

An issue was also raised about penalties associated with non-compliance, namely that there were no realistic penalties in place to incentivise Snowy Hydro Limited to comply with the conditions of the Licence.

Offence and court order provisions relating to the Licence are contained in sections 34 and 35 of the SHC Act. In summary:

- Snowy Hydro Limited must comply with the terms, conditions and other provisions of the Licence.
- If it fails to comply, Snowy Hydro Limited could face a maximum penalty of 1,000 penalty units (\$110,000) and a further 500 penalty units each day the offence continues.
- The maximum penalty may be increased to 10,000 penalty units (\$1,100,000) if Snowy Hydro Limited is found to have intentionally breached the Licence, or was reckless.
- Penalties, including imprisonment, may also apply to Snowy Hydro Limited directors if they are found to have breached the Licence.
- If convicted, the Land and Environment Court may order Snowy Hydro Limited to manage any impacts to the environment caused by the breach or to pay a public authority or person costs and expenses incurred as a consequence.

This review is not considering the SHC Act, so has not considered amendments to the offence and court order provisions prescribed for the Licence. Snowy Hydro Limited’s performance in meeting the conditions of the Licence is considered further in section 7.

6.2.3 Snowy Hydro Limited's water rights

Clause 7 prescribes the water rights conferred on Snowy Hydro Limited under the Licence.

In summary the Licence:

- grants Snowy Hydro Limited a right to collect, divert, store and release all surface waters within the Snowy Mountains Scheme subject to the water rights of riparian landholders and private diverters located within the scheme
- grants Snowy Hydro Limited a right to use that water to generate electricity
- obliges Snowy Hydro Limited to release all water, save for normal operating losses and consumption of works
- grants Snowy Hydro Limited a right to release this water as it sees fit, provided it complies with water release requirements, increased flows requirements and requirements of the AWOP
- prevents Snowy Hydro Limited from acting as a supplier of water, unless agreed by Ministerial Corporation
- obliges Snowy Hydro Limited to prioritise electricity generation to minimise internal spills of water held between developments in Lake Eucumbene, but not by releasing above target water.

These rights are fundamental to the operation and viability of the Snowy Mountains Scheme and reflect what is conferred on Snowy Hydro Limited under the SHC Act, which in turn reflects agreements made through Corporatisation and the outcomes of Snowy Water Inquiry. It is not proposed to vary these rights.

The water rights of riparian landholders and private diverters located within the scheme are presented in Tables 1 to 7 of Schedule 5 and reflect the volumes as at 2002. While Snowy Hydro Limited has no management control over these rights (the water diverted under them is considered 'lost' from an operational sense), and clause 10.8 of the Licence makes allowance for variations, it has identified the review provides an opportunity to update the tables to reflect current licensed volumes.

Combined, the water sharing plans applying across the Snowy Mountains Scheme and the NSW Water Register contain up-to-date information on the rights presented in Schedule 5.

The water sharing plans establish the bulk access regime, basic landholder rights and water source share components for water access licence types—for example domestic and stock, local water utility and river access licences. The water sharing plans applying across the Snowy Mountains Scheme include:

- Snowy Genoa Unregulated and Alluvial Water Sources
- Murrumbidgee Unregulated and Alluvial Water Sources
- Murray Unregulated and Alluvial Water Sources.

The NSW Water Register¹¹ provides public access to information about water licences, approvals, water trading, water dealings, environmental water and other matters related to water entitlements in NSW.

The water sources located within the Snowy Mountains Scheme are presented in Table 3.

While it is possible to update Schedule 5 with updated licence data, the review also provides an opportunity to rationalise the Licence and reduce duplication by varying it to take into account the existence of water sharing plans and availability of licence data in NSW's Water Register.

Proposal 2—Water rights of riparian landholders and private diverters

It is proposed the Licence be varied to remove Schedule 5 and update Ministerial Corporation's obligation to provide Snowy Hydro Limited a copy of licensed extractive water users within the Snowy Water Catchment.

Licence variation

¹¹ Source: www.water.nsw.gov.au/water-licensing/registers

Table 3 Water sources located within the Snowy Mountains Scheme

Water Sharing Plan		
Snowy Genoa Unregulated & Alluvial Water Sources	Murrumbidgee Unregulated and Alluvial Water Sources	Murray Unregulated and Alluvial Water Sources
Lake Eucumbene	Tantangara	Tooma
Eucumbene River	Goodradigbee River	Swampy Plain
Gungarlin River	Upper Tumut	
Burungubugge River		
Upper Snowy River (Island Bend Reach)		
Upper Snowy River (Munyang Reach)		
Perisher Creek		
Upper Snowy River		
Cobbin Creek		
Thredbo River		
Mowamba River		
Wollondibby Creek		
Lake Jindabyne		

6.2.4 Annual water operating plans

Issues around transparency and public availability of AWOPs are discussed in section 6.2.2. Additional issues raised by stakeholders focussed on consultation around AWOP implementation and the inability for Ministerial Corporation or WCLC to force changes to draft AWOP's prepared by Snowy Hydro Limited. The WCLC has also agreed to variations to the contents of the AWOP.

6.2.4.1 Collaboration

Improved collaboration between Snowy Hydro Limited and downstream water authorities such as the MDBA and WaterNSW, has the potential to improve coordinated management of the different water supply systems.

To quote the MDBA, 'Advance notice of Snowy Hydro release intentions is of significant benefit in managing the River Murray system. Knowledge of future Snowy Hydro releases would allow improved planning of transfers from Dartmouth to Hume dams and in doing so potentially reduce subsequent spills. Minimum releases updates through the year could bring forward water allocation improvements for water users. An indication of likely delivery of RMIF would inform environmental planning'.

Collaboration has increased in recent years, benefiting river operations and environmental planning. Formalising these, or comparable, arrangements between relevant authorities would ensure these benefits are captured on an enduring basis.

Proposal 3—Collaboration on water operations

Snowy Hydro Limited will agree to formal consultation arrangements with the MDBA and WaterNSW to discuss implementation of AWOPs during a water season.

Improved management

6.2.4.2 Approvals

A large part of Clause 8 is concerned with the AWOP consultation and approvals process. It provides for numerous drafts and opportunities for Ministerial Corporation and WCLC to provide feedback and request changes. It also points to a formal dispute resolution process in the event the parties cannot agree on AWOP provisions related to meeting increased flow or water release requirements.

The AWOP process established in the Licence is collaborative and provides for a fair process to resolve differences of opinion between Ministerial Corporation and Snowy Hydro Limited. This is important given the value of the water diverted by the Snowy Mountains Scheme to governments and Snowy Hydro Limited.

To date, Snowy Hydro Limited has not referred any disputes to an independent expert for determination, suggesting the consultation and approvals framework established in the Licence is effective. Consequently, it is not proposed to vary it.

6.2.4.3 Content

Clause 8.3 of the Licence prescribes what Snowy Hydro Limited must include in an AWOP. As stated previously, the WCLC has agreed two changes to clause 8.3 to ensure its contents contain relevant information.

In 2005, the WCLC acknowledged maximum releases are only relevant in a wet sequence and that data at that time will be better than at the end of summer/early autumn, when the AWOP is being prepared. WCLC subsequently agreed that 'Quarterly Likely Maximum Releases' need not be included in the AWOP on the proviso that if the WCLC members projected a wet sequence and requested that the Quarterly Likely Maximum Releases be calculated, Snowy Hydro Limited must provide those volumes as soon as practicable after any such request.

To codify this in the Licence it is proposed to:

- vary clause 8.3(2) so that Snowy Hydro Limited may have regard to antecedent conditions when providing details on a quarterly basis of the likely range of forecast water releases
- include a new provision that obliges Snowy Hydro Limited to provide WCLC, upon request from a member, updated projections of quarterly forecast releases if experiencing a wet sequence.

Following the 2002–03 water year the WCLC agreed that, rather than providing likely quarterly lower bounds, Snowy Hydro Limited would provide guaranteed quarterly lower bounds to which Snowy Hydro Limited committed, subject only to force majeure ('Quarterly Guaranteed Minimum Releases'). As guaranteed volumes, they are more useful in helping downstream water agencies plan for the releases.

To codify this in the Licence, it is also proposed to vary clause 8.3(2) so that Snowy Hydro Limited must have regard to guaranteed minimum releases.

Proposal 4—Contents of the AWOP

It is proposed clause 8.3(2) of the Licence be varied so that Snowy Hydro Limited may have regard to:

- antecedent conditions, when providing details on a quarterly basis of the likely range of forecast water releases
- guaranteed releases.

It is also proposed a new provision be added to the Licence that obliges Snowy Hydro Limited to provide WCLC, upon request from a member, updated projections of quarterly forecast releases in a timely manner if experiencing a wet sequence.

Licence variation

6.2.5 Fees and charges

Clause 9 of the Licence obliges Snowy Hydro Limited to pay fees and charges to the Ministerial Corporation to cover its costs of administering and monitoring compliance with the Licence. It also explicitly excludes any obligation for Snowy Hydro Limited to pay catchment or resource management related fees or any costs obliged on the Ministerial Corporation.

Several stakeholder submissions suggested Snowy Hydro Limited should be responsible for funding ongoing monitoring and environmental programs from its electricity generation revenue. This is consistent with the 'impactor pays' approach to allocating water planning costs. It was also suggested these costs be recovered from Murray and Murrumbidgee water licence holders based on the same principle.

Varying the Licence to impose catchment or resource management related fees on Snowy Hydro Limited may be considered a compensable action under section 30 of the SHC Act payable by governments to Snowy Hydro Limited.

Given this, and the fact that historically funding for these programs has been provided from governments to benefit Snowy communities, it is not proposed to vary the Licence to impose catchment or resource management related charges on Snowy Hydro Limited.

Further discussion around improving the coordination and governance around Snowy environmental management, including program funding, is provided in section 8 of the draft report.

6.2.6 Reviews of Snowy Hydro Limited's obligations

Clause 10 places an obligation on the Ministerial Corporation to review Snowy Hydro Limited's obligations under the Licence at set time periods, initially five years after corporatisation (increased flows obligations only) and every 10 years thereafter. It also provides for Ministerial Corporation to vary the Licence, subject to numerous conditions, depending on what section of the Licence is proposed to be amended.

Concerns were raised about the length of time between reviews, claiming only having one opportunity to input to the Licence every 10 years is inadequate. It was also proposed the Licence would benefit from including a formal process to consider issues raised by WCLC.

It is not proposed to vary the Licence in response to these issues. The Licence can be varied at any time, meaning there is flexibility to review licence obligations when a need is identified. This flexibility is demonstrated by the approval of variations made to the Licence in 2011, which followed an informal review into its effectiveness under highly variable weather conditions.

This flexibility also means that while there is currently no mechanism for WCLC to initiate a review of the Licence, neither does it prevent one from occurring. An agreement between WCLC parties as to when to trigger a review could be reached outside of the Licence.

Further, reviews are resource intensive and costly, and when combined with administering Licence variations, can take a number of years to complete. A review period of 10 years ensures there is adequate time to operate under the provisions before having to review them and balances the benefits of a formal review with the costs of carrying one out.

6.3 Increased flows

Snowy Hydro Limited's obligations to release SRIF and SMRIF are contained in Schedule 3 of the Licence. Obligations on RMIF are contained in both Schedule 3 and Schedule 4.

The obligations prescribed in the Licence reflect what was agreed and captured in the SWIOD about the volume, allocation, accounting and delivery of environmental water recovered under the SWI, as well as agreements made on the call out of RMIF when the Licence was varied in 2011.

Specifically, the Licence places obligations on Snowy Hydro Limited around:

- the allocation and accounting under the SRIF and SMRIF programs (Clauses 1 to 4, 10, 16, 22 and 23 of Schedule 3)
- environmental objectives (Clauses 5 and 18 of Schedule 3)
- constructing works to facilitate delivery of SRIF and SMRIF (Clauses 6, 19 and 20 of Schedule 3)
- delivery of SRIF and SMRIF (Clauses 8, 9, 11 to 17 and 24 to 27 of Schedule 3).
- Call out of RMIF (Clause 10.4 of Schedule 4).

The preliminary findings outlined in this section respond to issues raised around redundant provisions, the delivery of SRIF and access to RMIF. In summary, it is proposed to simplify Licence provisions and further investigate ways to increase operational flexibility for delivering increased flows. Issues around meeting SMRIF target volumes are considered as part of Snowy Hydro Limited's performance later in the report.

