NATIONAL PARKS ASSOCIATION OF NSW
protecting nature through community action

Department of Planning, Industry and Environment
Major Projects Team
Attention: Anthony Ko

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National Parks Association of NSW submission on the Snowy 2.0 Main Works EIS

Introduction

The National Parks Association of NSW (NPA) was formed in 1957 to advocate for the creation of national parks and other protected areas as the primary means of safeguarding natural places for generations to come. More than sixty years later, we regard the Snowy 2.0 proposal as an extremely serious threat to the world-class conservation reserve system that grew from our advocacy.

Overview

Kosciuszko National Park (KNP) was gazetted as a conservation reserve to ensure that Australia's rare alpine landscapes are protected in perpetuity. The concept of perpetual protection is not simply a function of the NSW *National Parks and Wildlife Act* (NPW Act), but represents an internationally binding commitment to future generations. NSW has played a major role in establishing the international stature of the concept, with Royal and Ku-ring-gai Chase National Parks holding place as the second and third oldest national parks in the world.

National parks are not held in trust for undefined future purposes. The act of declaring a national park confirms that area's essential role in conserving our nation's natural and cultural heritage. Proposals that diminish a park's conservation, recreation and education values are inherently inconsistent with the purposes for which national parks are declared. In planning terms, this imposes an especially high level of sensitivity to any proposals that threaten the ecosystem processes or conservation values.

NPA has carefully reviewed Snowy Hydro's case for the Snowy 2.0 proposal. Rather than finding a compelling argument for damage to the national park, we conclude that the exhibited EIS trivialises the environmental impacts on KNP while overstating the claimed benefits to the Australian community. The Environmental Impact Statement (EIS) does not provide a thorough assessment of energy storage that avoid major impacts on the national park. Instead, the proposal is framed as though Snowy Hydro holds exclusive landowner rights over KNP and has no obligation to consider other ways of delivering the project's energy storage outcomes. We conclude that the EIS is driven by Snowy Hydro's commercial interests rather than the national interest.

Snowy 2.0 represents the single largest and most destructive development ever proposed for a NSW national park. Approval would undermine the integrity of the state's reserve network and set a powerful precedent for large-scale development in conservation reserves. We are particularly concerned by the implication that reserves are available for development provided a project makes claims for climate abatement.

This submission focuses the EIS for the Main Works. NPA concludes that the EIS systematically understates the environmental costs and overstates the benefits of the project, and that when the

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principles of Ecologically Sustainable Development are applied, the costs significantly outweigh the benefits. **We recommend that Minister Stokes (hereafter the Minister) refuse approval for the Snowy 2.0 Main Works EIS.**

Our submission begins with general comments about assessment process, then detailed comments on selected environmental issues before finishing with the claimed economic and community benefits of the project.

1 GENERAL COMMENTS

1.1 Environmental impact assessment process

NPA has previously corresponded with the Minister for Planning and the Department of Planning, Industry and Environment (DPIE) about the staged assessment of environmental impacts in a series of separate EISs. Our concern is that this makes it very difficult to grasp the full extent and impact of the project on KNP.

This issue is exacerbated by Snowy Hydro's assertion that their project is entirely separate to the installation of transmission lines to service the Snowy 2.0 power station. The transmission lines will be owned and maintained by Transgrid, however the only reason they will be constructed through KNP is to enable Snowy 2.0. The fractured assessment process invites the 'death of a thousand cuts' and obscures the true scale and impact of the project on the national park.

Recommendation:

- That the Minister considers all stages of the Snowy 2.0 project, including the construction of transmission lines, as essential context when assessing the merits of the Main Works EIS.

1.2 Development in a National Park

The EIS fails to reflect or account for the implications of proposing a major infrastructure project on land gazetted under the *National Parks and Wildlife Act* (NPW Act). It applies the standard environmental impact assessment process and shows little recognition of the purposes for which national parks are gazetted, nor the expectation that natural processes will be allowed to continue without disruption by development. Section 30E(2)(a) is particularly pertinent, stating that the central purpose of national parks is 'the conservation of biodiversity, the maintenance of ecosystem function, the protection of geological and geomorphological features and natural phenomena and the maintenance of natural landscapes'.

The essential purposes of national parks include ensuring that common species do not become threatened and protecting cultural sites in their full landscape setting. The EIS consistently ignores the fact that the proposed development site has been expressly set aside for the conservation of the full spectrum of environmental values. Instead the assessment focuses primarily on threatened species and fails to adequately consider the significance of impacts across the full spectrum of the park's natural and cultural heritage.

Recommendation:

- That the Minister considers the commitments to future generations, the nation and international community, embedded in the declaration of KNP as a national park.

1.3 Assessment of alternatives

NPA appreciates the requirement for additional energy storage capacity to support the transition to renewable energy sources. However, rather than demonstrating that Snowy 2.0 is both fully consistent with ESD principles and offers the lowest net environmental cost, the EIS contains a cursory assessment of alternatives. The assessed alternatives are all internal to the existing Snowy Mountains scheme, a limitation that reveals the assumption that Snowy Hydro has some form of property rights over the undeveloped portions of KNP.

The studies that are provided as demonstration of an assessment of alternatives in the EIS are nearly 30 years old. The primary study is not available for public scrutiny on the grounds of commercial in confidence and evaluated only four pumped hydro options within the existing scheme. This falls dismally short of a transparent evaluation of alternatives.

Snowy Hydro has alluded to Snowy 3.0 and 4.0 and plans to deliver a further 6000 MW of pumped hydro. NPA contends that, even within the Snowy Mountains scheme, there are alternatives must be fully assessed and disclosed as an essential step in the EIS process. The NSW Government's own NSW Pumped Hydro Roadmap[1] identifies more than 20,000 potential pumped hydro options across NSW, while the $75 million Emerging Energy Program recently awarded[2] grants for 10 pre-investment studies. The grants represent 2,150 MW of on-demand electricity for projects covering compressed air storage, batteries and pumped hydro, with a further 21 shortlisted projects offering another 700 megawatts.

Given the environmental sensitivity of Snowy Hydro's preferred site in KNP, it is imperative that they fully disclose options of lower environmental impact inside and beyond the existing scheme. The proposal ignores the obligation to consider alternatives outside the existing scheme, assumes non-existent property rights over KNP and is belied by the corporation's extensive interests outside the park.

The *Environmental Planning and Assessment Regulation 2000* requires 'an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure'. We urge the Minister to apply the spirit and intent of the regulation to the Snowy 2.0 project and require investigation of alternatives outside the national park.

