CHAPTER 7

EVALUATION AND CONCLUSION

7 Evaluation and conclusion

This chapter presents the overall impacts and benefits of Exploratory Works, with regard to strategic need, environmental, social and economic impacts.

7.1 Strategic need

The Snowy Scheme is the largest engineering project ever undertaken in Australia and is one of the largest and most complex hydro-electric schemes in the world. Its construction is seen by many as a defining point in Australia's history. Snowy 2.0 involves linking Talbingo and Tantangara reservoirs within the existing Snowy Scheme, and will increase the generation capacity of the Snowy Scheme by almost 50%. Snowy 2.0 will provide an additional 2,000 MW generating capacity, and make approximately 350,000 MWh (about 175 hours at full power) of storage available to the NEM at any one time.

The development of Snowy 2.0 is consistent with Commonwealth and NSW strategic planning and policy objectives, including the NSW Renewable Action Plan. With the planned retirement of generation powered by fossil fuels, there is a need for reliable electricity supply to counteract a decline in the reserve generation capacity available in the NEM. The development of Snowy 2.0 will play a key role in helping NSW and the broader NEM achieve energy system reliability and security, with relatively low costs and emissions. Compared with other alternatives, Snowy 2.0 provides:

- increased storage capacity, longer lifespan for storage, and cheaper full life cycle cost when compared to current lithium-ion storage batteries;
- more efficient dispatch of electricity to major load centres and less emission generation when compared to traditional electricity generating plants; and
- improved security and reliability of supply when compared to the intermittency of primary renewable energy sources (such as wind and solar).

Snowy 2.0 would also increase generation competition in the NEM at peak times, and thus exert downward pressure on peak energy prices and providing economic benefits to the consumer. The Feasibility Study delivered in December 2017 confirmed that Snowy 2.0 is economic, technically feasible and financeable (Snowy Hydro 2017).

Before the detailed design of the power station cavern for Snowy 2.0 can be finalised, Exploratory Works are needed to gain a better understanding of the underground conditions and confirm the precise location of the power station and its construction method. This requires excavating an exploratory tunnel. It is important to note:

- excavating exploratory tunnels are common practice internationally to inform design, and was completed for both Tumut 1 and Tumut 2 power stations; and
- the underground power station for Snowy 2.0 will be in the Ravine Beds geological unit, and there is limited existing information available given it is at much greater depth and in different rock conditions than Tumut 1 and Tumut 2 power stations.

Design and construction of excavations of the size and complexity proposed are highly dependent on the rock properties and structural geology at the identified locations. No existing Snowy Scheme tunnel or excavation currently intersects the Ravine Beds geological unit, and therefore it is extremely important to understand excavation conditions, water seepage, rock bedding and faulting conditions, particularly in the area of the power station cavern.

Should Exploratory Works not proceed prior to the main Snowy 2.0 project (the subject of a separate application and assessment process) there is a risk that a lack of information on rock conditions could lead to unsuitable areas being excavated which would in turn have several negative impacts including the potential for additional works and greater surface disturbance. This would result in increased environmental and social impacts, as well as risks to schedule, costs and safety. Exploratory Works has been proposed and is needed to ensure this critical information is available to finalise the design of the power station cavern for Snowy 2.0, should it proceed.

7.2 Design development and assessment principles

Consistent with the principles of ecologically sustainable development, Exploratory Works has been designed to avoid and minimise impacts where possible. In the first instance this has included consideration of site suitability based on design and construction needs, existing assets and infrastructure (such as road access), and environmental conditions. Lobs Hole is relatively remote, is accessed by a network of existing tracks, and has been cleared and disturbed by previous land uses. This has contributed to the ability to avoid and minimise impacts, in particular, impacts that would otherwise be associated with new access roads and clearing through undisturbed sites. As far as possible, works have been limited to previously disturbed land.

Snowy Hydro has been working with NPWS since the announcement of Snowy 2.0. Consultation on the Exploratory Works has been to ensure its development and design avoids and minimises impacts to biodiversity, heritage, recreation, and considers their long term objectives for land management in KNP.