6.3.1 Environmental objectives of increased flows

The environmental objectives for the use of SRIF and SMRIF are contained in clauses 5 and 18 of Schedule 3 respectively and reflect the objectives agreed by governments in the SWIOD.

The five key objectives for the Snowy River include:

1. improving the temperature regime of river water
2. achieving channel maintenance and flushing flows within rivers
3. restoring connectivity within rivers for migratory species and for dispersion
4. improving triggers for fish spawning
5. improving the aesthetics of currently degraded riverine environments.

The objectives for the Snowy montane rivers include:

- protecting endangered/threatened species
- maintaining natural habitats
- maintaining wilderness and national parks values.

The SWIOD and Licence also require the NSW, Victorian and Commonwealth governments to determine a set of objectives for each river that receives SMRIF deliveries. In developing a more comprehensive set of ecological objectives, the strategies for increased flows developed by the governments have focused on repairing flow related processes that support:

- habitats (i.e. hydraulic diversity, substrate condition, channel morphology and thermal regime)
- resource availability (e.g. dissolved organic carbon) and productivity
- reproduction and recruitment
- biotic dispersal.

Some stakeholders have raised concerns that the objectives contained in the SWIOD, and therefore the Licence, are outdated.

Although the focus of the increased flows strategies has evolved since the SWIOD was initiated, the environmental objectives prescribed in the Licence are not constraining governments and Snowy Hydro Limited from achieving the desired outcomes. While consideration to update the SWIOD environmental objectives may be warranted based on recent experience in managing the increased flows programs, it is more appropriate to do so via an interjurisdictional review of the SWIOD than this review of the Licence.

Further discussion around coordination and governance of Snowy environmental management, including implementation of the SWIOD, is provided in Chapter 8.

6.3.2 Outlet works at Jindabyne and Tantangara dams

The Licence includes provisions to construct outlets at Jindabyne and Tantangara dams capable of delivering the flow targets committed in the SWIOID. Specifically, Snowy Hydro Limited was obliged to construct an outlet at:

- Jindabyne Dam capable of releasing 5 gigalitres per day in addition to the capacity of the spillway gates (Clause 6, Schedule 3)
- Tantangara Dam capable of releasing 1.5 gigalitres per day (clause 20, Schedule 3).

Snowy Hydro Limited has met these obligations, so the relevant start-up provisions are redundant.

Proposal 5—Construction of outlets at Jindabyne and Tantangara dams

It is proposed the Licence be varied to remove all provisions related to the outlet construction works at Jindabyne and Tantangara dams.

Licence variation

6.3.3 Mowamba Borrowings Account

In the years following Corporatisation, the release of SRIF was restricted by physical limitations of Jindabyne Dam and the volume of environmental water recovered from the Murray–Darling Basin. In response, the NSW, Victorian and Commonwealth governments agreed to release up to a maximum of 38 gigalitres per year of SRIF down the Snowy River via the Mowamba River and Cobbon Creek, with the water borrowed from water held in the Snowy Mountains Scheme. This was to occur until new outlet was constructed at Jindabyne Dam.

The obligation in the Licence to maintain a water account for Mowamba Borrowings is one of a number of start-up provisions established in the Licence to give effect to this agreement. In total, 64.9 gigalitres of SRIF was borrowed and debited from the Mowamba Borrowings Account between 2002–03 and 2005–06.

The Licence also gives effect to a repayment agreement specified in the SWIOID, which is to share all Snowy environmental allocation above 38 gigalitres per year evenly between SRIF and the Mowamba Borrow until the debt was repaid.

Repayments were slowly credited to the Mowamba Borrowings Account between 2002 and 2010, when an intergovernmental agreement was reached between the NSW, Victorian and Commonwealth governments to payout the outstanding debt.

Given the volume held in the Mowamba Borrowings Account has been reduced to zero and the SWIOID water recovery targets have been met, the Mowamba Borrowings Account provisions in the Licence are now redundant.

Proposal 6—Mowamba Borrowings

It is proposed the Licence be varied to remove all reference to the operation of the Mowamba Borrowings Account.

Licence variation

6.3.4 Delivery of Snowy River Increased Flows from Mowamba River

Since the outlet works at Jindabyne Dam were completed and the Mowamba Aqueduct reinstated in January 2006, Snowy Hydro Limited has been required to deliver SRIF from Jindabyne Dam in accordance with clause 11, Schedule 3 of the Licence.

Numerous submissions to the review have advocated for the Licence to be varied to allow these flows to be delivered from a combination of releases from Jindabyne Dam and unregulated flows from the Mowamba River. Many went further to seek the permanent decommissioning of the Mowamba Creek Aqueduct and Mowamba Weir.

It is suggested this will improve ecological outcomes by reintroducing the Mowamba River as a natural headwater for the Snowy River and increasing natural variability in the environmental flow pattern.

The mandatory five-year review into the increased flows provisions committed to investigating environmental flows to the Snowy under low-flow conditions. This included assessing the importance of inflows from the Mowamba River to the Snowy River and carrying out a cost-benefit analysis of options for improving environmental flow management, including decommissioning the Mowamba Aqueduct and removal of the Mowamba Weir.

This work is yet to be completed, however the NSW, Victorian and Commonwealth governments have made progress on:

- developing flow objectives for the Mowamba and Snowy rivers
- better understanding the local hydrology
- understanding the role of unregulated tributaries in the functioning of main river channels
- management options for the Mowamba Weir and costs
- analysing water quality data
- assessing the supply of dissolved organic carbon and invertebrate drift
- economic, social and cultural water assessments.

Since 2014, Department of Industry and Snowy Hydro Limited have also been carrying out annual experimental releases from the Mowamba River Aqueduct over May and/or June. During these periods the aqueduct has been turned out and all inflows to the diversion weir passed downstream to the Mowamba River. Releases from Jindabyne Dam during the same period targeted very low flow rates.

Conceptually, providing SRIF from the Mowamba River tributary has some merits, however no variations to the Licence are proposed at this time. More work is required to understand the ecological, economic, social and cultural heritage implications of required flow and infrastructure changes, and whether the timing is right to adopt such a strategy. Changes to Snowy environmental water management governance, discussed in section 8.1, provides a means to complete this work.

Proposal 7—Mowamba River investigation

OEH, in partnership with Department of Industry, Snowy Hydro Limited, the SAC and Victorian and Commonwealth governments, will finalise the Mowamba River investigation. This will include:

- evaluating using the Mowamba River as a way to provide environmental water to the Snowy River
- recommending an environmental flow regime for the Snowy River consisting of a combination of releases from Jindabyne Dam and the Mowamba River.

Work plan

6.3.5 Flexibility of Snowy River Increased Flows delivery

Part 4 of Schedule 3 of the Licence prescribes obligations on Snowy Hydro Limited and Ministerial Corporation around the notification and delivery of annual, monthly, daily SRIF volumes and flushing flows from Jindabyne Dam.

The Ministerial Corporation is required to notify Snowy Hydro Limited of the:

- annual SRIF volume, by 13 February
- target monthly SRIF volumes, by 13 February
- target daily SRIF volumes six days before the commencement of the next month
- flushing flows strategy, by 13 February.

Snowy Hydro Limited is required to deliver these volumes, within various operational tolerances.

Stakeholders have raised concerns about the rigid nature of these arrangements, particularly the need to plan the flow pattern two and a half months before the start of Snowy Hydro Limited's water year and the limited ability to vary them during the year in response to seasonal conditions. The Victorian Government considers this rigidity increases the likelihood of flooding in the lower reaches of the Snowy River, when increased flow

releases coincide with high natural flows originating from the downstream catchment. There are also environmental benefits of having the flexibility to ‘piggyback’ releases on to natural flow events below the dam.

Delivering large volumes of SRIF from Jindabyne Dam while operating the hydro-electric scheme is complex and opportunities to increase flexibility are limited. Arguably, it is the requirement to set monthly and annual patterns that are most rigid because daily flows can be modified, so long as the total daily volumes exceed the notified monthly volume.

Allowing SRIF to be carried over from one year to the next is one way to increase annual flexibility. This is a common attribute of environmental entitlements in the Murray–Darling Basin and is widely used by environmental managers to optimise use of their available water and adapt to weather conditions as they arise.

The value of carryover for SRIF is less evident because of the significant impact Jindabyne Dam has on flows for the Snowy River immediately downstream. All annual allocation available for the Snowy River, regardless of the recent climate, has been necessary to support the current management focus of repairing flow-related processes. As such, it is very unlikely there will be surplus allocation to carry over.

Theoretically, increased flexibility around monthly releases may be more beneficial. However, any benefits would need to be weighed up against the operational implications. It is also worth noting that the obligation to specify and deliver monthly targets will need to be considered as part of the Mowamba River Investigation given a flow regime relying on natural flows in the Mowamba River would make targeting monthly SRIF releases extremely difficult.

The ‘flashy’ nature of floods in the mid-to-lower catchments of the Snowy River means the risk of increasing flood risks in Victoria can only be managed by providing flexibility around daily releases patterns. However, SRIF releases primarily affect the river reach between Jindabyne Gorge and the junction with the Delegate River. As the Snowy River joins with its various tributaries further downstream, the effect of the flushing flow release is more likely to be within the bounds of flows that occur under normal conditions from time to time. Therefore, SRIF releases are unlikely to significantly increase the consequence of natural floods in the lower reaches in Victoria.

Notwithstanding, the Licence does recognise the need to manage risks, such as flooding, and includes an obligation for Ministerial Corporation to prepare a safety management plan. A plan is prepared annually and attempts to identify and address anticipated risks to the public, third-party property, and Department of Industry and Snowy Hydro Limited employees from the flushing flows. The objectives of the plan are to ensure that these risks are appropriately minimised by:

- establishing and maintaining productive relationships with stakeholders that hold an interest in public safety along the Snowy River
- complying with any statutory requirements
- promoting public awareness of potential risks from the variable river heights in the Snowy River from below Jindabyne Dam to the Dalgety Uplands
- promoting public awareness of potential risks from the collection of river debris.

During a high-flow event, Department of Industry constantly monitors information by liaising with the Bureau of Meteorology (BOM) and Snowy Hydro Limited, particularly when forecasts indicate that future rain is likely. Approximate river flows can be forecast by the BOM up to several days in advance. If natural flows combined with Jindabyne Dam releases are likely to cause inconvenience to downstream communities, Department of Industry can direct Snowy Hydro Limited to modify or cease releases from the dam.

Effective relationships with all stakeholders who have an interest in ensuring the winter–spring high-flow events occur safely are essential, and NSW will continue to work with Victorian agencies, and others, to manage their concerns. Improvements to Snowy environmental water management governance, discussed later in this report, will support this outcome.

6.3.6 Delivery of long-term average Snowy River Increased Flow volumes

Target levels of increased flows are contained at Clause 7 of the SWIOID. These targets are not replicated in the Licence, in which Snowy Hydro Limited releases are limited only by the annual allocated volume of Snowy River increased flows in any year (Clause 2).

Despite some stakeholders raising concerns about the Licence restricting the delivery of target flows of up to 28% of annual natural flows (ANF), this is not the case. The Licence obliges Snowy Hydro Limited to release all water recovered for the Snowy and Snowy montane rivers under the SWIOID and makes no reference to water recovery targets agreed by partner Snowy governments.

The conditions on delivering more than 21% ANF are contained in the SWIOID. Under clause 5 of Annexure 1:

- SRIF cannot be increased to more than 294 gigalitres per year (equivalent to 28% ANF).
- Snowy Hydro Limited must be compensated for forgone revenue associated with delivering more than 212 gigalitres per year (21% ANF).

The volume of SRIF exceeded the 21% ANF target in 2017–18 by 2,334 megalitres. This was the first time the Snowy River allocation had reached the target volume. Ambiguities in the Licence and SWIOID around whether or not compensation is payable to Snowy Hydro Limited to deliver more than 212 gigalitres in any year, or over the long-term, resulted in the excess 2,334 megalitres not being delivered down the Snowy River in 2017–18.

Restricting releases to 212 gigalitres in any year places the partner Snowy governments' targets of achieving 21% ANF at risk. This is because they have assumed the annual 212 gigalitre target is a long-term average, which requires more water to be delivered in some years ('overs') to offset the years where there is less water available ('unders').

This is reflected in clause 7.1 of the SWIOID, where the stage-three target volume is an average annual flow of 212 gigalitres per year.