There are numerous alternatives to Snowy 2.0, many of which could be completed before Snowy 2.0 (Attachment A). It is incorrect to assert that Snowy 2.0 offers the only short term, large scale option for energy storage. The EIS simply does not demonstrate that there are no feasible alternatives to proposed impacts on KNP.

Recommendations:

- That the EIS be revised to include a comprehensive evaluation of alternatives; and
- Any revised EIS be publicly exhibited.

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[1] "NSW Pumped Hydro Roadmap". December 2018 https://energy.nsw.gov.au/media/1546/download

[2] "NSW Government delivering an affordable, reliable and clean energy future" Minister for Energy 30 September 2019 https://energy.nsw.gov.au/nsw-government-delivering-affordable-reliable-and-clean-energy-future and https://energy.nsw.gov.au/renewables/clean-energy-initiatives/emerging-energy-program

1.4 Definition of the impacted area and the assessment of cumulative impacts

Snowy Hydro argues in the EIS and media that the construction footprint of Snowy 2.0 accounts for 0.25% of KNP and that the 'permanent' impact would be less than 0.01%. These figures are intended to demonstrate that the proposal will not have a significant impact on the environment. These assertions, which trivialise the extent of impact on KNP, are highly misleading.

KNP is highly diverse in terms of topography, landforms, vegetation communities, habitats and cultural landscapes. The park boundaries do not constitute an appropriate unit of analysis for the areas that will be damaged or destroyed by Snowy 2.0. Instead, assessment of the proportionate impact of the proposal should be based on the spatial distribution, extent and condition of comparable landforms, vegetation communities, habitats and cultural landscapes. The EIS does not provide such data fails to assess the quantitative impact of the proposal within relevant frames of reference The result is that the EIS cannot adequately analyse the extensiveness and/or irreplaceability of the areas to be impacted in their biophysical or cultural context. This failure negates the EIS's conclusion that the impacts on matters of national heritage, environmental and cultural value fall within acceptable limits.

Another problem is the shifting baseline phenomena. There are repeated references to the (unstated) impacted area and the 'unaffected' portions of KNP. This ignores the large areas of KNP that have already been damaged or destroyed by Snowy 1 (ie. impoundments, quarries, roads, power infrastructure, construction sites, transmission lines, access easements) and the resorts. Of particular concern is the cumulative impact of successive disturbances on a relatively small range of landforms associated with valley floors.

The failure to assess the cumulative impact of previous disturbances is contrary to the requirements of the Secretary's Environmental Impact Assessment Requirements and standard *Environmental Planning and Assessment Act* processes. Describing and quantifying previous disturbances is an essential part of evaluating the cumulative impact of the current proposal.

The stated development footprint in the EIS is 1,680 hectares, including more than a thousand hectares of native vegetation, the large majority of which is habitat to threatened species and threatened ecological communities. A construction footprint of 1,680 hectares is the largest development ever proposed in a NSW national park. Even this figure understates the full extent of environmental damage to KNP. It is unclear whether it includes Asset Protection Zones for the new infrastructure, and it doesn't seem to include the indirect impacts on the Talbingo and Tantangara Reservoirs, the c.100 kilometres of new and upgraded roads, 10 kms of transmission lines, or most importantly, the areas that will suffer from changes in ground water availability. When all of these areas are taken into account, we estimate that Snowy 2.0 will permanently damage more than 10,000 hectares of KNP. Attachment B detail the derivation of this total.

In summary, the claim that only 0.25% of KNP would be impacted by Snowy is incorrect and highly misleading. The lack of a rigorous frame of reference for the assessment of the spatial extent of proposed impacts is a serious shortcoming in the exhibited EIS. The absence of appropriate frames of comparison is particularly problematic in relation to those natural and cultural heritage values where landform diversity strongly influences spatial distribution, notably Aboriginal Cultural Heritage, threatened species, threatened ecological communities and ground water dependant ecosystems.

In addition to the spurious claims about the size of the development footprint the EIS argues that the 'permanent' footprint of the proposal is only 0.01% of KNP. The argument is that post-construction works will restore KNP to its original condition. This assertion betrays a fundamental lack of understanding of ecosystem processes, threatened species and the technical limits of environmental restoration. The project involves each worksite being cleared of vegetation, soil and wildlife and used for construction purposes for several years before being covered in spoil, contoured and planted. The Snowy Hydro claim requires that the resultant areas are fully equivalent to the indigenous habitats that were destroyed. NPA recognises the place of environmental restoration in the mitigation of the impacts, but definitely rejects the false view that such works effectively neutralise the loss of environmental value.

Recommendation:

- That the EIS be revised to correct the inaccurate description of the spatial extent of environmental impacts and provide an assessment of the cumulative impacts of the proposal; and
- The revised EIS be publicly exhibited.

1.5 Deferred planning and assessments

The EIS describes a range of potential impacts whose assessment, significance and mitigations have been deferred to subsidiary plans to be prepared and approved at a later time. This approach is highly problematic due to the lack of certainty about the intensity of environmental impact and the feasibility of neutralising those impacts through mitigative measures. Of particular concern in this respect are the management of ground-water, the disposal of contaminated spoil, the long term control of pests, weeds and pathogens, and the implementation of offsetting for biodiversity impacts.

The nature and scale of these unresolved threats casts doubt on whether the Minister can have confidence that proposed mitigations are even feasible. For example, it is very difficult to envisage any mitigations that will permanently stop Climbing Galaxias from entering the habitat of Stocky Galaxias. There is a high probability that the first major flood event will see the Climbing Galaxias penetrating into the other species' habitat and drive the Stocky Galaxias into extinction.

The disposal of asbestos contaminated tunnel spoil will require a solution of a permanence and scale that may well exceed all of the other works currently described in this EIS, hardly an issue for deferral to post approval planning

Finally, one of the major impacts of Snowy 2.0 is the threat to groundwater dependent ecosystems. There is no guarantee that grouting of the tunnel lining will be permanently effective in controlling the loss of groundwater, and no strategy is proposed to monitor the loss of groundwater and remediation works if the water-proofing fails.

Recommendations:

- That the EIS process be suspended pending the completion of all subsidiary plans involving unresolved environmental impacts and/or undefined mitigations;
- Snowy Hydro be required to demonstrate the feasibility of all proposed mitigations and the adequacy of funding streams to implement current and future mitigations; and
- The subsidiary plans be publicly exhibited.

1.6 Offsets and irreplaceability

NPA objects in principle to the use of biodiversity offsetting procedures in situations where there is no prospect of securing a 'like-for-like' outcomes that achieves a no net loss outcome. The unacceptable scale and intensity of impacts on threatened species and ecological communities is one of the reasons why we believe the proposal should be refused in total.

