

Investment Evaluation Summary (IES)



Project Details:

Project Name:	SIWES - Endangered Species
Project ID:	00690
Business Segment:	Distribution
Thread:	Overhead
CAPEX/OPEX:	CAPEX
Service Classification:	Standard Control
Scope Type:	D
Work Category Code:	SIWES
Work Category Description:	Wildlife Endangered Species Protection
Preferred Option Description:	Continue 2018/19 mitigation retrofit program.
Preferred Option Estimate (Dollars \$2016/2017):	\$4,750,000

	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29
Unit (\$)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Volume	68.00	68.00	68.00	68.00	68.00	68.00	68.00	68.00	68.00	68.00
Estimate (\$)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total (\$)	\$950,000	\$950,000	\$950,000	\$950,000	\$950,000	\$950,000	\$950,000	\$950,000	\$950,000	\$950,000

Governance:

Works Initiator:	Mandy Fish	Date:	25/09/2018
Team Leader Endorsed:	Darryl Munro	Date:	20/11/2018
Leader Endorsed:	Nicole Eastoe	Date:	20/11/2018
General Manager Approved:	Wayne Tucker	Date:	22/11/2018

Related Documents:

Description	URL
NPV - SIWES	http://reclink/R1191364
Conductors and Hardware – Distribution AMP	http://reclink/R260427
Overhead Line Structures - Distribution AMP	http://reclink/R799669
TasNetworks Business Plan 2017-18	http://reclink/R779008
TasNetworks Risk Management Framework	http://reclink/R238142
TasNetworks Corporate Plan - Planning period: 2017-18	http://reclink/R745475
TasNetworks Transformation Roadmap 2025	http://reclink/R764285
National Electricity Rules (NER)	http://www.aemc.gov.au/Energy-Rules/National-electricityrules/
Environment Protection and Biodiversity Conservation Act 1999	https://www.legislation.gov.au/Details/C2016C00777
Threatened Bird Incident Risk Mitigation Plan	http://reclink/R1195446
External Stakeholder Meeting Minutes	http://reclink/R1195439

Section 1 (Gated Investment Step 1)

1. Overview

1.1 Background

Bird strikes on the distribution network are the cause of 9 per cent of unplanned outages (with known causes) and 5 per cent of ground fire starts in Tasmania. They occur either at the pole-top or mid-span, when a bird either bridges a conductor and a grounded element when perching, or bridges two phases when colliding with the line when flying. This has a significant impact on TasNetworks reliability and bushfire mitigation risk profiles.

An increasing number of these bird strikes are concerned with threatened birds, with 33 Tasmanian threatened birds reported as killed by electrocution in the 2017/18 financial year. This is an increase of more than double since the 2016/17 financial year and directly impacts TasNetworks' environmental sustainability and corporate reputation risk profiles.

TasNetworks has had a Public Authority Management Agreement (PAMA) in place since 2008, which is currently under review. It stipulates that Aurora Energy, now TasNetworks, will work with the Department of Primary Industries, Parks, Water and Environment (DPIPWE) to strategically mitigate TasNetworks' impact on threatened species. If TasNetworks fail to strategically manage their impact on threatened species, the Environment Protection and Biodiversity Conservation Act 1999 will be breached.

TasNetworks has implemented a number of risk controls, outlined in the referenced risk mitigation plan and external stakeholder group discussion minutes, which have reduced both the likelihood and severity of threatened birds coming into contact with certain network assets. However, the number of threatened bird incidents remains unacceptable in terms of TasNetworks risk appetite for other overhead network infrastructure and continued implementation of the annual mitigation works is required.

TasNetworks' target is to reduce the number of threatened bird incidents per annum and maintain a Medium risk profile. Note that there is no exact target for the number of threatened bird incidents per annum which is deemed acceptable. There is currently uncertainty regarding the population of the Tasmanian wedge-tailed eagle, the threatened bird most impacted by TasNetworks (29/33 incidents), and therefore TasNetworks cannot accurately state when its impact will be reduced to a level that does not negatively affect their population at this time.

However, it was last estimated that around 1000 Tasmanian wedge-tailed eagles remain in the world, with the capability to only raise their population at a maximum by 2 per cent (around 20 eagles) per year. This suggests that TasNetworks' impact is significant on the population of this threatened bird. TasNetworks is currently engaging with external stakeholders to undertake research into the population for the Tasmanian wedge-tailed eagle.

1.2 Investment Need

The distribution network presents an environmental risk to Tasmanian threatened birds. This risk has been classed as Medium, yet unacceptable in terms of TasNetworks risk appetite, due to the significant number of threatened bird fatalities by electrocution in recent years.

The secondary risks of threatened bird strikes with the distribution network include bushfire ignition, reduced customer reliability, legislation breach and negative corporate reputation, resulting in financial losses due to the response required by TasNetworks if these risks were to eventuate.