The NSW, Victorian and Commonwealth governments have not considered a scenario that requires them to compensate Snowy Hydro Limited to deliver 'overs', when targeting the 212 gigalitre average. The alternative of capping deliveries at 212 gigalitres per year would make it impossible to deliver the target volume over the long-term, unless annual allocations against the recovered environmental entitlements remain high and generate at least 212 gigalitres per year.

Given that a resolution may require variations to the Licence (e.g. Department of Industry has suggested allowing surplus annual allocation to be carried over within the Snowy Mountains Scheme), the review provides an opportunity to clarify these arrangements.

Proposal 8—Delivery of annual Snowy River Increased Flows target volumes

Department of Industry, Snowy Hydro Limited and the Victorian and Commonwealth governments will work together to ensure governments can deliver an average annual flow of 212 gigalitres per year down the Snowy River cost-effectively in accordance with the intent of the SWIOID.

Work plan

6.3.7 Data sources for reporting increased flows targets

In 2011, the WCLC noted and agreed that:

- for the purposes of reporting against daily SRIF flow targets, Snowy Hydro Limited uses operational data available on the SCADA system or via field measurements. This is the data used on the day to physically manage the delivery of that day's target
- for monthly and annual targets, Snowy Hydro Limited uses hydrographically corrected data and is consistent with the monthly water accounts as a whole.

It is proposed to codify this arrangement in the Licence for releases of SRIF from Jindabyne Dam and SMRIF from Tantangara Dam.

Proposal 9—Data sources for reporting increased flows targets

It is proposed to vary clauses 12.2 and 25.2 of Schedule 3 of the Licence to clarify that Snowy Hydro Limited may use the following data to demonstrate compliance with daily, monthly and annual flow targets from Jindabyne and Tantangara dams:

- operational data to report compliance against daily targets
- hydrographically corrected data to report compliance with monthly and annual targets.

Licence variation

6.3.8 Riparian releases

The Licence was intended to codify Snowy Hydro Limited’s water release obligations on and from the corporatisation date. However, the Licence does not refer to two of the three riparian releases made from the Snowy Mountains Scheme, being from Mowamba Weir and Eucumbene Dam.

Snowy Hydro Limited has committed to continue these riparian releases even though it is not strictly required under the Licence. These releases are described as follows:

1. Mowamba Weir—riparian releases of approximately 1.4 megalitres per day, equivalent to 0.5 gigalitres per annum, released continuously from the Mowamba Weir and accounted as Jindabyne base passing flow.
2. Eucumbene Dam—riparian releases of up to 2.4 megalitres per day, released continuously from Eucumbene Dam to maintain visible flow in the Eucumbene River at Nimmo, about seven kilometres downstream of the dam.

It is proposed to codify these arrangements in the Licence to improve visibility and provide certainty.

Proposal 10—Riparian releases

It is proposed to vary the Licence to capture the agreement for Snowy Hydro Limited to continue making a riparian release of:

- Approximately 1.4 megalitres per day (0.5 gigalitres per year) from Mowamba River, as part of nine gigalitres per year Snowy River base passing flow requirement.
- Up to 2.4 megalitres per day from Eucumbene Dam, to maintain a visible flow in the Eucumbene River at Nimmo.

Licence variation

6.3.9 Warm water pollution

Obligations to construct outlets at Jindabyne and Tantangara dams capable of releasing water above the thermocline are included in the SWIOID and replicated in clauses 6 and 20 of Schedule 3 of the Licence. These obligations were inserted to manage cold water pollution in the Snowy and Murrumbidgee rivers, which can have significant adverse impacts upon aquatic organisms and aquatic ecological processes and is a key determinant of river health¹².

Further efforts to mitigate the cold water pollution risk from increased flows was made through the five year review, which resulted in obligations on Snowy Hydro Limited to ensure it operates both variable-level offtakes to selectively release water from near the surface horizon of the reservoirs.

¹² Source: *NSW Cold Water Pollution Strategy: Guidelines for managing cold water releases from high priority dams*, (2011) State of NSW through the Department of Primary Industries.

Some stakeholders have raised concerns that mandating the requirement to release from the surface horizon of the reservoirs at all times risks causing warm water pollution in the cooler months, when temperatures in the upper levels of the dams are higher than downstream tributaries.

Winter temperature elevation caused by releases from large dams is considered a component of the cold water release issue facing river operators across the Murray-Darling Basin, where ‘discharges from large dams are typically colder than natural for approximately half the year and warmer than natural for the other half of the year’.

The NSW Government has endorsed the principle of requiring dam operators to match the temperature of releases from individual dams as closely as possible to the natural temperature regime, having regard to the associated costs and benefits.

In considering NSW’s *Guidelines for managing cold water releases from high priority dams*:

- Matching the temperature regime on a monthly basis may be workable and a reasonable compromise between ecological outcomes and operational complexity.
- The approach of managing releases to better mimic the background temperature regime should be limited to the spring/summer/autumn period. Selective withdrawal is not a practical option in winter because the dams are isothermic during this period (that is, uniform in temperature from top to bottom).

For the Snowy River, it has been suggested delivering SRIF via a combination of releases from Jindabyne Dam and Mowamba River could address this issue by mixing warm and cooler water. It is therefore sensible that warm water pollution be considered as part of the Mowamba River Investigation, including consideration of whether the obligation to release from the surface horizon of Lake Jindabyne is constraining Snowy Hydro Limited and environmental managers from achieving optimal temperature outcomes in the Snowy River below Lake Jindabyne.

6.3.10 Call out of River Murray Increased Flows

The availability and delivery obligations established in the Licence for RMIF are relatively straightforward when compared to SRIF. However, many submissions raised concerns with the entitlement’s existing arrangements, which are contained across a number of different instruments and plans including the SWIOD, the Licence, Murray-Darling Basin Agreement, the *Strategy for River Murray Increased Flows* and River Murray water entitlements.

The availability and apportionment of recovered environmental water to the River Murray is set out in the SWIOD and is applied annually to allocate water to SRIF and RMIF. Under the SWIOD (Clause 16.1), NSW must apportion water recovered under the environmental entitlements between SRIF and RMIF on a 2:1 basis, until the RMIF annual allocation reaches 70 gigalitres. From then on, all water is allocated to SRIF.

In the Licence, arrangements for RMIF are specified in clause 4.1(6) of Schedule 3 and clause 10.4 of Schedule 4. Together, they:

- result in RMIF being allocated to and accounted in ‘above-target water’ in the Snowy–Murray Development
- grant Ministerial Corporation a right to call out RMIF in addition to required annual releases when the volume of net above-target water in the Snowy Mountains Scheme exceeds 800 gigalitres.

Similarly to SRIF, savings accruing to RMIF are transferred to above-target water in the Snowy-Murray Development. This occurs primarily because this water is no longer needed to meet required annual release volumes, so is not considered in meeting target storage levels. More discussion on the target storage principle and allocation of Snowy Mountains Scheme resources between below-target and above-target water is provided in section 6.4.1.

The crucial difference between SRIF and RMIF is that SRIF are encumbered by delivery obligations under Schedule 3 of the Licence and not available to Snowy Hydro Limited to use at its discretion. In contrast, above-target water identified as RMIF by the MDBA may be released by Snowy Hydro Limited at its discretion, some or all of which may be recognised as RMIF by the MDBA in consultation with NSW and Victorian environmental managers. This is described in more detail in the following sections.

6.3.10.1 Snowy Hydro Limited's right to release River Murray Increased Flows

When releasing above-target water, Snowy Hydro Limited does not differentiate RMIF from its other above-target water reserves. This differentiation is made by the MDBA in accordance with the Murray-Darling Basin Agreement, which provides that RMIF must have first priority from above-target water releases. In other words, environmental managers have the option to accept previously released above-target water as RMIF if they would like to use it in the River Murray. If they choose not to, RMIF stored as above-target water is not reduced and remains stored in the Snowy Mountains Scheme and downstream resource managers make best use of the released above-target water, for example by allocating to licence holders.

The only time environmental managers must accept above-target water releases as delivery of RMIF is when the total volume of above-target water in the Snowy–Murray Development equals the volume of RMIF (i.e. when RMIF are the only above-target water stored in the Snowy Mountains Scheme). Under these circumstances, MDBA rules require the above-target water released to be RMIF and the releases may occur at sub-optimal times for Murray environmental managers.

These arrangements, including the lack of limits on Snowy Hydro Limited releasing the RMIF component of above-target water, were the negotiated outcome at corporatisation and were put in place to manage the impacts of recovering water for the Snowy Mountain and Snowy montane rivers. They seek to achieve both environmental and electricity generation outcomes from RMIF, consistent with the overarching objective of the Snowy Mountains Scheme.

6.3.10.2 Ministerial Corporation's right to call out River Murray Increased Flows

A variation to the Licence in 2011 increased flexibility for environmental managers to improve environmental outcomes from RMIF. The variation established a call-out right for Ministerial Corporation that, when exercised, obliges Snowy Hydro Limited to release this volume to the Murray from its above-target water reserves, in addition to required annual releases.

This call-out right only applies when the volume of net above-target water stored in the Snowy Mountains Scheme exceeds 800 gigalitres. For this purpose, the Licence defines net above-target water as the volume of above-target water in the Snowy Mountains Scheme minus the volume of water stored in the River Murray and Murrumbidgee drought accounts.

This trigger volume was agreed to ensure a buffer of above-target water for Snowy Hydro Limited's commercial operations.

Numerous stakeholders have raised concerns that the additional flexibility provided by the call-out right does not go far enough, claiming access to taxpayer-funded water recovery should be independent of Snowy Hydro Limited's electricity generation needs. Of particular concern is that RMIF may not be available to manage a sequence of dry years, when it is most needed. It is asserted RMIF could be better used to maximise environmental benefits by providing environmental managers sole discretion over its use and delinking it from the volume of above-target water in the scheme. Agricultural interests contend this would have the added benefit of reducing the water recovery pressures facing irrigation-dependent communities in the Murray–Darling Basin.

The obvious impact of increasing flexibility for environmental managers by removing RMIF from Snowy Hydro Limited's discretion would be to reduce Snowy Hydro Limited's flexibility to generate electricity. The call-out right was not granted in isolation and was negotiated between partner Snowy governments and Snowy Hydro Limited and formed part of a package of variations that sought electricity generation, environmental and water security outcomes.

Further, Snowy Hydro Limited has also raised concerns that the definition of net above-target water does not consider all water accounts that Snowy Hydro Limited has no discretion over, including:

- SRIF
- Ministerial Corporation call-outs linked to the previous year's relaxation volumes
- water held in the Snowy-Tumut Development in the Pre-release Compensation Account for the purposes of the Blowering Airspace Deed.

Snowy Hydro Limited asserts that a failure to consider these volumes in the definition undermines the purpose of the trigger to provide an adequate operational buffer of above-target water reserves. Of particular concern is that a call out of RMIF could significantly compromise Snowy Hydro Limited's ability to use above-target water in the Snowy-Murray Development.

While including these above-target water accounts in the definition of net above-target water would improve outcomes for Snowy Hydro Limited, it would also reduce the volume of net above-target water stored in the scheme at any one time and restrict access to RMIF more often and for longer periods. This would pare back the flexibility gained in 2011 for environmental managers and risk reducing its contribution to the MDBA's assessment of the sustainable diversion limit adjustment mechanism. The latter threat could result in more water recovery under the Basin Plan.

The issues raised are primarily concerned about what might happen in the future. While the submissions provided little evidence the arrangements have resulted in unforeseen or perverse outcomes to date, the issues are significant and warrant further consideration and investigation into whether:

- the variations made to the Licence in 2011 have met the intent of the agreement between governments and Snowy Hydro Limited
- certain climate and/or operating scenarios place the assumed outcomes at risk (for example, an extended dry sequence)
- alternative arrangements would provide a more balanced outcome.

Proposal 11—Call out of River Murray Increased Flows

Department of Industry, in partnership with Snowy Hydro Limited and the Victorian and Commonwealth governments, will further investigate the trigger for accessing River Murray Increased Flows.

Work plan

6.4 Western release requirements

Snowy Hydro Limited's obligations to release water from the Snowy-Murray and Snowy-Tumut developments are contained in Schedule 4 of the Licence. Schedule 4 includes a series of rules intending to benefit both electricity generation and downstream water interests under a variety of different circumstances, while protecting stored water in the Snowy Mountains Scheme. It defines how releases are accounted on an annual basis, with particular reference to very wet or very dry climatic conditions, transfers between developments, or accounting between years or within a single year.