The EIS states that like-with-like offsets are preferred for biodiversity impacts but acknowledges that this is likely to be impossible given the lack of comparable habitats on private land. This failure reflects the irreplaceability of the landscapes and habitats that will be lost and, combined with the scale of that loss, more than justifies the Minister's refusal of project approval.

The unacceptable scale of environmental impact is reflected in the requirement for an estimated 32,118 ecosystem credits and 44,100 species credits. Applying the Biodiversity Conservation Trust fixed prices as a conservative guide, this suggests compensation of more than $100 million in payments or funded works. The actual market value of the credits will inevitably be higher than this estimate given the irreplaceability issues and may well exceed $200 million. The EIS does not provide an estimate of the likely costs of offsets, which would have provided the community with a tangible indication of the scale of proposed environmental impact.

The Offsetting Strategy and Mitigations Table propose a variety of measures to be finalised in consultation with DPIE, Commonwealth and other authorities. The proposed mitigations are heavily weighted towards improving information about the species, ecological communities and values rather than funding actions that would improve their long term survival through habitat improvement or threat reduction. The lack of proactive improvements is particularly startlingly in respect to the control of the most apparent threats to the natural heritage values of KNP, namely feral horses, deer and pigs. Despite referencing to the *Caring for our Australian Alps Catchments* report by Worboys and Good (2011), the EIS doesn't indicate which elements of the strategy would be implemented.

NPA has serious concerns that the proposed offsetting process would provide Snowy Hydro with excessive control over the selection and funding of mitigations. The proposal to have a single 'upfront' payment is highly problematic, breaking any linkage between funding and the outcomes of the monitoring of the effectiveness of offsetting and mitigation actions. The failure to rehabilitate all of the Snowy Hydro's previous construction sites underlines both the challenges of environmental restoration in the alpine region and the loss of leverage to compel the developer to complete the restoration task.

Recommendations:

- That the project be refused to avoid the need to calculate or generate biodiversity offsets;
- Any agreed offsetting and mitigation agreement should be fully disclosed and publicly exhibited; and
- Any offset agreement should include performance thresholds triggering further payment by the proponent if impacts exceed predictions.

1.7 Contribution to renewable energy

Snowy Hydro claims that Snowy 2.0 will play a pivotal role in the National Energy Market (NEM) by stabilising the addition of renewable generation to the grid. However, the performance data in the

EIS seriously undermines these claims. Snowy 2.0 will consume 30% to 40% of the power it ultimately transmits to the grid due to the 'round trip' losses between pumping and generating. The timing of demand and excess power availability over the 24 cycle will result in most of the power consumed by Snowy 2.0 coming from coal-fired power stations for at least the next decade, potentially extending the profitability and service life of those facilities. Recent media and academic debate about Snowy 2.0 demonstrates that Snowy Hydro's assertions about its role in the NEM are broadly contested.

The other major operational claim for Snowy 2.0 is that it will have the capacity to generate 350 GWh over a 7 day period. Our analysis indicates that this quantum of power would only be available in the most exceptional of circumstances, and that the practical recyclable capacity of Snowy 2.0 is considerably less than the claimed figure.

Recommendation:

- That the EIS be revised to provide a realistic appraisal of the energy generation capacity of Snowy 2.0, fully accounting for the operational limitations of achieving maximum delivery; and
- The revised EIS be publicly exhibited.

2. DETAILED COMMENTS ON ENVIRONMENTAL IMPACTS

2.1 Defining the development area

The EIS states that 'the configuration of the project takes advantage of existing reservoir infrastructure and is constructed almost entirely underground in order to minimise the surface impacts of the works.' This assertion is contradicted by both the Project Area and the disturbance footprint as described in the EIS.

The Project Area[3] is defined as 'the extent within which direct impacts from Snowy 2.0 Main Works are anticipated'. It covers approximately 2,500 square km (250,000 ha), a third of Kosciuszko National Park or a similar size to the Australian Capital Territory. The development works, while concentrated in the vicinity of the 27 km corridor between Tantangara and Talbingo, will affect the full project area to some extent.

The dispersed impacts throughout the Project Area have particular relevance to environmental attributes that occur on a landscape scale. These include the visual character, aesthetic and wilderness values of the alpine landscape, all of which have been degraded by previous development. Similarly landscape scale biodiversity impacts include the fragmentation of habitats and species distributions and the dispersal of pests, weeds and pathogens.

The EIS lacks an adequate assessment of dispersed impacts across the broad Project Area, instead focusing on the areas associated with the disturbance footprint and permanent installations.

The EIS states that the disturbance footprint of the proposal is 1,680 hectares. This represents an immense area of disturbance, four times the size of Lane Cove National Park, and unprecedented in a

[3] "Project Area" is *"the broader region within which Snowy 2.0 will be built and operated, and the extent within which direct impacts from Snowy 2.0 Main Works are anticipated".* Summary page 12.

NSW national park. However, even this estimate only accounts for those areas where construction works are proposed. It doesn't include several environmental impacts that are equally attributable to the proposal and relevant to the terms of the EIS. These include changes to water quality, substrate and margins within the two impoundments (due to the modified water management regimes) and the areas affected by the loss of ground water. When such additional issues are included NPA estimates that the full extent of impact is in the order of 10,000 hectares. Attachment B details the derivation of this total.

NPA asserts that the true extent of environmental impact on KNP is at least 3 orders of magnitude greater than is described in the EIS, that is, in the order of 10,000 rather than the claimed 99 hectares. The understatement of impacted areas fundamentally compromises the proponent's assessment of environmental impacts.

Recommendation

- That the EIS be revised to address the full scope and extent of proposed environmental impacts on KNP; and
- Any revised EIS be publicly exhibited.

2.2 Biodiversity impacts

2.2.1 Fauna and flora

The EIS only assesses biodiversity impacts within the acknowledged disturbance footprint (ie. 1,680 hectares), which as argued above significantly understates the area subject to environmental impacts. Within this constrained assessment framework, the EIS states that an area of at least 1,053 of native vegetation will be damaged or destroyed. Most of this vegetation is classified as habitat for one or more of fourteen threatened species or Threatened Ecological Communities. The EIS calculates these losses will require compensatory works or payments equivalent to 32,118 ecosystem credits and 44,100 species credits. NPA notes that our proposed re-evaluation of the impact area would significantly increase both the loss of threatened species/communities and the value of required biodiversity credits.

NPA has been unable to find a NSW development project that has accrued so many biodiversity credits, and no previous development in a national park that has destroyed so much native vegetation. The threatened species and community assessments under the BAM methodology demonstrate the irreplaceability of the vegetation communities and species that would be destroyed by the proposal. The absence of any credible opportunity for 'like-for-like' offsetting emphasises the exceptionally adverse level of impact. The proposed impacts on the biodiversity values of KNP are unprecedented and the scale and intensity of impact if approved, warrants an equally exceptional package of offsets and mitigations.