The avoidance and minimisation of impacts has been carried through Exploratory Works as an iterative process between design and environment assessment, and supported by consultation activities. This process has been described throughout this EIS (see Chapter 4, 5, and 6). Exploratory Works has been informed and refined by the results of field surveys and consultation with key stakeholders, in particular NPWS and OEH. On this basis, a number of significant impacts on biodiversity, heritage, recreation and land use have been avoided and minimised.

An avoidance footprint has been defined by the EIS to limit the extent of direct impacts and disturbance. This is a commitment made by Snowy Hydro and will be implemented by the construction contractor(s) It is anticipated the construction method would be further refined during detailed design to ensure avoidance and minimisation objectives are met.

7.3 Biophysical, social and economic impacts

The Exploratory Works project area supports a variety of natural settings and landscape features including escarpments, ravines, rivers, creeks and reservoirs associated with KNP. It is also used for recreational pursuits such as remote camping at Lobs Hole and fishing in Talbingo Reservoir. There has been a long history of Aboriginal presence in the Snowy Mountains and the Walgalu people continue to have a cultural association with the region. The high country also has a rich history from early exploration, pastoralism and settlement, as well as the construction of the Snowy Scheme. A number of nearby townships were originally established as a result of the Snowy Scheme, some of which continue to support the Snowy Scheme's workforce today.

7.3.1 Biophysical environment

Impacts to the biophysical environment are likely to arise in two ways; via direct impacts from clearing of vegetation and ground disturbance, and via indirect impacts (eg water runoff, noise and light) to adjacent areas during construction activities. Following the avoidance and minimisation measures adopted through design, the main impacts concluded for Exploratory Works are described and assessed as follows.

i Conservation

Conservation values include biodiversity and heritage, which contribute to the overall values of KNP. Field surveys identified the Yarrangobilly River and associated riparian corridor as an area containing important ecological habitat for a number of native and threatened species, and high Aboriginal archaeological heritage values. The 50 m exclusion surrounding the Yarrangobilly River, accompanied by a suite of other relevant mitigation measures, will protect these values.

In locations that will be disturbed by Exploratory Works, most of the land has been previously disturbed and considered to be of low significance for Aboriginal archaeology. However, the land contains habitat for native and threatened fauna including the Gang-gang Cockatoo, Eastern Pygmy-possum, Booroolong Frog, Smoky Mouse and Masked Owl. Residual impacts to biodiversity are considered to be one of the most important issues to be managed during Exploratory Works.

The impacts on Smoky Mouse habitat is potentially the most serious and therefore specific limitations to design and construction along identified habitat on Lobs Hole Ravine Road have been recommended. The minor loss of native vegetation and impacts to threatened species will require offsets in accordance with legislation, and implementation of a biodiversity offset strategy will be determined in consultation with NPWS and OEH.

Over a hundred potential historic heritage items were identified including 16 considered to be of local significance. The majority of these sites have been avoided by Exploratory Works. For example, the Washington Hotel has purposely been excluded from the works by applying a 20 m buffer from the item to avoid impacts. However, five items considered to be of local significance are within the disturbance footprint. Four of these sites are associated with the former Lobs Hole Mine and will be subject to archival recording before any impacts to the items can occur. One site (Ravine cemetery) is within the disturbance footprint but has been recommended to be avoided during construction. While the majority of potential heritage items are not assessed to warrant protection or management, the material heritage at Lobs Hole is considered to be of value to the local community and individuals with historic ties to the area.

As part of the CEMP, residual impacts on conservation values will be managed through the implementation of a Cultural Heritage Management Plan and a Threatened Species Management Plan. Protocols will be put in place to manage any unexpected finds for threatened species, historic heritage and Aboriginal cultural heritage.

ii Land

The nature and location of Exploratory Works means that impacts on landform and soil characteristics, including ground movement and cave (karst) systems, is an important consideration. The disturbance footprint has been reduced as far as practical to avoid and minimise disturbance to landforms, soils and cave (karst) systems, and methods of excavation have been designed to create minimal seismic or subsidence risk. Identified geodiversity, a value of KNP, along Lobs Hole Ravine Road has largely been avoided with minor disturbance confined to one boulder scree/ block stream. Yarrangobilly Caves is approximately 8 km north east of the Exploratory Works project area and will not be impacted.