Specifically, Schedule 4 of the Licence places obligations around:

- the sharing, allocation and transfer of water within and between the Snowy-Murray and Snowy Tumut developments (clauses 2 to 4 and 9)
- how water releases should be accounted (clause 5)
- the volumes and timing of water required to be released (clauses 6 to 8 and 10 to 13)
- sharing data with Ministerial Corporation and NSW Government (clause 14)
- developing analytical models for downstream water supply systems (clause 15)
- maintaining water accounts (clause 16).

The preliminary findings outlined in this section respond to issues around water resource efficiencies; requests to review the operation of the variations made in 2011; errors and ambiguities identified in the Licence; and requests to undertake detailed assessments of any proposed changes. In summary, it is proposed to secure agreements between partner Snowy governments and Snowy Hydro Limited in the Licence, fix errors and further investigate ways to maximise operational efficiencies and clarify arrangements. These investigations will be supported by Snowy Hydro Limited, MDBA and WaterNSW collaborating to improve analytic modelling capability to enable assessment of options.

6.4.1 Water sharing

6.4.1.1 Snowy-Murray and Snowy-Tumut developments

Clauses 2, 3 and 4 of Schedule 4 define how inflows to the Snowy Mountains Scheme are shared between the Snowy-Murray and Snowy-Tumut developments. Clauses 2 and 3 prescribe the water available to each development, while clause 4 specifies what downstream catchments the water is committed to.

The sharing of the Snowy Mountains Scheme's water resources was first legislated in 1959 in an agreement between the Commonwealth, NSW and Victorian governments on the construction, operation and management of the scheme. This agreement allocated approximately 75% of water regulated by the scheme to NSW and 25% to Victoria by:

- granting the River Murray Commission (now the MDBA) the right to control water released from the works of the Snowy–Murray Development via the River Murray (which is shared equally between NSW and Victoria)
- granting NSW the right to control water released from the works of the Snowy–Tumut Development via the Murrumbidgee River
- committing diversions from the Tooma River (in the upper Murray), Upper Murrumbidgee River and Eucumbene River to the Tumut River
- committing diversions from Lake Jindabyne and the Snowy River to the Murray River.

Corporatisation of the Snowy Mountains Scheme subsequently secured the following rights in the Licence:

- **The River Murray** is entitled to receive all water from the Snowy River catchment (except for the Eucumbene River), together with water from Geehi River and Bogong Creek.
- **The Murrumbidgee River** is entitled to receive all water from the Tooma River, the Upper Murrumbidgee River and the Eucumbene River, together with water from the Tumut River.

In addition, up to 2,019 gigalitres of water available for the River Murray can be stored in Lake Eucumbene, which is the only storage in the scheme shared by the two developments.

An issue was raised about the growing differences in the nature of these rights due to changing inflow and use patterns of each development. Given these rights are fundamental to the design and operation of the scheme, it is not proposed to specifically investigate this issue in this review.

Nevertheless, it will be necessary to consider changes to the nature of these entitlements when assessing any proposal to vary Snowy Hydro Limited's release requirements.

6.4.1.2 Below-target and above-target water

The inflows to each development are further characterised as either below-target water¹³ or above-target water, depending on whether the volume available in storage at any time is below or above a target storage volume. Below-target water is water set aside to deliver the annual release requirement specified in Schedule 4 of the Licence. Above target water, conceptually, is unencumbered and is available for Snowy Hydro Limited to release at its discretion.

Target volumes were established for each development during the scheme's design. They reflect how much water is needed in storage to ensure the scheme can release an agreed annual volume during a repeat of the design drought without running out of water. The design drought incorporates the period of inflows between 1936 and 1946.

The agreed annual volume is defined as the required annual release, and equals a nominal volume for each development of:

- Snowy–Murray Development: 1,062 gigalitres per year
- Snowy–Tumut Development: 1,026 gigalitres per year.

¹³ Note: below-target water is not explicitly defined in the Licence but is commonly referred to in the management of the scheme.

On average, these nominal volumes were designed to contribute around 85% of total releases from the Snowy Mountains Scheme.

As illustrated in Table 4, target volumes apply for each month, taking into account seasonal variation in inflows and release of the required annual release. They are secured in clause 8 of Schedule 4 of the Licence.

Inflows to the scheme are accounted as below-target water when storages are below the target volumes. When storages are above the target volumes, inflows are accounted as above-target water. Importantly, inflows are not reallocated from above-target water to below-target water if storages fall back below target volumes in the future.

Water can be transferred between below target and above target water under certain circumstances specified in the Licence. Below target water is re-classed as above-target water when:

- annual allocations are made against SRIF and RMIF
- water is transferred to the drought accounts
- a relaxation volume is calculated
- a pre-release volume is calculated for the previous year.

Above-target water is re-classed as below-target water when:

- water in excess of the required annual release is required to meet minimum release volumes between 1 December and 30 April (within-year release requirements)
- Ministerial Corporation seeks to call out a portion of the previous year's relaxation volume, or water from the drought accounts
- a wet sequence protection volume is calculated.

The relaxation volume, within-year release requirements, wet sequence protection volume and drought accounts are discussed in more detail in section 6.4.2.

Table 4 Target storage volumes

Month	Target storage volumes (gigalitres)	
	Snowy-Murray Development	Snowy-Tumut Development
January	1510	1660
February	1520	1670
March	1460	1610
April	1410	1530
May	1340	1460
June	1290	1410
July	1240	1350
August	1170	1300
September	1190	1490
October	1240	1580
November	1400	1590
December	1450	1580

Similar to the catchment-based sharing of inflows, the target storage approach and allocation of inflows to below- and above-target water are fundamental to the operation of the Snowy Mountains Scheme. Concerns have been raised that the Licence lacks clarity around the accounting of above-target water, specifically transfers between above target water and below target water. The consequence is that various parties have had different interpretations of above-target water availability.

The review provides an opportunity to clarify accounting arrangements.

6.4.2 Release requirements

Clauses 6 to 13 of the Licence govern the minimum annual release requirements of Snowy Hydro Limited to the Murray and Murrumbidgee rivers, consisting of the required annual releases for each development and the Murrumbidgee riparian release.

In practice, the required annual releases vary from the nominal volumes every year. Elements that influence the calculated volume include:

- the volume and timing of inflows to the Snowy Mountains Scheme
- storage volumes/water availability in Hume and Blowering reservoirs
- timing of actual releases
- allocations against SRIF and RMIF
- decisions of Ministerial Corporation.

6.4.2.1 Dry inflow sequence volume

While the target storage volumes are designed to ensure reliable required annual releases over a major drought, the Licence does contain a demand management mechanism aimed at securing ongoing releases from the Snowy Mountains Scheme when inflows are drier than the design inflow sequence.

This mechanism reduces the demand on each development by reducing the required annual releases when the cumulative volume of inflows falls below the design inflow sequence for an extended period. The DISV is the volume by which the required annual releases are reduced.

The DISV is determined monthly using a predictive formula that determines whether the current inflow sequence, going back to when below-target water reserves were last at target storage and looking forward to the end of the water year, is adequate to meet the nominal volume for that development. If not, a DISV is calculated equal to the volume necessary to ensure the Snowy Mountains Scheme can supply a reduced required annual releases under forecast minimum inflows until the end of the water year.

The DISV is calculated at the beginning of every month, therefore the required annual releases are adjusted monthly when there is a DISV. However, the DISV does not change in the last two months of each water year. Improvements in inflows during this period are reflected in the following year's required annual releases calculation.

Relying on minimum inflows to calculate the DISV means that when the inflow sequence is tracking below the design inflow sequence, the DISV tends to begin the water year higher, before slowly recovering as actual inflows exceed minimums and are factored into the calculation. As a consequence, the required annual release tends to begin the year low and increases over the year when there is a persisting DISV.

Significant inflow deficiencies were experienced in the Snowy Mountains Scheme during the Millennium drought, over which time DISV's were calculated between 2006–07 and 2016–17 on the Snowy–Murray Development and between 2006–07 and 2009–10 on the Snowy–Tumut Development.

Amendments were made through the five year review to improve the operation of the DISV and the fact the scheme continued to release water during the Millennium drought indicates it has generally been effective in meeting its objective of balancing release requirements over extended dry sequences.

Stakeholders did not raise any issues with the DISV provision or dry inflow sequence formula. However, in considering previous AWOPs, the WCLC did identify the accounting treatment of inflows in the DISV formula (Clause 8.1, Schedule 4) is different to its treatment in the 'water available' calculation (clauses 2.1 and 3.1, Schedule 4). The definition of water available to the Snowy–Murray and Snowy–Tumut developments is given as 'water regulated by the Snowy Mountains Scheme', while the DISV refers to inflows only.

In 2012, WCLC considered adopting ‘regulated inflows’ for the calculation of the DISV on the understanding that doing so will not impact accounted below-target and above-target water stores. This treatment was partially agreed by WCLC and has been adopted in recent AWOPs. The review provides an opportunity to resolve this ambiguity.

Stakeholders have also sought that the review consider how the DISV interacts with other provisions in the Licence, namely the prerelease and relaxation provisions, to ensure it remains fit for purpose.

Further, the review provides an opportunity to consider whether the DISV provision that was effective in managing water through the Millennium drought, will be effective under a changing climate (noting a DISV persisted on the Snowy–Murray Development a few years after the Millennium drought ended), and whether there are any opportunities to improve the arrangements.

Proposal 12—The dry inflow sequence volume

Department of Industry, in partnership with Snowy Hydro Limited, MDBA and the Victorian and Commonwealth governments, will:

Work plan

- A. seek agreement on the definition of inflows for calculating the DISV
- B. further investigate the:
 - interaction of DISV with other elements of the required annual release
 - effectiveness of the DISV in managing release requirements through the Millennium drought and a changing climate.

6.4.2.2 Relaxation volume

The Licence contains provision to reduce the required annual release when downstream water availability is high and releases from the Snowy Mountains Scheme are not needed to support increased water allocations in the Murray or Murrumbidgee river systems. The volume by which the required annual release is reduced is defined as the relaxation volume and is determined according to a fixed formula that takes into account downstream water supply system demands and operating requirements, and current and forecast water availability.

The relaxation mechanism is in place to maximise water efficiency by not forcing releases from the scheme when neither Snowy Hydro Limited nor downstream water interests are seeking them. When triggered, the required annual release is reduced by the calculated relaxation volume and the volume of water set aside in the Snowy Mountains Scheme’s below-target water reserves is transferred to above-target water. The relaxation volume cannot reduce the nominal required annual release below 800 gigalitres, i.e. a maximum of 262 and 226 gigalitres on the Murray and Murrumbidgee rivers respectively.

The Licence also provides Ministerial Corporation the opportunity to call out up to 100 gigalitres of the relaxation volume in the following year (Clause 10.1, Schedule 4) if actual releases in the previous year were less than 900 gigalitres and relaxation volumes exceeded 162 gigalitres on the River Murray and 126 gigalitres on the Murrumbidgee River.

Stakeholders have raised a number of concerns with the mechanism, including:

- the presence of a drafting error in the calculation of the Snowy–Tumut relaxation volume
- the complexity of the related call out provisions
- the provision not operating as intended
- unintentional reduction of the required annual release due to interaction with DISV and prerelease provisions
- a lack of flexibility for downstream water supplies.

It is clear from the submissions that stakeholders believe the current approach to determining relaxation volumes is not achieving outcomes sought by Snowy Hydro Limited or downstream water users and that stakeholders consider further investigation of the mechanism a priority for the review. Further discussion is provided in the following sections.

Drafting error in Snowy–Tumut calculation

The formula used to calculate the Snowy–Tumut relaxation volume at Clause 7, Schedule 4 allows for up to 262 gigalitres, matching the volume that can be calculated for the Snowy–Murray Development. As discussed earlier, the intent of the relaxation provision is that it does not reduce the required annual release below 800 gigalitres. To achieve this on the Snowy–Tumut Development, the relaxation volume calculation should be capped at 226 gigalitres.