A biodiversity impact that stands above all others is the potential for Snowy 2.0 to cause the extinction of the Stocky Galaxias, a species endemic to the area impacted by the project. The potential mechanism for extinction would be through the dispersal of the Climbing Galaxias into its habitat. There appears to be a negative correlation in the distribution of the two congeners and it is likely that the Climbing Galaxias would displace and thereby make the Stocky Galaxias extinct.

The efficacy of the proposed mitigation for this outcome, the installation of a physical barrier to the upstream movement of the Climbing Galaxias, is highly problematic given the dispersal capabilities of

the species during high water events. The result is that extinction remains a serious risk. The fact that the species is so recently discovered that it has not be declared as threatened in no way diminishes the risk and consequence of failure to protect its only known population.

Hydro schemes have a proven track record of endangering galaxiid species to the point of extinction[4]. The risk of extinction of the Stocky Galaxia is unacceptably high, and on this basis alone project approval should be denied.

NPA is concerned that the details of proposed mitigations are not fully developed in the Offsets Strategy and there is no indication that any final agreements with the NPWS and Commonwealth will be publicly disclosed. It is imperative that there is full public disclosure of the financial terms, biodiversity credits and mitigation works proposed to offset the biodiversity impacts. A useful step towards such transparency would be the publication of the financial value of the biodiversity credits, particularly once these have been adjusted to reflect the expanded disturbance footprint.

The proposed biodiversity mitigations are mostly focused on refining the impact assessment through further survey and monitoring works, rather than offering immediate improvements to the resilience and recovery of the site's biodiversity. A high priority for immediate action to improve the overall condition of KNP would be the control of feral species including horses, deer and pigs.

One of the major impacts of the proposal on biodiversity values will be the construction of new roads and the widening of existing roads. The EIS describes the new roads to be constructed but omits data on the extent of clearing and widening around existing roads. It is not clear whether these impacts have been included in the calculation of biodiversity impacts, however they would have a more pervasive impact through the fragmentation of habitat and by providing a vector for the expansion of pests, weeds and diseases throughout the Project Area. No detail is provided on the biodiversity or heritage impacts of the new roads, including any details on potential mitigations such as fauna under passes or overpasses. The lack of assessment of one of the most severe impacts of the proposal fatally compromises the validity of the proponent's position on the impacts of Snowy 2.0.

An especially concerning aspect in relation to roads is the direct impact on both threatened and protected fauna within and adjacent to the impacted area. This include a number of terrestrial species that are highly vulnerable to roadkill, including Eastern Pygmy Possum. The proposed mitigation in the EIS is to impose speed limits. The small size, relatively small size and dispersal requirements of these species guarantee that they will regularly cross the new and more intensely used roads at night. The single most effective means of reducing the impact of the proposal on native fauna, including threatened fauna, is to limit the use of construction roads after dark. Heavy vehicles should be prohibited from all night-time operations and appropriate protocols put in place for the night time use of private vehicles by construction staff.

An adaptive management program should be established to monitor and respond to loss of native fauna during the construction period. This would begin with the preparation of Population Viability Analyses (PVA) for each of the threatened and/or nocturnal native fauna. The purpose of the PVA is to establish numeric thresholds for individual mortality events beyond which fauna populations are at risk of local extinction. Daily counts of deceased fauna would be required across the construction

[4] see https://theconversation.com/australian-endangered-species-tasmanian-galaxiids-21884

sites including access roads. Should the numeric thresholds are exceeded, or other evidence emerges in relation to the viability of the local populations, additional mitigations including a prohibition on night-time traffic should be implemented.

NPA opposes approval of the project for reasons that include the scale and intensity of biodiversity impacts, including the serious potential to cause the extinction of an entire species, the Stocky Galaxias. Moreover, NPA does not accept that application of biodiversity offsets mitigates these impacts, especially in a situation where there is no prospect of 'like-for-like' conservation outcomes. Should the Minister determine to approve the project despite these compelling issues, NPA does not support a single up-front compensatory payment by the developer. Any compensation should be based on a staged payment schedule that links expenditure to the progress of proposed mitigations. Any mitigations must be subject to monitoring and funding must be available to enable necessary adjustments beyond the construction phase of Snowy 2.0.

Recommendations:

- That project approval be denied on the grounds of the intensity and scale of impacts on threatened species, threatened ecological communities, including the risk of making the Stocky Galaxias extinct, and the overall severity of biodiversity impacts on an area declared as national park under the *National Parks and Wildlife Act*;
- The EIS be revised to include a calculation of biodiversity credits that encompasses the full extent of directly and indirectly impacted habitats;
- A revised EIS be publicly exhibited;
- Offsets must include a multi-decade program for monitoring, review and adaptive management;
- DPIE to develop peer reviewed conditions to guarantee that the project will not result in the extinction of the Stocky Galaxias; and
- Night-time construction traffic movements be prohibited; and
- An adaptive management program be implemented to ensure that local fauna populations are not driven to extinction.

2.2.2 Groundwater dependant ecosystems

The EIS describes intense and extensive impacts on ground water dependant ecosystems due to tunnelling through the underlying groundwater systems. The adverse impacts are predicted over an area extending up to several hundreds of metres either side of the 27 kilometre long tunnel. Direct impacts are predicted along Gooandra Creek, the upper Eucumbene catchment and Yarrangobilly catchment. The EIS suggests that impacts will be most intense during the construction phases but acknowledges that there will be permanent damage to the groundwater systems. NPA estimates that the total area impacted by reduced groundwater availability is in the order of 5,000 hectares.

The environmental impact of groundwater changes will be most acute in relation to groundwater dependant ecosystems, including alpine and sub-alpine peatlands, damp herbfields and fens, sedgelands, wet grassland and Sub-alpine grassland. Additional biotic impacts include the aquatic fauna in streams with reduced or lost stream flows. The EIS estimates that more than 17 hectares of ground water dependant Threatened Ecological Communities will be damaged or destroyed.

The ground water dependant ecosystems of the alpine region represent some of the most significant habitats of KNP and the broader Australian Alps. Apart from their high biodiversity value, a reflection

of high levels of endemism and climate-controlled species distributions, these systems are integral to the quality and quantity of water flowing into the major catchments of eastern Australia.

Ground water dependant ecosystems are highly threatened throughout KNP as a result of previous disturbance, weeds and most importantly, the impacts of feral horses, deer and pigs. In this context, any proposal that further degrades the resilience and condition of ground water dependant ecosystems must be considered as a significant impact. The EIS's conclusion that 'the regional effects on the catchment surface water flows are considered insignificant' is unsupportable.