There are some isolated areas of existing contamination, mostly near Lobs Hole, but these do not present health risks and are generally avoided by Exploratory Works. The former Lobs Hole Mine is largely contained within the avoidance footprint to limit the potential for contamination impacts offsite.

Other areas of environmental concern are the site of the former settlement of Ravine and the local campsites where shallow contamination may be present due to past waste disposal, fuel leaks and agricultural activity. However, early soil sampling indicated no health risk and there is considered to be low potential for naturally occurring asbestos to exist

A range of mitigation and risk management measures will be implemented including erosion and sediment controls, surface rehabilitation and monitoring.

iii Water

Exploratory Works will include management systems to minimise disturbance to water resources by avoiding discharge to or extraction from the Yarrangobilly River, and implementing on-site controls for sediment and erosion, water re-use and for safe storage of chemical compounds. The works will have minimal influence on flood water behaviour and infrastructure will, as far as possible, be above the flood plain.

Key elements of Exploratory Works such as tunnelling, excavation and rock emplacement will, invariably, impact surface and groundwater systems. The potential issues include fine sediment in runoff, accidental spills, seepage at rock emplacement sites and changes to flow regimes from new infrastructure such as bridges. These impacts will, however, be minimised through further design and control measures.

Erosion and sediment controls will be an important management measure to prevent sediment laden and process water from being uncontrollably released to the environment. A water treatment plant will be built at the portal construction pad and a wastewater (sewage) treatment plant built at the accommodation camp, to ensure water quality objectives for discharge water to Talbingo Reservoir are met.

Sites where excavated materials are placed on land will be designed to be physically and chemically stable landforms. Monitoring of surface and groundwater will be designed to detect potential changes in water quality resulting from these areas.

The initial phase of subaqueous placement in Talbingo Reservoir has been designed to minimise impacts by selecting suitable placement locations, methods, and environmental controls. The strategy for managing and monitoring subaqueous placement will be confirmed in consultation with EPA. Additional investigations are currently underway and will be needed to inform the suitability of further placement, including geochemical analysis and hydrodynamic modelling.

There will be some localised drawdown of groundwater due to tunnelling but this will not adversely impact local ecosystems or vegetation potentially dependent on groundwater.

7.3.2 Social and economic

Impacts to social values are primarily connected to the amenity and conservation values of KNP as part of recreational uses. Social and economic impacts are also associated with the influx of workforce and contribution to local business and housing. The main impacts concluded for Exploratory Works are described and assessed as follows.

i Amenity and public safety

The construction associated with Exploratory Works will have potential to cause noise and vibration impacts, impacts to local air quality and visual amenity. However, due to the isolated and remote location many of these impacts are not perceptible to identified sensitive receivers. Predicted noise exceedance is primarily limited to one residence in Talbingo, for about six weeks during the upgrade of Spillway Road. Consultation with affected residents will be undertaken to determine appropriate management measures.

There will be additional vehicle movements to and from Lobs Hole, via Snowy Mountains Highway, Link Road and Miles Franklin Drive. The level of service of these roads will not change as a result of the Exploratory Works. However, roads within the construction area will be closed to the public during the Exploratory Works for public safety.

Other public safety risks are bushfire, the protection of essential services such as water supply, the transport and handling of dangerous goods, and emergency access and evacuation. These risks will be mitigated through design of buildings, construction areas and other assets to include appropriate bushfire protection standards and emergency access and evacuation protocols will be developed as part of an Emergency Response Plan.

ii Recreation

There will be temporary impacts (ie for the duration of Exploratory Works) on recreational visitors, predominantly at the remote area camping site at Lobs Hole (Ravine campground) and the water recreation pursuits on Talbingo Reservoir. The closure of the campground will be offset by enabling currently unavailable sites within the KNP to be opened to low impact camping as an alternative.

The works at Talbingo Reservoir also have potential to impact swimmers, water skiers, fishers and boat and other seasonal visitors. Works at the reservoir will be scheduled to avoid interruption during periods of peak visitor demand.