Complexity of related call-out provision

Clause 10.1, Schedule 4 is complex and fails to take into account prereleases in determining the volume of the previous years' actual release volumes. In 2013, the WCLC agreed to simplify the drafting of this clause and reflect the changes required to consider the addition of prerelease provisions. All AWOPs since this date have included the following agreement:

For the Snowy–Murray Development, if the maximum relaxation volume in a water year was greater than 162 gigalitres, a volume of water that could be called out not later than 31 August in the following water year is the greater of:

- (1) zero
- (2) maximum relaxation volume—162 gigalitres—discretionary above-target water release

Where discretionary above-target water releases represents above-target water releases made entirely at Snowy Hydro Limited's discretion and is defined as above-target water release excluding above-target water components in the required annual release formula as well as drought release and call out of RMIF.

For the Snowy–Tumut Development the same conditions apply, but using 126 gigalitres as the volume.

The relaxation volume is not operating as intended

Since corporatisation, there has been very little relaxation volume calculated, and when it has, it has been late in the year. This has been the case even in the wetter years that followed the Millennium drought.

Stakeholders have singled out issues with the use of modelled baseline conditions (development and operating conditions at corporatisation) to estimate diversions in the River Murray water supply systems as well as the use of fixed numbers to estimate system operating requirements and forecast inflows. Changes to water allocation policies and water use behaviour since 2002 and changes to minimum inflows and transmission and evaporation, means it may no longer be appropriate to rely on these fixed requirements as they do not accurately represent current conditions.

To resolve this, stakeholders have sought that the review consider revising the relaxation provisions to no longer rely on modelling baseline conditions and to enable the calculation to adapt to changes to downstream fixed-system operating requirements and inflow forecasts. Other considerations include the need to consider the impact carryover has on the determination of downstream water availability and the benefits provided by not relaxing the required annual release, for example on maintaining storage levels at higher volumes.

Interaction of relaxation, DISV and flex provisions

It is possible for the required annual release to be reduced by a DISV due to both a long-term deficiency in inflows to the Snowy Mountains Scheme and a relaxation volume due to short-term recovery in the downstream water supply system. There are concerns that this could lead to an excessive, unintended reduction in required annual release. Similarly, there are concerns that allowing relaxation and prereleases in the same year could also lead to less water committed to the Murray and Murrumbidgee systems, albeit in future years.

Flexibility for downstream water supplies

A commonly held view of Murray and Murrumbidgee water interests is that the relaxation provisions are not effective at delivering flexibility to downstream water supply systems between years and thus provide little benefit to downstream water users—particularly in future years when water availability may be low.

Stakeholders are interested in the review investigating options that increase call out flexibility, in terms of volume and timing, to maximise the value of below-target water to downstream systems and help smooth variations in water allocation determinations. Options identified include allowing:

- relaxation volumes to be called out in future years (i.e. two or three years after relaxation)
- downstream water authorities to call out all relaxation volumes when conditions turn dry
- relaxation volumes to be used to offset DISV.

Proposal 13—Relaxation

<p>A. The Licence be varied to:</p> <ul style="list-style-type: none"> • correct the drafting error in the Snowy–Tumut calculation • reflect the WCLC drafting of Clause 10.1, Schedule 4 and definition of ‘discretionary above-target water release’. 	Licence variation
<p>B. Department of Industry, in partnership with Snowy Hydro Limited and the Victorian and Commonwealth governments, will investigate options to improve the relaxation mechanism.</p>	Work plan

6.4.2.3 Flexibility and prereleases

Clause 13 provides:

- the Ministerial Corporation and Snowy Hydro Limited the ability to agree to reduced releases of below-target water in any year (Clauses 13.2 and 13.3, Schedule 4)
- Snowy Hydro Limited the ability to prerelease a portion of the following year’s required annual release (Clause 13.4);
- for wet sequence protection for a portion of prereleases (Clause 13.5).

Reduction in required annual release

The facility to agree to reductions in required annual release was included in the first issue of the Licence and has been exercised on numerous occasions on the Snowy–Tumut Development on a without-prejudice basis. As discussed earlier in the context of the relaxation provisions, stakeholders have sought flexibility around moving required annual release volumes between years. Conceptually, this provision could be utilised to achieve a similar outcome, provided conditions can be agreed with Snowy Hydro Limited.

Prereleases of required annual release

Variations to Clause 13 were made in 2011 to provide Snowy Hydro Limited the right to release at least 200 gigalitres of flex in any year, regardless of the previous year’s final DISV. This allows Snowy Hydro Limited to prerelease next year’s required annual release when water availability is greater and downstream spills more likely, and is why the increased flexibility was accompanied by the downstream wet sequence protection spill compensation mechanism (discussed in section 6.4.2.3).

Snowy Hydro Limited is content that the provisions are effective, except for the definition of unused spills used to calculate the downstream wet sequence protection volume (refer section 6.4.2.3) and two known errors addressed below. However, some stakeholders have expressed additional concerns that the provisions may have altered operations to the detriment of downstream water availability.

The Licence contains two errors in relation to the flex and prerelease provisions, being the definition of agreed annual release and the calculation of the recovery amount.

The agreed annual release is applied when Ministerial Corporation and Snowy Hydro Limited agree to reduce the required annual release. An administrative error has resulted in the definition of agreed annual release incorrectly referencing clause 13.1 instead of 13.2. It is proposed to vary the Licence to fix this mistake.

The recovery amount is the volume by which the DISV reduces in a given year and is used to calculate the prerelease volume and to credit the drought and DISV reserve accounts. The WCLC identified an error in the

definition of the recovery amount at Clause 1.1(56), where it mistakenly calculates the DISV recovery over the preceding month, instead of the year to date.

In 2013, the WCLC agreed to amend the drafting of the definition so that:

‘Recovery Amount means, for each Development with respect to each Month in a Water Year, the volume (if any) by which the Dry Inflow Sequence Volume for that Development calculated as at the commencement of that Month under clause 8 of Schedule Four is less than the volume of the Dry Inflow Sequence Volume for that Development calculated as at the commencement of March in the previous Water Year under clause 8 of Schedule Four.’

It is proposed the Licence be varied to reflect this agreement.

Numerous submissions also called on the review to analyse how the flex provisions have operated since being reformed in 2011. There are concerns that flex may not be adequately incorporated into other provisions of the Licence, may be responsible for increasing the volume downstream spills and may increase the likelihood of the Snowy Mountains Scheme failing under ongoing dry conditions. The review provides an opportunity to investigate the flex provisions to understand whether it has had any unforeseen impacts and identify any opportunities to improve the existing arrangements.

Proposal 14—Flexibility and prereleases

A. The Licence be varied to:

- correct the drafting error in the definition of the ‘agreed annual release’
- reflect the WCLC drafting of the definition of ‘recovery amount’.

Licence variation

B. Department of Industry, in partnership with Snowy Hydro Limited and the Victorian and Commonwealth governments, will review the operation of the flexibility and prerelease provisions, including its interaction with other required annual release provisions, and consider opportunities to improve existing arrangements.

Work plan

6.4.2.4 Timing of releases

The timing of releases is regulated in the Licence to ensure:

- a nominal volume of water is released annually, i.e. the required annual release
- regulated releases from Jounama Dam do not exacerbate flooding of the Tumut River
- early releases from the required annual release is available for downstream water supply systems.

The Licence only places two restrictions on Snowy Hydro Limited regarding timing of releases, being the minimum requirement to deliver the required annual release during the water year (Clause 12, Schedule 4) and the limit on releases from Jounama Dam (Clause 12.4, Schedule 4).

Snowy Hydro Limited can make early releases of the required annual release within a water year, between May and December, and between water years through flex prereleases. The provisions in place to manage early required annual releases do not restrict Snowy Hydro Limited from making releases during this time. Rather, they act as a disincentive that can result in Snowy Hydro Limited calling on its above-target water reserves to compensate downstream water supply system for releases that cannot be re-regulated downstream and ultimately spill. This is intended to balance water supply certainty for water users with operational flexibility to generate electricity.

Compensation for spills of early releases from the required annual release is governed by:

- the within-year release requirement provision (Clause 11, Schedule 4), in the case of early season releases
- downstream wet sequence protection (Clauses 13.5 and 13.6, Schedule 4), in the case of prereleases of the required annual release in the previous year.

Within-year release requirements provide a minimum volume of releases from the Snowy Mountains Scheme between 1 December and 30 April when early season releases from the required annual release have spilled from the downstream water supply system. The volume is limited to a maximum of 200 gigalitres on the Snowy–Murray Development and 241 gigalitres on the Snowy–Tumut Development.

Changes to the flexibility and prerelease provisions in 2011 introduced spill protection for water prereleased from the scheme under new flexibility arrangements. Downstream wet sequence protection volume provisions require Snowy Hydro Limited to release above-target water if they prerelease from the required annual release and it spills in the following water year. The volume ‘protected’ is the difference between what Snowy Hydro Limited could have released under historic required annual release provisions and 200 gigalitres. This former prerelease right, commonly referred to as ‘DISV Flex’, allowed Snowy Hydro Limited to deliver a volume of next year’s required annual release up to the DISV.

No pre-release is protected if the volume of DISV Flex exceeds 200 gigalitres. In other words, downstream wet sequence protection can be restricted or negated altogether by the presence of a DISV.

What is DISV Flex?

Prior to the 2011 licence variations, the required annual release was reduced by the 1 March DISV and increased by a volume equal to the 1 March DISV of the previous year (defined as ‘carry overs’).

In 2007, the WCLC agreed to variations to the required annual release formulae to recognise pre-releases up to the DISV volume¹⁴, which essentially allowed Snowy Hydro Limited to pay next year’s carry over volume early. This early release, now termed DISV Flex, was not afforded spill protection.

Adequacy of spill protections

Numerous stakeholders have sought a review of the downstream wet Sequence protection to ensure it is meeting the intent and is adequately compensating downstream water users in response to any consequential changes to Snowy Hydro Limited’s release patterns. Stakeholders pointed to recent examples where capacity existed within the Snowy Mountains Scheme to store water when Blowering and Hume reservoirs were close to full or prereleasing, but releases were made anyway at a cost to downstream water availability and above-target water reserves in the scheme. It has also been suggested the review go further and investigate the consequences of not protecting spills of DISV Flex.

The adequacy of the within-year release requirements to compensate early releases of required annual release has also been questioned, namely that:

- the periods specified in the Licence may not match the risk of spill profiles of downstream storages
- there is ambiguity around whether prereleases affect the within-year release requirement.

Determination of unused spill

Key to both the within-year release requirements and wet sequence protection provisions is the calculation of unused spill, which is linked to physical spills and/or flood prereleases¹⁵ from Hume and Blowering dams.

Snowy Hydro Limited has expressed a desire to reform the spill compensation arrangements, citing deficiencies it believes exist in the calculation of unused spill. In summary, Snowy Hydro Limited considers any compensation for early release from the required annual release should:

- only be provided to the extent the volume of early release contributes to the spill downstream, i.e. any unused spill should be proportional to other inflows contributing to the spill
- take into account Snowy Hydro Limited’s minimum release obligations.

¹⁴ This agreement was inserted into the Licence in variations that came into force in May 2010.

¹⁵ ‘Pre-releases’ are commonly used to describe early releases of water from a reservoir to manage risks of flooding. It does not appear in the definition of unused spill in the Licence because the term is adopted in the Blowering Airspace Deed to meet a different purpose.

In considering these proposals previously, the WCLC has also noted that the volume of unused spills should be limited to accountable releases from the scheme (i.e. regulated releases) and that changes to downstream water user behaviour, as a consequence of water policy reforms, could affect the ability of the downstream water storages to regulate early releases from the Snowy Mountains Scheme when compared to baseline conditions, being at corporatisation in 2002.

Further, the WCLC has identified and discussed inconsistencies in how unused spills are calculated for the Snowy–Tumut and Snowy–Murray developments due to the prerelease compensation arrangements that exist in the Blowering Air Space Deed. The compensation clauses in the deed operate in a way that potentially reduces the volume of unused spills calculated under the Licence, thereby reducing the volume of releases regulated by the Murrumbidgee River system.

There may also be opportunities to investigate the usefulness of the spill compensation mechanisms where, similar to the call out of the previous year's relaxation volume, they may not generate compensation when they are most needed downstream (i.e. during a dry period).

Flood mitigation

The provision in place to manage Tumut River flooding restricts Snowy Hydro Limited from releasing water from Jounama Dam when Blowering Dam is spilling and downstream flows in the Tumut River exceed the operating channel capacity (Clause 12.4, Schedule 4). During these periods Snowy Hydro Limited cannot release a daily volume that exceeds the volume that would have passed through the Tumut River at Jounama Dam had the Snowy Mountains Scheme not been constructed.