The EIS argues that the severity of impacts on the ground water system can be mitigated through the grouting of voids between the tunnel walls and linings. However, this assertion does not appear to be coupled with a commitment to long term monitoring to ensure that it proves, and remains, an effective mitigation.

Recommendations:

- That project approval be denied due to the unacceptable risk of large-scale adverse impacts on ground water dependant ecosystems'
- Any approval that might be issued for tunnelling should be staged to enable real time monitoring of the efficacy of grouting in controlling impacts on the ground water system;
- The intervals at which monitoring is conducted should be no more than a kilometre, and further tunnelling should not be permitted until the monitoring of each stage is complete;
- If monitoring demonstrates that the grouting is not effective then approval for further tunnelling works would be denied , with approval to be withdrawn if it proves ineffective in stopping the loss of groundwater; and
- A long-term monitoring program be established over the entire area of potentially affected ground water dependant ecosystems, with any resultant future mitigations to be fully funded by Snowy Hydro.

2.3 Pests, weeds and pathogens

Pests, weeds and pathogens are the greatest threats to world biodiversity along with habitat loss, climate change and inappropriate fire regimes. The impacts of pests, weeds and pathogens might be less obvious than those of clearing native vegetation, however they can be just as ecologically severe and have extend well beyond the immediate development site.

The removal of existing vegetation and massive disturbance of soil profiles will provide excellent conditions for the proliferation of weeds throughout the disturbance footprint. Mitigation measures, including follow up weed control, will need to extend over decades rather than years to ensure effective suppression of weeds. This requirement sits poorly with the proposed single payment model for biodiversity offsets.

The increased fragmentation of the park and presence of thousands of workers within the construction camps will increase opportunities for feral species including foxes, cats and rats. These species predate upon or compete with native fauna and/or consume native vegetation, again spreading the impacts of the proposal far beyond the disturbance footprint. If the project is approved Snowy Hydro must retain accountability for resourcing the ongoing management of pests in and around the development site.

The proposal's large scale exchanges of water between previously distinct reservoirs and catchments introduces acute threats from aquatic pests and diseases. These include the dispersal of Redfin Perch, a Class 1 Noxious Pest, into previously Redfin free waters including Tantangara Reservoir. Other aquatic pests include Eastern Gambusia, a known predator of the tadpoles of threatened frogs, and the Wild Goldfish. Aquatic weeds include Elodea, a highly invasive species with the capacity to propagate from tiny fragments. This group of aquatic pests will adversely impact on a range of aquatic environments with significant conservation values precisely because of the absence of these exotic species.

Catchment connectivity means that the proposal would eventually impact on hundreds of kilometres of currently uninfected waterways. The EIS notes 'the potential transfer of noxious species (fish and/or fish disease) between Talbingo and Tantangara reservoirs, and into associated catchments', including Epizootic Haematopoietic Necrosis Virus, a pathogen with the potential to destroy currently unaffected populations of native fish. Similarly the proposal has the potential to disperse a species of algae 'implicated in harmful algal blooms that are currently in Tantangara Reservoir that could be transferred to Talbingo Reservoir'.

Once transferred between the two reservoirs 'the pest species could eventually spread upstream and downstream into the Murrumbidgee River catchment and downstream into Lake Eucumbene and connected reservoirs, unless adequately contained'. Assessment of the environmental impacts of this outcome, a critical requirement for the EIS, is limited to the statement that such introductions 'would inevitably pressure native and threatened species'.

The expansion of pests will have severe implications for the visitor amenity of KNP, potentially displacing iconic recreational species such as Brown Trout with the less valued Redfin Perch.

The EIS proposes the development and design of three barriers to prevent the further dispersal of aquatic pests, weeds and pathogens once they become established Tantangara Reservoir. The proposed barrier on Tantangara Creek is designed to prevent Climbing Galaxias from entering the habitat of the Stocky Galaxia (see comments above).

The other two physical barriers are location of the Tantangara Outlet to the mid and lower Murrumbidgee and at the entrance to the Murrumbidgee-Eucumbene tunnel. Both barriers would be challenged by spillage during periods of high flow, let alone periodic breakdowns or human error. None of the barriers offer plausible, long term guarantees and a single failure is all that is required for an irreversible transfer of aquatic pests.

It is inappropriate to defer the refinement of mitigations to a *Weed, Pest and Pathogen Management Plan*, particularly given the very reasonable doubts about the availability of effective mitigations and controls.

Recommendations:

- That the EIS not be approved due to the guaranteed transfer of several aquatic pests, weeds and pathogens into catchments that are currently free of those threats;
- The EIS be revised to include assessment of the environmental impacts of expanded pest, weed and pathogen distributions and to provide details on long- term pest, weed and pathogen management within and adjacent to the development footprint;

- Any pest, weed and pathogen management strategy should include adaptive management triggers.

2.4 Aboriginal cultural heritage impacts

The surveys conducted for the EIS have revealed a minimum of 335 Aboriginal cultural heritage sites in the proposed disturbance footprint. The discovery of sites is limited by the small proportion that was subject to subsurface investigation or otherwise exposed for examination, suggesting that the true number of sites in the disturbance footprint will be in the thousands.

This result provides fresh insight into the truly pervasive nature of Aboriginal connections to the alpine region, particularly the along valley floors and major waterways.

All of the identified sites are proposed for destruction, with a sample of artefacts to be excavated or collected. The linkages between the indigenous landscape and the sites it contains will be irrevocably lost.

The assessment of the significance of these sites dismisses this remarkable reminder that the alpine region was, forever remains, Aboriginal land ,with the statement that 'The Aboriginal artefact distribution in the project area does not surpass significance thresholds which would act to preclude the proposed impacts'.

The rationale appears to rest once upon the incorrect claim that only 0.25 % of KNP will be impacted by the proposal, with an additional observation that there are billions or even trillions of flaked stone artefacts across the Australian continent.

Both arguments suffer from the issues addressed in Section 1.4 above. The question is not whether there are other Aboriginal cultural heritage sites in KNP, but rather how the ones that would be impacted by the proposal compare to those in similar landscape and environmental contexts, how many already been lost to past disturbances, and thereby assess the cumulative impact of the proposed additional loss on the region's cultural heritage. The DPIE guidelines for the assessment of Aboriginal Cultural Heritage Assessment Reports expressly require an assessment of cumulative impacts. Attachment P does not satisfy this requirement.

Recommendations:

- That project approval be denied due to the excessive loss of irreplaceable Aboriginal cultural heritage;
- The EIS be revised to include assessment of the significance of the project's cumulative impact on the Aboriginal cultural heritage of the alpine region; and
- The revised EIS be publicly exhibited.