Recreational use of KNP is one of the objectives of the PoM. There will be long term recreational benefits and opportunities to be realised through upgrades to roads and facilities after Exploratory Works. These will enhance the capacity of the area for increased access and use, and provide for facilities to remain resilient to visitation.

iii Economic factors

Around 200 workers will be employed over the life of the Exploratory Works. Workers will be rostered on a 'swing shift' where they will likely work continuously (for example for two weeks) and then have time off before next shift (for example one week off). All workers will be accommodated on-site when they are rostered-on. Some employees will be sourced from the local labour force but most will FIFO and/or DIDO. It is estimated that up to 40 workers may relocate to live in local towns and there is sufficient local rental housing to cater for this need.

Exploratory Works has potential to impact service level providers, such as community services, facilities and infrastructure particularly in Cooma and Tumut, via the influx of the workforce to the local area. The social impacts on service level providers as a result of these population changes are predicted to be low as there will be no measurable impacts on the capacity of community services and infrastructure. This is based on the negligible population changes and the existing service and infrastructure capacity of service level providers within the local area.

This EIS provides estimates of the monetary value of all material costs and benefits associated with Exploratory Works. The costs and benefits have been compared transparently to provide an estimate of the project's net benefit.

7.4 Snowy Hydro's commitments

Snowy Hydro is committed to maintaining its excellent environmental track record of work within the KNP. The environmental management framework that will govern the avoidance, minimisation and management of impacts during the Exploratory Works has been set out to ensure responsibilities and accountabilities for environmental performance are clear (see Chapter 6).

Snowy Hydro's consultation with key stakeholders and the community is ongoing. Working together with NPWS is fundamental to achieving long term management objectives, and has been important in the development of Exploratory Works. Snowy Hydro has set out in its commitments, the ability for the Exploratory Works to be reversible (ie decommissioned and suitably rehabilitated) should unacceptable impacts occur or if Snowy 2.0 does not proceed. Snowy Hydro has also been working with NPWS to develop appropriate offsets for biodiversity and recreational uses, for predicted impacts.

7.5 Conclusion

Exploratory Works is essential to the final design of Snowy 2.0.

Snowy 2.0 is in the public interest as it will ultimately provide the ability to counteract the predicted shortfall in reliable electricity supply and generation capacity available in the NEM, as it transitions from a predominantly fossil-fuel based market to a renewable one. It will provide a reliable, secure and relatively low cost and emission solution compared to other alternatives.

Exploratory Works has been designed to avoid and minimise impacts where possible. The residual impacts have been identified and assessed. The key impacts of Exploratory Works are associated with direct and indirect impacts from vegetation clearance and ground disturbance, such as loss of native habitat for threatened species and potential changes to water quality from construction activities. During construction, a number of roads and walking tracks will need to be closed off to the public. On completion of Exploratory Works, most sites will be reopened, subject to the requirements of the Snowy 2.0 main project, currently in a design phase.

While there are some unavoidable impacts during the construction period, Exploratory Works will allow for a number of longer term benefits and contributions to KNP through a biodiversity offset program, improved access roads and recreational facility upgrades. The completion of Exploratory Works will also allow for the greater benefits of Snowy 2.0 to be realised.

Exploratory Works is considered to be justified and in the public interest because:

- it seeks to promote the management and conservation of resources, while also permitting appropriate development to occur which is in line with the objects of the EP&A Act;
- the benefits of Snowy 2.0 are in the public interest and will provide long term reliable energy, environmental and economic benefits;
- it is a necessary precursor to finalising the detailed design for Snowy 2.0. The exploratory tunnel is needed to understand the geotechnical conditions of the site for the underground power station;
- the design of Exploratory Works has been an iterative design and environmental assessment process to ensure impacts have been avoided and minimised as much as possible. This has included refining the design in consultation with NPWS and OEH;
- the environmental impact assessment has identified that residual impacts can be appropriately managed and offset in consultation with NPWS and OEH;
- consultation with NPWS, OEH and other key stakeholders has been undertaken to ensure appropriate management objectives are identified and incorporated into the construction and long term management framework for Exploratory Works; and
- Snowy Hydro has committed to the long term environmental management and rehabilitation of impacted sites, including removal, decommissioning and rehabilitation if needed. Therefore, should Snowy 2.0 not proceed, long term negative environmental issues can be reasonably avoided.