To manage the impact this restriction has on Snowy Mountains Scheme operations and allow for emergency electricity generation, Snowy Hydro Limited has entered into an agreement with the Ministerial Corporation to manage the likelihood of the provision being triggered. Under the agreement, known as the Blowering Air Space Deed, Snowy Hydro Limited may notify an airspace volume in Blowering Reservoir of up to 190 gigalitres that the Ministerial Corporation (WaterNSW) must target in its operations. To offset the water lost from the reservoir as a consequence, Snowy Hydro Limited maintains a separate above-target water account in the Snowy–Tumut Development that is used to compensate the Murrumbidgee system at a later date.

Snowy Hydro Limited has identified an operational constraint within the *Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016* that impacts WaterNSW's ability to target the notified air space volumes and thus increases the volume of required annual release spilled from Blowering Reservoir and the likelihood of major flooding. It claims the operating channel capacities of 9 gigalitres per day at Oddy's Bridge and 9.3 gigalitres per day at Tumut are too low and recent experience has shown it may be possible to operate to higher rates.

Numerous other submissions raised flood mitigation, and the Snowy Mountain Scheme's capacity to help manage flood risks, as an issue worth investigating through the review. In addition to the constraints below Blowering Dam, it was also highlighted there is no limit on releases from the Snowy–Murray Development to the upper River Murray while Hume Dam is spilling. Concerns were raised that Snowy Hydro Limited has in the past continued to release water to the upper Murray River when prereleases were being made from Hume Reservoir and capacity existed in Lake Eucumbene to retain water in the scheme.

Proposal 15—Timing of releases

Department of Industry, in partnership with Snowy Hydro Limited, WaterNSW and the Victorian and Commonwealth governments, will:

- A. review the effectiveness of spill compensation and flood mitigation arrangements
- B. investigate options to improve Licence rules around the timing of releases to increase water use efficiency and flood management outcomes.

Work plan

6.4.2.5 Accounting for inter-valley water transfers

Inter-valley water transfers are described in Clause 9.2, Schedule 4 of the Licence as releases of:

- water available to the Snowy–Murray Development to either or both the Tumut River catchment and the Murrumbidgee River catchment

or

- water available to the Snowy–Tumut Development to the River Murray catchment upstream of Hume Dam.

The required annual release formulae include references to increases or decreases due to inter-valley water transfers from either development. However, there is no recognition of bulk transfers between developments in Clauses 2.1 and 3.1, Schedule 4, which specify the water available to the Snowy–Murray Development and Snowy–Tumut Developments respectively.

In 2009, the WCLC agreed that an inter-valley water transfer should be complemented by a transfer in water availability for each development and has been operating in accordance with this arrangement since 2009–10.

It is proposed to codify this arrangement in the Licence by amending the formulae to calculate development water availability at clauses 2.1 and 3.1 to include reference to the volume of annual inter-valley water transfers.

Proposal 16—Accounting for inter-valley transfers

It is proposed to vary clauses 2.1 and 3.1, Schedule 4 of the Licence to ensure the method used to calculate the water available to each development reflects any inter-valley water transfers.

Licence variation

6.4.2.6 Releases from Tantangara Dam

The Licence was varied in 2010 to place a minimum release obligation from Tantangara Dam (Clause 12A, Schedule 4). Specifically, the requirement obliges Snowy Hydro Limited to release the lesser of 83 megalitres per day, or natural inflows, to maintain the flow of the Murrumbidgee River at Mittagong Crossing at 32 megalitres per day. These releases are made from below-target water reserves.

A submission questioned whether the intent of the variation was to ensure higher volumes of SMRIF could be released to deliver water held under ACTEW AGL's high-security Murrumbidgee licence or increase the reliability of supplies for ACT's water licences held in the upper Murrumbidgee.

As stated in the five-year report, this variation was provided to secure a reliable water supply for Cooma. Further, releases of base passing flows are made in addition to releases of SMRIF. This is reiterated in numerous clauses throughout the Licence.

However, the WCLC did agree that any Tantangara releases above the normal riparian release arrangements required to maintain Cooma township water supply would be accounted as SMRIF releases. While this decision has not influenced the design of the SMRIF strategy, as some stakeholders have questioned, it has risked SMRIF being diverted downstream. Numerous stakeholders raised concerns around the protection of Snow montane rivers and Snowy River increased flows downstream of the scheme and this issue is proposed to be considered separately to the review. Further details are provided in Chapter 8.

6.4.2.7 Early season commitment of Snowy Mountains Scheme releases

Several submissions identified an opportunity for Snowy Mountains Schemes water reserves to contribute to early season water availability in the River Murray and Murrumbidgee River systems. Changes to available water determination inputs, such as minimum inflow assumptions, and more frequent dry periods are resulting in low water availability at the beginning of the water year. Relying on future inflows to increase water allocations over the year introduces significant uncertainty for irrigators and environmental managers, making it difficult plan the forthcoming year's water use. Notably, persistent DISVs are contributing to this issue

because the required annual releases used to be a reliable source of inflows that could be relied on at the start of the water year.

One method used to manage this issue in recent years is commonly referred to as ‘above-target water borrow’ or ‘Snowy Advance’. While the arrangements have differed over the years, such borrows are essentially a commercial agreement between water service providers and Snowy Hydro Limited and approved by Ministerial Corporation, whereby:

- Snowy Hydro Limited agrees to release a volume of above-target water in return for a fee and in some cases more flexible releases arrangements.
- The borrowed water is allocated through state water sharing plans to the water service provider, who assigns it to affiliated customers.
- Snowy Hydro Limited is paid back through a reduced requirement to release below-target water (i.e. reduction in required annual release, which leads to a transfer of below-target to above-target water) when downstream water availability improves.
- The water service providers that received the advance are required to make good the required annual release reduction to avoid third-party impacts, for example by ‘writing off’ or forfeiting water allocation.

Beneficiaries of previous Snowy Advances have advocated for the review to consider developing similar market-based approaches to help water users manage low water availability years. Supporters believe they provide a win-win for water and electricity generation interests—downstream water users benefit from early season water at reasonable prices, and Snowy Hydro Limited benefits from financial payment and increased flexibility.

However, not all stakeholders support above-target water borrows. They cite concerns that the benefits are not available to all water users, they risk impacting third-parties, the arrangements are not governed by the Licence or relevant water sharing plans and the required approval process is resource intensive for regulatory agencies.

An alternative option has also been proposed by the MDBA. Instead of borrowing above-target water, it has proposed the required annual release be supplemented by a fixed volume when there is a DISV early in the season, which would provide for increased water allocations downstream. This supplement could be underwritten by encumbered above-target water held in the Scheme, such as the drought accounts, and called on if the DISV fails to recover during the year. The appropriate supplement volume would need to be determined through modelling and consultation with affected parties.

Further work is required to understand the costs, benefits and risks associated with various borrow/advance options, however it is clear pursuing this work is a priority for water users.

Proposal 17—Early season commitment of release volumes

Department of Industry, in partnership with Snowy Hydro Limited, the MDBA and the Victorian and Commonwealth governments, will investigate options to secure commitment of releases from the Snowy Mountains Scheme to support increased early season water allocations for Murray or Murrumbidgee water users.

Work plan

6.4.3 Water accounts

Clause 16, Schedule 4 establishes water accounts relevant to the Western Release Requirements and places obligations on Snowy Hydro Limited to maintain them. They include the:

- River Murray and Murrumbidgee River Drought accounts
- Snowy–Murray Development DISV Reserve and Snowy–Tumut Development DISV Reserve.

Snowy Hydro Limited is also required to maintain environmental accounts in accordance with Schedule 3, being:

- SRIF
- SMRIF

- Snowy-Murray Development¹⁶
- Mowamba Borrowings Account.

The MDBA is responsible for maintaining an account for RMIF in the Snowy Mountains Scheme¹⁷ in accordance with provisions in the *Murray-Darling Basin Agreement*.

6.4.3.1 Operation of the drought and DISV reserve accounts

Drought accounts

The drought accounts were established as part of a package of variations made to the Licence following the Millennium drought. They respond to the agreement between Murray–Darling Basin States and the Commonwealth Government that critical human water needs are the highest priority water use and that conveyance water will receive first priority from the water available¹⁸. This agreement was reached during the Millennium drought when water supplies for critical human, stock, intensive industry and permanent plantings were at risk, and a range of contingency measures were required to ensure ongoing supply of water.

Establishing reserves in the Snowy Mountains Scheme was a more efficient way to meet this commitment than in the downstream storages. This is because the drought accounts:

- take advantage of periods when sudden recoveries in the Snowy Mountains Scheme would have forced repayment of accumulated DISV when downstream water availability had improved
- store the mandatory reserves in the highest reservoirs, exposing them to less evaporation and ensuring they service the entire River Murray and Murrumbidgee systems
- do not take up valuable storage space in downstream reservoirs.

The drought accounts are established in Clause 16.1 of Schedule 4 and are credited with water when a DISV has accumulated in previous years, and there is a subsequent improvement in inflows to the Snowy Mountains Scheme that would allow the DISV to be repaid. This is defined in the Licence as the ‘recovery amount’.

The accounts can hold up to 225 gigalitres in the Snowy–Murray Development and up to 150 gigalitres in the Snowy–Tumut Development and can be called out as additional releases from the Snowy Mountains Scheme when needed to support the delivery of critical human water needs. They do not store the water allocations for critical human water needs entitlements. Rather, they hold water in reserve to ensure there is enough water to run the river (i.e. meet conveyance requirements) in the following year and thereby enable water required for critical human needs to be delivered. This benefits all water licence holders, not just those with critical needs.

Both accounts are full as at May 2018. Improvements in inflows in the years following the Millennium drought resulted in the Murrumbidgee and Murray drought accounts being credited 150 gigalitres and 215 gigalitres respectively. The Murray drought account was topped up with the final 10 gigalitres in 2016–17. No water has been called or forced out.

Numerous stakeholders believe this review provides a good opportunity to investigate whether the drought accounts are meeting their intent and to what extent they have impacted available water determinations. Concerns were raised around the impact crediting the drought accounts can have on the required annual release in any year compared to the benefits they might provide water users who had been subject to reduced water availability in the previous years through accumulation of a DISV. It is proposed to carry out this investigation.

DISV reserve accounts

Stakeholders were also interested in better understanding the function of the DISV reserve accounts and how they interact with the drought accounts.

¹⁶ The Snowy–Murray Development account specifies the volume of River Murray annual allocation that Snowy Hydro transfers to above-target water in the Snowy–Murray Development (Clause 1.2, Schedule 3).

¹⁷ The Murray Darling Basin Authority is obliged to maintain Initial River Murray Increased Flows Account and the River Murray Increased Flows in Authority Storages Account to track allocation, releases and use of RMIF in the Snowy Mountains Scheme and River Murray system.

¹⁸ This agreement is secured in Section 86A of the *Water Act 2007* (Commonwealth).

The DISV reserve accounts are also credited when there is a recovery of DISV that had accumulated in previous years, but only when the drought accounts are full. The difference is that water stored in the DISV reserve accounts is not transferred to above-target water. Instead, it remains as below-target water and supports next year's required annual release when conditions are dry and there is risk of a DISV and a reduced required annual release. It does this by reserving below-target in storage in the year of recovery and using it to offset the next year's DISV.

The alternative is to release the water in the year of recovery at a cost to early season required annual release volumes in the following year.

An investigation of the drought accounts also provides an opportunity to consider the effectiveness of the DISV reserve accounts and whether or not they are providing downstream water users the outcomes they are seeking.

Proposal 18—Drought and DISV reserve accounts

Department of Industry, in partnership with Snowy Hydro Limited and the WCLC, will investigate the effectiveness of the drought and DISV reserve accounts and consider options for improving how they support downstream water user requirements.

Work plan

6.4.3.2 Sharing of net evaporation

The Licence is silent on how net evaporation should be shared. However, in practice net evaporation is shared at the bulk level between the Snowy–Murray and Snowy–Tumut developments and between below-target and above-target water in proportion to the volume of water held in these accounts. It is calculated monthly.