2.3 Visual and aesthetic impacts

One of KNP's core social values is the sense of wilderness and solitude that visitors experience amongst the alpine landscapes.

These aesthetic qualities of KNP will be seriously diminished by the proposed proliferation of roads, permanent large structures and transmission lines. Locations that provide clear viewscapes without the intrusion of electricity infrastructure have become increasingly rare in KNP. As noted in Section 1.4 above, the entire EIS fails to adequately assess the impacts of the proposal in the context of the impacts of previous development. The cumulative loss of viewscapes unobstructed by electrical infrastructure risks shifting public perceptions of the park from a conservation reserve to a landscape defined by industrial development.

Contrary to Snowy Hydro's spurious claims that only 99 hectares of KNP would be permanently impacted by Snowy 2.0, the EIS documents the permanent loss of high significance viewscapes and aesthetic values throughout (and indeed beyond) the 250,000 hectare Project Area. The EIS acknowledges that the significance of such impacts is particularly severe in a national park setting, where 'landscape sensitivity is high due to their location within the natural settings provided by Kosciuszko National Park'. The EIS concludes that there are no feasible mitigations for the intense impacts on the aesthetic qualities of the park, which will be particularly severe within the visual catchments of Lobs Hole (especially the greatly widened road), Talbingo and Tantangara.

Recommendation:

- That project approval be denied on the grounds of the excessive and permanent impacts on the aesthetic qualities of KNP.

2.6 Water impacts

Consistent with NPA's position that Snowy Hydro has consistently understated the true extent of environmental impacts of the proposal, the EIS package describes a changes to the water quality of the major reservoirs that would occur during the operation of Snowy 2.0. Adverse environmental impacts include an increased potential for harmful algal blooms and the dispersal of aquatic pests, weeds and pathogens (see above). Discussion in the EIS is limited to the two major reservoirs and fails to address the potential for more diffuse downstream impacts across the affected catchments.

The increased fluctuations in water levels has the potential to further increase the impacts of illegal vehicle access and feral horses on the periodically exposed residual soils around the edge of reservoirs. The altered water management regime will also result in the loss of recreational amenity for anglers and campers due to the increased fluctuations of water levels and the introduction of new pest species.

Recommendations:

- That the EIS be revised to address the full extent of impacts associated with changes to water regimes, including increased erosion around the reservoir catchments and the environmental and community impact of algae blooms; and
- Any revised EIS be publicly exhibited.

2.7 Waste and contamination impacts

The EIS indicates that the tunnelling and other excavation works would require the disposal of 9 million cubic metres of hardrock, which after excavation will expand to an estimated volume of 12.9 million to 14.6 cubic metres. The EIS foreshadows further increases to these quantities for reasons including widening the tunnels.

Approximately 25% of these wastes are potentially contaminated by asbestos fibres while more than 50% are assessed as having acid forming properties. The result is that the large majority of the truly immense quantity of waste that would be produced by the proposal is severely contaminated.

The EIS proposes that most of the excavated material will be placed into the active storage of Talbingo and Tantangara reservoirs, with the balance to be used for road works and landforming. In this context 'landforming' is thinly veiled code for dumping millions of cubic metres of contaminated waste in a national park.

The EIS provides no basis for concluding that this quantity of contaminated waste can be managed without permanent, adverse impacts on KNP and catastrophic impacts on the health of visitors and wildlife. NPA utterly rejects the proposition that dumping contaminated waste in a national park is ever acceptable, let alone disposal at the scale proposed in the EIS. This proposal would set an international precedent for abuse of a protected area, inflicting serious damage on Australia's reputation as a credible advocate for global environmental causes.

Remarkably the EIS defers the development and assessment of potential mitigations for contaminated waste to a yet to be prepared *Asbestos Management Plan* and *Excavated Material Management Plan*. It is entirely unacceptable that such a critical aspect of the EIS process be deferred, particularly given the long-term persistence of the threats to human and environmental welfare and the serious doubts about the technical feasibility of any effective mitigation strategies.

Our objection to the dumping of tunnelling waste in KNP is not contingent on the materials being contaminated. Even if the health and environmental risks associated with the contamination could be managed, the disposal of waste in these quantities requires an unacceptable level of modification to the park's original landform and habitats.

The construction of Snowy 2.0 would result in the emission carbon dioxide through various processes including the production of steel and concrete, transport and soil disturbance. As a net consumer of electricity the proposal will contribute to further carbon emissions by drawing upon power from coal fired sources. It is remarkable that, despite claiming that the project will have positive carbon abatement outcomes at the national scale, the EIS does not include a lifecycle assessment. In the absence of such an assessment it is not surprising that several commentators have suggested that the project may well have a perverse outcome and actually result in a net increase in noxious emissions.

Recommendations:

- That approval for the proposal be refused on the basis of the unacceptable environmental impacts associated with the disposal of more than ten million cubic metres of mostly contaminated waste;
- The EIS be revised to address the disposal of any waste outside the boundaries of KNP, a comprehensive account of how that waste could be managed without adverse health and environmental outcomes, and a full assessment of lifecycle and greenhouse gas emissions; and
- Any revised EIS be publicly exhibited.

2.8 Site specific environmental impacts

The comments above cannot the full spectrum of environmental impacts associated with the proposal. Additional specific concerns include:

- Lob's Hole- the impact of road widening on the geodiversity heritage sites described as the Ravine block streams, the Ravine tufa and Devonian fossil beds;
- Lob's hole- the management of contaminated waste in temporary storage and the permanent modification to landform through permanent dumping;
- Marcia- the impact on the visual character of the alpine zone due to the headrace surge shaft and ventilation shaft;
- Marcia- the loss of large areas of Smoky Mouse habitat.

- Tantangara and Talbingo- the loss of recreational amenity around the reservoir margins due to the increased fluctuations in water levels;
- Tantangara and Talbingo- visual impacts of the exposed surfaces;
- Tantangara and Talbingo- increased downstream discharge of sediments due to increased substrate disturbance and turbidity; '
- Powerlines and communication cables- the EIS does not provide details on whether the lines are to be buried or overhead, or an assessment of the absolute and relative environmental impacts of each option; and
- Roads- increased potential for motor vehicle accidents due to construction traffic and future restrictions on access to visitor destinations such as Tantangara.

3. CLAIMED BENEFITS OF THE PROJECT

A critical component of environmental impact assessment is the application of Environmentally Sustainable Development (ESD) principles. This requires that the claimed economic and community benefits of a proposal have sufficient merit, and credibility, to justify the predicted environmental costs. NPA contends that the claimed benefits of the proposal are overstated and fall far short of providing a net benefit to the community when compared to the extreme environmental impacts.

NPA fully supports the transition to renewable sources of generation and the associated need for additional energy storage. However, neither the information provided in the EIS or in any other Snowy Hydro communications offers a convincing case that Snowy 2.0 is the best means of providing that storage.

3.1 Claimed benefits for the National Energy Market

The following addresses the six 'key benefits' presented in the EIS as justification for the proposal

Claim 1- A significant contribution to the continued decarbonisation of the economy

Snowy 2.0 will be a net consumer of electricity, not a net generator. For every 100 units of electricity used to pump water up to Tantangara Reservoir, only about 70 units will be generated when that water flows back down through the turbine generators to Talbingo Reservoir. In other words, the proposal is no more than 70% efficient consuming significantly more energy than it delivers.

Every hour that Snowy generates 2000 MW will require nearly 1½ hours of pumping to replenish the water used. Putting it another way, if Snowy 2.0 ever generated its claimed 350 GWh of energy, it would take 500 GWh of pumping to be re-charged, incurring 150 GWh of losses. Snowy 2.0 will consume 43% more energy for pumping than it generates [(500-350)/350].

Pumped hydro stations pump when prices are cheap and generate when prices are high. The current situation is illustrated in the 'daily power demand' figure in the EIS. This shows that pumping occurs from 12 am to 6 am *and* generation occurs from 5 pm to 8 pm. Pumping in the early hours of the morning will be derived predominantly from coal-fired base load plant. The result is that for as long as coal remains the primary base load generator, ie. at least the next decade, Snowy 2.0 will be 'storing' significant quantities of coal-fired generation, not solar and wind generation. This pattern will not change significantly until the late 2030's.

Rather than support the transition to renewables, Snowy 2.0 will increase coal-fired generation and extend the life of those generators.

Contrary to Claim 1, the proposal will:

- Consume more than 40% more energy than it generates;
- Derive most of that consumed energy from coal-fired generators over the next decade; and
- Produce a net increase in emissions and extend the life of coal-fired generators

Claim 2- Snowy 2.0 will improve the overall efficiency of the National Energy Market

All forms of energy storage (pumped storage hydro, batteries etc) may improve the overall efficiency of the NEM by storing excess energy and generating at peak times. However, the value of a specific storage solution depends on its efficiency and cost effectiveness compared to feasible alternatives. Snowy 2.0 performs poorly in such comparison.

As well as a 'round-trip' loss of 30% within the pumping/ generation cycle, there are also losses in transmitting electricity to and from Snowy 2.0 of typically 3-5% each way relative to the regional reference nodes, or up to 10% when including the distribution network losses. So, for every 100 units of electricity purchased by Snowy 2.0 for pumping, it will only deliver about 60 units to the Sydney and Melbourne load centres. Snowy 2.0 requires 170 units of pumping energy to deliver 100 units of electricity.

By comparison, the newer batteries are typically over 90% efficient. Their losses are less than one-third that of Snowy 2.0. Further improvements in battery efficiency and cost are anticipated.

Snowy 2.0 is located a considerable distance from the major generation centres (Hunter Valley and Latrobe Valley) and load centres (Sydney and Melbourne). It is far preferable to locate energy storage as close as possible to load centres to minimise transmission losses and constraints. The claimed advantage of being approximately mid way between Sydney and Melbourne is offset by the costs of being 500 km or more away from either load centre.

For example, if Snowy 2.0 is compared to solar PV generation with local storage batteries distributed around the power system at residential premises, there will be a further ~10% heating loss incurred in the transmission/distribution networks in each direction for Snowy 2.0 compared to zero such losses for the local PV systems. Thus, if Snowy 2.0 generated 350GWh only 315GWh would be delivered to residential consumers and residential solar PV sources would need to export 526 GWh in order to deliver the 500GWh at Snowy 2.0 for pumping.

When the Snowy 2.0 cycle is compared to solar PV/battery systems on an overall system basis, Snowy 2.0 would consume ~67% more energy [(526-315)/315] than it could effectively deliver to consumers, whilst solar PV/battery systems would only need to produce 10% more energy.

Contrary to Claim 2, the proposal:

- Offers a highly inefficient form of energy storage in comparison to alternative options; and
- Is not ideally located for distribution to major load centres.

Claim 3- Snowy 2.0 provides large-scale energy storage at least cost

A key claim for Snowy 2.0 is a cyclic energy storage capacity of 350 GWh, enabling generation for up to 175 hours. The EIS claims that this distinguishes Snowy 2.0 from all other energy storage options.

NPA's analysis of the veracity of these claims is addressed in detail in Attachment C, which addresses projected project costs, and Attachment D, which analyses the energy storage capacity of the proposal. Further detail is provided in our Paper *Snowy 2.0 Doesn't Stack Up*, available at https://npansw.org/npa/campaigns/protect-our-parks/kosciuszko-national-park/snowy-2-0/

Rather than repeat the details of those arguments in this submission our conclusions in respect to Claim 3 can be summarised as:

- Snowy 2.0 is unlikely to ever be called upon to generate 2,000 MW for 7 days;
- The energy storage capacity of Snowy 2.0 is significantly less that presented;
- The total cost of the Snowy 2.0 project, including transmission, will be approximately $10 billion;
- Large, complex infrastructure projects rarely come in on budget;
- Snowy 2.0 appears to be financially unviable;
- Snowy 2.0's cost is greater than its market benefit;
- Snowy 2.0 is not the least-cost energy storage on the market;
- The advantage of using two existing reservoirs is more than offset by the large distance between them;
- Snowy 2.0 is only a closed system when it is operating at the lower end of its theoretical capacity;
- That theoretical energy storage capacity, based on the volume of water that can be cycled between its two reservoirs, is 240 GWh;
- Snowy 2.0's practical recyclable capacity, based on the volume of water that can be cycled up-and-down between its two reservoirs, is 40 - 200 GWh; and
- If Snowy 2.0 were required to generate to maximum capacity the water would be exported to Blowering and cannot be returned.

Claim 4- Snowy 2.0 can run for 7 days

A major constraint on Snowy 2.0's purported pumping/generating cycling is that whenever Tantangara Reservoir is emptied down to its minimum operating level it will take many months to refill.

In theory, Tantangara could be refilled in about 11 days of continuous 24 hour/day pumping (allowing for a 30% loss factor). But this would not be possible as there would be insufficient water in Talbingo, being two-thirds the capacity of Tantangara. It does not make economic sense to generate at Tumut 1 & 2 to refill Talbingo at the same time as Snowy 2.0 was pumping, thus limiting the amount of water from Tumut 1 & 2 to non-Snowy 2.0 pumping periods.