None of the water accounts established under the Licence are debited net evaporation. As a consequence, it is only allocated to below-target water stored for required annual release and above-target water stored for Snowy Hydro Limited's discretionary use. The impact of evaporation on these water reserves increases as the volume held in the accounts accumulates, particularly as more water is carried over between water years.

Snowy Hydro Limited believes the RMIF and Drought accounts should be debited net evaporation because the extra water stored in the Snowy Mountains Scheme as a consequence physically evaporates. They assert this is an oversight of the Licence, not a deliberate act. Other stakeholders believe not subjecting these accounts to net evaporation was intentional, being a negotiated outcome.

Either way, the review provides an opportunity to investigate the potential impacts these arrangements are having on Snowy Hydro Limited and downstream water users and whether they should be varied to achieve more equitable outcomes.

Proposal 19—Sharing of net evaporation

Department of Industry, in partnership with Snowy Hydro Limited and the WCLC, will further investigate and resolve how net evaporation should be shared between bulk water accounts.

Work plan

6.4.4 Data provision and analytical models

The data provision and analytical model provisions at clauses 14 and 15 of Schedule 4 essentially establish obligations on both Snowy Hydro Limited and Ministerial Corporation to ensure the successful operation of the Licence. With the exception of issues associated with the estimation of baseline conditions (refer to section 6.4.2.2), stakeholders did not raise any significant issues with the adequacy of existing provisions.

However, it was highlighted that there is nothing in the Licence compelling Snowy Hydro Limited or the NSW, Victorian and Commonwealth governments to provide data or modelling analysis to support future variations to the Licence or investment in future efficiencies.

Using analytical tools to support decision-making is essential to making informed decisions and is consistent with how water management reforms are implemented elsewhere in Australia. It is also consistent with the

expectations of stakeholders, who made it clear in the submissions that variations proposed through the 10-year review be supported by technical analysis.

As such, it is proposed that relevant water agencies and Snowy Hydro Limited collaborate to improve modelling capability to support the investigations recommended from this review and any future reviews that propose to consider meaningful variations to the Licence. Not only is improved modelling capability in the best interests of both Snowy Hydro Limited and NSW, Victorian and Commonwealth governments it is necessary to meet community expectations around decision-making.

It is not proposed to vary the Licence to compel Snowy Hydro Limited to provide long-term data or develop an analytical model because doing so would not support the operation of the Licence and risks creating an unnecessary administrative burden on Snowy Hydro Limited.

Proposal 20—Modelling support

Department of Industry, in partnership with Snowy Hydro Limited, the WCLC and WaterNSW will collaborate to improve modelling capability to support the investigations committed for the next phase of the review.

Improved management

7. Performance of Snowy Hydro Limited

7.1 Expert review of performance

A key requirement of the review is considering Snowy Hydro Limited's performance in meeting the conditions of the Licence. Snowy Hydro Limited is confident it has complied with its obligations under the Licence and has used its submission to present its position, a summary of which is provided below at section 7.2.

Despite compliance not being a major focus, numerous submissions did raise implementation issues with increased flows, namely the management approach taken to account for spills of SRIF and meet SMRIF target volumes. These are described in more detail in section 7.3.

In recognition of Department of Industry's role in administering the Licence and overseeing the increased flows programs, it is proposed to procure an expert panel to independently carry out the performance review.

The expert panel will comprise a mix of professionals with expertise in the fields of bulk water operations and accounting, environmental flow management, compliance and water licencing frameworks, and will be chosen by Department of Industry on the advice of the inter-jurisdictional group.

Its scope will be to independently review Snowy Hydro Limited's and Ministerial Corporation's performance to date, based on Snowy Hydro Limited's assessment, the issues raised in the submissions, a collection of AWOPs and an audit of the systems and processes in place to determine and demonstrate compliance.

The expert panel's findings and recommendations will feed into the development of the final report. It will not assume an ongoing compliance role.

Proposal 21—Expert review of performance

It is proposed Department of Industry procure an expert panel to independently review:

- Snowy Hydro Limited's assessment of compliance with its obligations of the Licence
- the appropriateness of the management approach taken to account for spills of SRIF and meet SMRIF targets
- The systems, procedures and frameworks in place to ensure Snowy Hydro Limited and Department of Industry can demonstrate Snowy Hydro Limited's compliance with the Licence.

Work plan

7.2 Snowy Hydro Limited assessment

Snowy Hydro Limited's submission to the 10 year review has sought to demonstrate its performance in meeting the conditions of the Licence. A copy of the submission can be accessed on the Water in NSW website (www.industry.nsw.gov.au/water). In summary, Snowy Hydro Limited is confident it has complied with all its obligations as follows.

It has complied with its administrative obligations by:

- making compliance reports publically available since 2010, outlining its performance against each of its obligations and a summary of its release requirements based on the relevant AWOP
- operating in accordance with the rights granted to it under clause 7
- preparing AWOPs each year in accordance with the content, timing and consultation requirements
- procuring an independent audit of its annual compliance based on ISO19011.

It has complied with its increased flows obligations by:

- working constructively with the Ministerial Corporation to implement, manage and monitor all increased flow requirements.
- constructing an outlet at Jindabyne Dam that can, and has, enabled flow rates of up to 5 gigalitres per day to the Snowy River below the dam
- endeavouring to remain within the operational tolerances of the specified annual, monthly and daily targets from Jindabyne and Tantangara dams and successfully delivering flushing flows from Jindabyne Dam when directed by Ministerial Corporation
- collaborating with the Ministerial Corporation to identify suitable release points and deliver SMRIF to all five catchments listed in the Licence in a way that sought to maximise the prescribed environmental objectives
- delivering SMRIF at a time and volume required by the Licence and Ministerial Corporation, noting the impracticalities of achieving the exact targets envisaged under the SWIOD.

It has complied with its water release obligations by:

- operating in accordance with the water available to each development and preservation of catchment-based inflows obligations
- ensuring actual release volumes meet the required annual release
- providing the required data to the Ministerial Corporation and collecting and verifying data in accordance with the required standards
- maintaining the required water accounts and detailing them in the AWOP.

7.3 Stakeholder issues

A number of stakeholder submissions raised issues with increased flows compliance, namely around the treatment and assignment of spills and unregulated flows to the SRIF program and the management of SMRIF.

7.3.1 Accounting for spills from Lake Jindabyne

In March 2012, Snowy Hydro Limited determined that 16 gigalitres spilled from Lake Jindabyne in excess of the specified daily SRIF release targets. Ministerial Corporation, with the support of Snowy Hydro Limited and WCLC, agreed these spills were the consequence of Snowy Hydro Limited holding Lake Jindabyne higher than it would have if it was not targeting releases from the dam in accordance with the SRIF program strategy.

The accepted rationale was that Snowy Hydro Limited could have delivered the annual target volume of 163 gigalitres by releasing a constant daily flow rate if the 1 May storage level was 903.1 meters without inflows.

Starting the year at this storage level would have had a 25% chance of achieving the required flushing flow, but would have been successful in preventing spills.

To achieve a greater chance of delivering the flushing flow event, Snowy Hydro Limited was required to target a higher storage level throughout the year, which prevented it from avoiding the spill. Thus, it was agreed the accounted spills of 16 gigalitres would not have occurred if Snowy Hydro Limited had not been required to prepare the storage for the flushing flow release.

In total, eight gigalitres was accounted as a borrow against SRIF in future years in accordance with Clause 16.1, Schedule 3 of the Licence. This equalled the balance of the SRIF account at the time of spill.

It was agreed the SRIF borrow amount would be repaid at a rate of two gigalitres per year over four years, commencing 2015–16. The volume is being repaid to below-target water reserves.

Numerous stakeholders dispute the decision to account the spills as SRIF, claiming they occurred due to a natural event and reflect the realities of water operations. They have sought that the eight gigalitres be paid back to the SRIF account.

7.3.2 Accounting of unregulated flows over Mowamba River and Cobbon Creek weirs

As stated earlier in the report, base passing flows are made in addition to releases of increased flows. This is reiterated in numerous clauses throughout the Licence, as well as the SWIOID. Base passing flow is defined in both instruments as:

- **with respect to the Snowy River**, the volume of nine gigalitres per water year from Jindabyne Dam plus the non-regulated flow past the relevant works on the Mowamba River and Cobbon Creek prior to the corporatisation date
- **in the case of the Upper Murrumbidgee River**, the long-term average volume of two gigalitres per water year from Tantangara Dam
- **with respect to works on the Snowy montane rivers**, the unregulated flow of the relevant river past the particular work prior to any modification to that work required under the Licence.

As acknowledged in the SWIOID (Clause 7.3), base passing flows contributed to the derivation of increased flows volumes under the Snowy Water Inquiry. Water recovery targets, when presented as percentage flow equivalents (for example 21% average natural flow of the Snowy River), comprise a volume of base passing flows, some of which are unregulated, in addition to regulated releases.

Concerns have been raised that the unregulated flow contribution over Mowamba River and Cobbon Creek weirs is being accounted as a regulated release of SRIF instead of base passing flows, consequently reducing the volume of water delivered down the Snowy River. It is asserted the impact could be as much as 2% of average natural flows over the long-term.

A lack of access to gauged flow data below Mowamba Weir and public reporting of unregulated flows to the Snowy River may be contributing to this view. With the exception of spills from Lake Jindabyne (under certain circumstances), the delivery of SRIF is accounted as water released by Snowy Hydro Limited to meet the daily, monthly and annual targets specified by the Ministerial Corporation. This is in addition to regulated base passing flow releases of nine gigalitres per year from Jindabyne Dam¹⁹ and unregulated flows, which are unaccounted for. Further, when delivering SRIF from Mowamba Weir, for example in recent experimental releases from the Mowamba Aqueduct, only releases up to the capacity of the aqueduct, excluding the existing base passing flow release, were accounted as SRIF.

7.3.3 Compliance with Snowy Montane Rivers Increased Flow targets

Numerous stakeholders have expressed concerns that the management approach developed by Snowy Hydro Limited and Ministerial Corporation for the SMRIF program is not meeting the SWIOID targets specified in the Licence.

Specifically, there are concerns that:

- the modifications to Snowy Hydro Limited's works cannot deliver the river reach or overall target flow volumes, pointing to a shortfall of 36.5 gigalitres in 2017–18—the first year when full allocations were available
- SMRIF cannot be delivered from Guthega or Island Bend Dams, thus failing to restore flow to the entire upper Snowy River
- A disproportionate amount of SMRIF is being delivered to the upper Murrumbidgee River at the expense of the upper Snowy River.

¹⁹ Base passing flows from Jindabyne Dam include a regulated release of 8.5 gigalitres per year from Jindabyne Dam and a riparian release of 0.5 gigalitres per year from Mowamba Weir.

7.3.3.1 Management of the SMRIF program

The SMRIF program implements environmental flow regimes for the Snowy montane rivers in line with Part 5, Schedule 3 of the Licence. Accordingly, the SMRIF program supports increased flows in the:

- Murrumbidgee River
- Goodradigbee River
- Geehi River
- upper Snowy River.

The program is governed by agreed annual target volumes for each river reach, a set of overarching environmental objectives and a requirement to determine specific objectives for each target river. It is supported by obligations on Snowy Hydro Limited to:

- modify works on these rivers to increase the amount of unregulated flow
- construct an outlet at Tantangara Dam to allow regulated flows of up to 1.5 gigalitres per day down the Murrumbidgee
- operate the works to deliver a defined volume of increased flows.

SMRIF program targets

The SMRIF program targets are prescribed at Table 1, Schedule 3 of the Licence. It replicates the agreed targets prescribed in the SWIOD for five catchments (or river reaches) within the Snowy Mountains Scheme.

Similar to the SRIF program, targets were set progressively over 10 years from the corporatisation in tandem with increases in water recovery. However, unlike the SRIF program, the targets are represented as forgone electricity generation, with the maximum target being 150 gigawatt hours per year. Final SMRIF program targets are presented in Table 5.

Modifications to works

Snowy Hydro Limited is responsible for modifying any works to pass the required SMRIF after seeking the advice of the WCLC. However, with the exception of Tantangara Dam, there is no obligation within the Licence to carry out major structural changes to any infrastructure.

In each instance, Snowy Hydro Limited assessed the inflows and engineering of each of the works within each catchment and recommended to the WCLC how and where modifications should be made²⁰.

The works identified as suitable release locations for SMRIF are presented in Table 5. These locations have been chosen to maximise the degree to which SMRIF will be delivered to meet the environmental objectives.

Each weir has been modified to either allow all water to pass downstream (i.e. 'transparent' releases) or, in the case of the Goodradigbee River, allow a proportion of the daily inflows to be released (i.e. 'translucent' releases). It is anticipated that the hydrological characteristics downstream of the weir under the modified flow regimes will reflect the hydrology of a Snowy montane river/stream.²¹

The weirs were selected as release locations rather than dams as they provide alternative ecological benefits not capable of being delivered via large dams and are simpler to implement.²²

As discussed earlier in the report, Snowy Hydro Limited has also met the obligations in the Licence to construct the outlet at Tantangara Dam capable of delivering 1.5 gigalitres per day. These works enable Snowy Hydro Limited to meet daily, monthly and annual volumes targeted under the SMRIF program, instead of relying on inflows.

Volume of increased flows

The volume of SMRIF to be made available is prescribed in clause 22, Schedule 3 of the Licence. The volume available annually depends on how much water is allocated to SRIF and where it will be released.

²⁰ Source: *Snowy Water Licence Review*, Snowy Hydro Limited Submission, 13 October 2017.

^{21,22} Source: Williams, S. (2017), *Release strategy for the Snowy Montane Rivers Increased Flows, 2017–18*. *Snowy Response Monitoring and Modelling Program*, NSW DPI Water, Sydney.

The Licence provides for a maximum volume equivalent to 150 gigawatt hours of forgone electricity generation across the five river reaches. How much electricity Snowy Hydro Limited is obliged to forgo each year is proportional to the volume of water available to SRIF. For example, when 212 gigalitres is allocated to SRIF Snowy Hydro Limited may be obliged to forgo up to 150 gigawatt hours of electricity generation in delivering SMRIF. If 106 gigalitres is allocated to SRIF (i.e. 50% of its maximum), then Snowy Hydro Limited may only be obliged to forgo up to 75 gigawatt hours of electricity generation.

A set of factors has been agreed between partner Snowy governments and Snowy Hydro Limited to convert forgone electricity generation to water volumes based on long-term average generation and release records. These conversion factors are secured in the Licence at Table 1, Schedule 3 and are shown in Table 5 below. Different conversion factors apply at different locations based on the impact SMRIF releases would have on electricity generation. Higher factors mean greater impacts and result in lower water volumes. Generally, higher factors occur when a release cannot be re-regulated by the Snowy Mountains Scheme downstream.

Accounting for Snowy Montane Rivers Increased Flow deliveries

As explained earlier, SMRIF releases from the weirs reflect catchment inflows to the weir pool because it is not practical to prescribe a daily flow target.

Accordingly, the SMRIF program sets for the weirs a long term annual yield rather than defined flow targets. This means the annual volume will average the nominated target over the long term, but will vary annually depending on the weather, reflecting the hydrology of the inflows. In wetter years the flow will exceed the long term target and in drier years the annual volume will be less than the target.

This means that weir releases are made and accounted for based on long-term historical or modelled data on a largely 'set-and-forget' basis. For example, where a weir is configured to target a passing flow of nine gigalitres, regardless of what volume actually passes that structure as a result of annual climatic fluctuations.

In contrast, releases from Tantangara Dam must be accurately targeted and released with any shortfalls or excesses to be made good in the following year. This allows Tantangara Dam to be used to manage any annual variations of SMRIF weir deliveries.

Variation of Snowy Montane Rivers Increased Flows program²³

To date, the allocation of water to the SMRIF program has varied each year. This variation has occurred due to a gradual increase in water entitlements, climate variability, operational issues at existing infrastructure, and optimising use of the available environmental water.

Until 2017–18, insufficient water has been available to meet the annual targets specified in the SWIOID, and there is also some uncertainty that the annual targets can be met with a full 150 gigawatt hour allocation. Achieving exact targets is difficult due to the nature of the works and what they can realistically deliver. Therefore, a conservative and staged approach has been implemented to ensure sustained long-term ecological improvements at each montane location.

The optimisation of water has primarily occurred via two mechanisms, by varying annual allocations to the upper Murrumbidgee River and the staged commissioning of each release location in the weirs program. The resultant average annual yield of the SMRIF program is presented at Table 5.

²³ Source: Williams, S. (2017), *Release strategy for the Snowy Montane Rivers Increased Flows*, 2017–18. Snowy Response Monitoring and Modelling Program, NSW DPI Water, Sydney.

Snowy montane rivers—weirs

Two variations to the SWIOID annual targets are currently being implemented in the Snowy montane rivers weirs.

Firstly, in the upper Snowy River catchment lower annual targets are being implemented. This lower target reflects issues associated with the overall available water, and a staged implementation within Perisher Range.

Secondly, in the Geehi River Catchment, a slightly higher annual target is being implemented. For the second year, an additional volume of 5.2 gigalitres per year is being released to the Geehi River via a tributary release on Strzelecki Creek. The annual SMRIF volume is expected to provide improved ecological outcomes for the Geehi River given the additional connectivity to higher altitude headwaters.

Snowy montane rivers—dams

The ability to actively manage environmental releases from Tantangara Dam to the upper Murrumbidgee River provides the flexibility to accommodate changes in total annual allocation to SMRIF.

In 2017–18, a greater allocation is provided to the upper Murrumbidgee River, as the 35.8 gigalitres will allow a better mimicking of the local hydrology across most of the year, and it will allow greater physical reworking of the river benthos and in-channel habitats during winter and spring. The poor in-channel habitat of the Murrumbidgee River is still deemed a constraint to river recovery. This type of reworking of the in-channel habitats appears to be limited with lower annual allocations.

Table 5 Summary of the Snowy montane river increased flows program

River reach/catchment	Target forgone electricity generation (GWh)	GWh conversion factor	Increased flow target (GL)	Modified works	Average annual yield
Murrumbidgee River	52.4	1.94	27.0	Tantangara Dam Outlet	35.8
Goodradigbee River	23.3	1.94	12.0	Goodradigbee River Weir	12
Geehi River	36.6	1.85	19.8	Middle Creek Weir Strzelecki Creek Weir	22.7
Snowy River – Gungarlin	20.6	0.71	29.0	Tolbar Creek Weir Diggers Creek Weir	18.9
Snowy River – Perisher/Rams Flat	17.1	0.57	30	Falls Creek Weir	3.4
Total	150	-	117.8	-	92.8

8. Snowy water management

As discussed in section 6.1, approximately 20% of the issues raised in the submissions did not fall within the review's terms of reference. These issues were generally concerned with the implementation of the Snowy Water Initiative and broader water resource management arrangements in the Snowy mountains region. They were not directly related to Snowy Hydro Limited's obligations under the Licence.

One possible explanation for the large number of issues raised out of scope is a lack of alternative opportunities to contribute to water resource management outcomes in the region. Necessarily, government oversight and interjurisdictional coordination was a focus in the years leading up to and following corporatisation and the Snowy Water Inquiry. However, this need diminished over time once the environmental water recovery task and works programs were delivered and the management of the Snowy Mountains Scheme and environmental water programs became business-as-usual.

Nevertheless, it is clear from the submissions that continued government oversight of Snowy Mountains water management remains an expectation of the community and the Victorian and Commonwealth governments.

8.1 Governance and coordination

The NSW Government is committed to the Snowy Water Initiative and on working to build community confidence in the way the Snowy River and Snowy montane rivers are managed.

With the significant water recovery task now complete, the NSW Government is reforming management arrangements to ensure the recovered water is used to its greatest effect. A number of changes are planned and are underway.

Firstly, the government is transferring responsibility for Snowy Mountains increased flows from Department of Industry to the OEH. OEH has suitably qualified and experienced staff to plan and deliver environmental flows for optimum outcome. It will support these tasks through scientific monitoring and evaluation, consistent with the activities it pursues in other river valleys. The formal transfer of functions is expected to be complete in 2018. Department of Industry will continue to administer the Licence and maintain oversight of Snowy Hydro Limited's operations.

OEH will be supported in its new role by the Snowy Advisory Committee, which will provide community and expert input to the design on the timing and pattern of SRIF releases to the Snowy River and the volumes and locations of SMRIF releases. The Snowy Advisory Committee will operate under a contemporary management framework that will ensure it can respond to community and government needs. Legislation establishing the committee commenced in January 2018. It will begin operating in the first half of 2018 and will advise the Ministerial Corporation on the pattern of increased flows from the 2019–20 water year onwards.

These reforms will bring Snowy Mountains environmental water management into line with other rivers in NSW.

It is also proposed to re-establish the Snowy Water Advisory Government Officials Committee (SWAGOC) to provide strategic advice and direction for water management in the Snowy River and Snowy Mountains, facilitate integration of activities between stakeholders, and set work priorities.

It is proposed the SWAGOC will:

- approve and/or review advice and recommendations concerning implementation of recommendations arising from the 10-year review of the Snowy Water Licence
- oversee the SWI/OID
- provide strategic advice and recommendations to the respective government ministers concerning key water management issues
- facilitate coordination of water management and complementary management activities in the Snowy River basin
- oversee communication of agreed management decisions.

Subject to the support of the Victorian and Commonwealth governments, the SWAGOC will meet within the first three months of the release of the final report. In the meantime, the inter-jurisdictional group set up to advise Department of Industry on this review will provide an intergovernmental forum to discuss broader Snowy water management issues.

Proposal 22—Snowy Water Advisory Government Officials Committee

The NSW Government will re-establish the Snowy Water Advisory Government Officials Committee to jointly oversee and coordinate water management in the Snowy Mountains and ensure the NSW, Victorian and Commonwealth governments continue to meet agreed outcomes from the Snowy Water Inquiry.

Improved management

8.2 Broader water management issues

The SWAGOC will provide another avenue to consider the broader environmental management issues raised in the submissions. The summary of submissions report will provide more detail on these issues and identify the means by which they will be considered further by the NSW and, if necessary, the Victorian and Commonwealth governments through the SWAGOC. The summary of submissions report will accompany the final 10-year review report.

Broadly, these issues relate to:

- the volume of water recovered and committed to be recovered under the Snowy Water Initiative
- monitoring and state of environment reporting
- scientific, community and Aboriginal input to environmental flow planning and program management
- complementary environmental management programs
- the management of RMIF.
- The impact of SRIF on access to downstream properties
- coordination and oversight of Snowy Mountains management responsibilities and compliance with legal commitments
- Snowy Water Initiative program funding
- Integration of Snowy water resource management with the Murray–Darling Basin Plan.
- the ‘2011 Snowy Water Licence Schedule 4 Amendments to River Murray Increased Flows Call Out Provisions’ sustainable diversion limit adjustment mechanism project
- protection of increased flows downstream of the Snowy Mountains Scheme
- Explanatory information around Snowy Mountains water resource management
- Potential impacts of Snowy 2.0 on western river releases and availability of SMRIF.

9. Implementation plan

Department of Industry will include a detailed implementation plan in the final report. It will contain three distinct phases, being:

1. initial administrative variations to the Licence
2. a plan for further investigations and a second round of Licence variations
3. implementation of improved Snowy Mountains management arrangements.

The three phases will run concurrently, with priorities recommended by Department of Industry after consulting with Snowy Hydro Limited and the project stakeholder groups and considering the public submissions.

The implementation plan will include project governance and consultation arrangements.

Department of Industry will oversee the implementation plan and put it into effect with the support of Snowy Hydro Limited, OEH, MDBA, WaterNSW, Victorian Department of Environment, Land, Water and Planning, Commonwealth Department of Agriculture and Water Resources and the South Australian Department for Environment and Water.

APPENDIX 1: List of stakeholder submissions

Department of Industry invited public submissions on the 10-year review between 28 June 2017 and 13 October 2017. The review received 24 submissions from a range of stakeholders including Snowy Hydro Limited, government agencies, environmental groups, community groups and individuals.

A G Andrich

Australian Dairy Industry Council

B R Dunn

C Ingram

Coleambally Irrigation Co-operative Limited

Commonwealth Department of Agriculture and Water Resources

Dalgety Chamber of Commerce

Dalgety District and Community Association

E Guarracino & R Valler

Environment Victoria

Gippsland Environment Group

I E Pottage

M Talbot

Murray Irrigation Limited

Murray–Darling Basin Authority

National Farmers' Federation

National Parks Association of NSW

New South Wales Irrigators' Council

Ricegrowers' Association of Australia

Snowy Hydro Limited

Snowy River Alliance

V Wallace

Victorian Government

WaterNSW