Usually it would not be financially viable to run Snowy 2.0 pumps for more than 5-8 hours/day at 2000 MW (ie. when the spot price is 'cheap'). It could well be less hours/day, as if Tantangara were emptied it is likely to be during a period when wholesale prices were high due to stresses within the National Electricity Market (NEM) that triggered extended Snowy 2.0 generation in the first place.

To run a plausible best-case scenario, if Snowy 2.0 pumped for 6 hours/day at 2,000 MW, it would take about 45 days to fill Tantangara, at just over 5 GL/day. Coincidentally, 5 GL/day is about the maximum rate at which water from Eucumbene can be transferred to Talbingo via Tumut 1 and Tumut 2 generating for 12 hours/day, which is likely to be the maximum daily period for economical

generation. So, 45 days is the minimum time it would take to refill Tantangara, ignoring any direct inflows to Tantangara and avoiding any net drawdown of Talbingo.

This best-case scenario assumes no generation by Snowy 2.0 during that 45-day period. But it is likely to be profitable to run Snowy 2.0's generators for at least some of those days, especially if prices were high. Obviously, any Snowy 2.0 generation depletes the water pumped back to Tantangara and requires 1.4 times that period for pumping back uphill to replenish that water. The net amount of water pumped back up to Tantangara would be determined by the prevailing electricity price spreads. Any unavailability or breakdown of the Tumut 1 or Tumut 2 generators or the Snowy 2.0 pumps would extend the time to refill Tantangara.

So, in practice it would be expected to take more than 3 months to fill Tantangara and for Snowy 2.0's full capacity to be 'available' again. In reality, emptying Tantangara is at best a once-a-season shot.

Contrary to Claim 4:

- If Snowy 2.0 were run to 'empty' it would take many months to be recharged.

Claim 5- Snowy 2.0 has a 100 year design life and will operate for generations to come.
Tumut 3, a similarly sized pumped hydro station (1800/600 MW) to Snowy 2.0, has been significantly underutilised during its 50-year life. In 7 of the 17 years from 2002 to 2018 pumping occurred for less than 10 days per year, while in 2013 Tumut 3 pumps didn't run at all. Over the past decade Tumut 3 pumps have operated on average for 281 hours per year at a capacity factor of just 1.6%.

Snowy 2.0 cannot be justified until Tumut 3 is near full capacity, otherwise it would be supplanting an existing, fully depreciated asset. Historical operation is not directly translatable to the future, but at least for this decade the market situation is unlikely to be significantly dissimilar for Snowy 2.0.

At a Senate Estimates hearing on 21 October 2019, Mr Broad stated that
As my colleague just said, Snowy 2 is required today. With a swing of 9,000 megawatts, and Snowy 2.0 is 2,000 megawatts, we're underdone already. As the market operator has pointed out, with the transition that's going on in the marketplace, the investment in renewables, you're going to need many more 2.0s.

However Dr Bruce Mountain, Director Victorian Energy Policy Centre, offered a strong rebuttal of those claims[5]
Specifically, on that day Snowy Hydro generated 4207 MWh in total. This is just 0.83% of the NEM's total generation for the day.

And how much did the Tumut 3 pumped-hydro station pump or generate on that day? Well, it pumped nothing, and it generated 1 MWh (0.000199%) of NEM production for the day). So on a day that Snowy Hydro argues emphatically proves the need for a massive augmentation of pumped hydro, in fact we find no such need at all.

[5] "Snowy 2.0: Who will be held to account for this giant folly?" https://www.vepc.org.au/post/snowy-2-0-who-will-be-held-to-account-for-this-giant-folly

To the contrary existing capacity lies barely used, as has long been the case."

Contrary to Claim 5:

- Snowy 2.0 is not needed till Tumut 3 pumped hydro station is at capacity; and
- Snowy 2.0 is definitely not required now.

Claim 6- Snowy 2.0 will lower electricity prices

Snowy Hydro claims that Snowy 2.0 will lower electricity prices. The EIS contains no evidence to justify this claim. On the contrary, a Snowy Hydro own market modelling [6] predicts Snowy 2.0 will push NSW spot prices higher after 2030 (to 2047). Remarkably, prices are only predicted to be lower with Snowy 2.0 for 3 of the projected 22 years. Prices are similar from 2028 to 2033, but higher for every year thereafter.

Contrary to Claim 6:

- Snowy 2.0 will increase electricity prices.

3.2 The case for review

NPA, along with many expert analysts supports Dr Mountain's recommendation[7] that it is time to press the pause button on the financial investment Snowy 2.0 pending a comprehensive independent valuation:

These facts put Snowy 2.0 in a completely different light. There are many competing alternatives that can provide storage far more flexibly for a fraction of Snowy 2.0's price tag. These alternatives would also have far fewer environmental impacts or development risks, in most cases none of the transmission costs and could be built much more quickly.

It is always difficult to press the pause button on a major project once it has begun. But the evidence for doing this is overwhelming. In pursuit of the public interest, the federal government should put the project on hold and ask a reputable investment bank to publicly advise, perhaps through the Productivity Commission, what Snowy 2.0 would be worth if built.

A credible independent valuation would establish with some confidence how deeply Snowy Hydro will have its hands in the public's pockets. A panel of independent experts should then be asked to publicly advise whether taxpayer money is needed to meet the demands of a renewables-dominated power system, and if so, the best way it should be spent."

[6] "Final Investment Decision Information – Market Modelling" Snowy Hydro January 2019 https://www.snowyhydro.com.au/our-scheme/snowy20/fid/

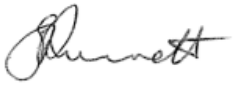
[7] "Snowy 2.0 will not produce nearly as much electricity as claimed. We must hit the pause button" The Conversation 15 October 2019 https://theconversation.com/snowy-2-0-will-not-produce-nearly-as-much-electricity-as-claimed-we-must-hit-the-pause-button-125017?utm_medium=email&utm_campaign=Latest%20from%20The%20Conversation%20for%20October%2015%202019%20-%201434613584&utm_content=Latest%20from%20The%20Conversation%20for%20October%2015%202019%20-%201434613584+CID_a85d01531ffae203f1b8bc15a5df505f&utm_source=campaign_monitor&utm_term=Snowy%2020%20will%20not%20produce%20nearly%20as%20much%20electricity%20as%20claimed%20We%20must%20hit%20the%20pause%20button

CONCLUSION

NPA strongly objects to the Snowy 2.0 proposal because of the unprecedented scale and intensity of damage it would inflict on Kosciusko National Park.

We would be pleased to provide further information and advice on the Snowy 2.0 proposal. Executive Officer Gary Dunnett can be contacted on 9299 0000 or at garyd@npansw,org.au

Yours sincerely



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