The proposed program will implement risk controls to effectively reduce both the likelihood and severity of threatened birds contacting the electricity network.

1.3 Customer Needs or Impact

TasNetworks continues to undertake customer engagement as part of business as usual and through the voice of the customer program. This engagement seeks in depth feedback on specific issues relating to:

- how its prices impact on its services;
- current and future consumer energy use;
- outage experiences (frequency and duration) and expectations;
- communication expectations;
- STPIS expectations (reliability standards and incentive payments); and
- Increasing understanding of the electricity industry and TasNetworks.

Consumers have identified safety, restoration of faults/emergencies and supply reliability as the highest performing services offered by TasNetworks. Consumers also identified that into the future they believe that affordability, green, communicative, innovative, efficient and reliable services must be provided by TasNetworks.

This program specifically addresses the requirements of our customers in the areas of environmental sustainability and reliability of supply.

1.4 Regulatory Considerations

This project is required to achieve the following capital and operational expenditure objectives as described by the National Electricity Rules section 6.5.7(a) Forecast capital expenditure:

- (1) meet or manage the expected demand for standard control services over that period;
- (2) comply with all applicable regulatory obligations or requirements associated with the provision of standard control services;
- (3) to the extent that there is no applicable regulatory obligation or requirement in relation to:
 - (i) the quality, reliability or security of supply of standard control services; or
 - (ii) the reliability or security of the distribution system through the supply of standard control services, to the relevant extent;
 - (iii) maintain the quality, reliability and security of supply of standard control services; and
 - (iv) maintain the reliability and security of the distribution system through the supply of standard control services; and
- (4) maintain the safety of the distribution system through the supply of standard control services.

2. Project Objectives

This continuous program proposes to mitigate the environmental sustainability, bushfire ignition, customer reliability, legislative, corporate reputation and financial risks associated with threatened bird strikes on the distribution network.

3. Strategic Alignment

3.1 Business Objectives

Strategic and operational performance objectives relevant to this project are derived from TasNetworks 2017-18 Corporate Plan, approved by the board in 2017. This project is relevant to the following areas of the corporate plan:

- We understand our customers by making them central to all we do;
- We enable our people to deliver value; and
- We care for our assets, delivering safe and reliable networks services while transforming our business.

3.2 Business Initiatives

The business initiatives reflected in TasNetworks Transformation Roadmap 2025 publication (June 2017) for transition to the future that have synergy with this project are as follows:

- Voice of the customer: We anticipate and respond to your changing needs and market conditions.
- Network and operations productivity: We'll improve how we deliver the field works program, continue to seek cost savings and use productivity targets to drive our business.
- Electricity and telecoms network capability: To meet your energy needs and ensure power system security, we'll invest in the network to make sure it stays in good condition, even while the system grows more complex.
- Predictable and sustainable pricing: To deliver the lowest sustainable prices, we'll transition our pricing to better reflect the way you produce and use electricity.
- Enabling and harnessing new technologies and services: By investing in technology and customer service, we'll be better able to host the technologies you're embracing.

4. Current Risk Evaluation

The qualitative risk evaluation summarised in section 4.1 below shows the untreated risk associated with a do nothing option. It equates to a worst case scenario of inherent risk associated with a particular asset. A lower level of likelihood and / or consequence may be applied as part of the sensitivity analysis when calculating the total risk cost as part of the quantitative options analysis.

The risks associated with threatened bird strikes on the distribution network include environmental sustainability, bushfire ignition, customer reliability, legislative, corporate reputation and financial risks. The overall risk rating is Medium, however is unacceptable as per TasNetworks Risk Mitigation Framework due to TasNetworks significant impact on threatened birds. TasNetworks therefore must proactively act and put a treatment plan in place to maintain the risk as Medium, yet reduce the number of threatened bird incidents per annum.

4.1 5x5 Risk Matrix

TasNetworks' business risks are analysed utilising the 5x5 corporate risk matrix, as outlined in TasNetworks Risk Management Framework.

Relevant strategic business risk factors that apply are as follows:

Risk Category	Risk	Likelihood	Consequence	Risk Rating
Customer	Although 8 per cent of threatened bird strikes are concerned with outages, the short duration and low number of customers concerned with these outages means that the appropriate risk rating is Low.	Unlikely	Negligible	Low
Environment and Community	Estimated that for every 20 threatened bird deaths, TasNetworks impact on the species is major. This is in line with Tasmania's wedge-tailed eagle, where there is an estimated 1000 eagles remaining and can only increase population at a maximum of 2 per cent (20 eagles) per year. The appropriate risk rating is Medium.	Unlikely	Major	Medium
Financial	TasNetworks' required response to the eventuation of the environmental sustainability, bushfire ignition, customer reliability, legislative, or corporate reputation risks. E.g. TasNetworks fined 50,000 penalty units per wedge-tailed eagle fatality if found non-compliant with the Act. This risk rating is Low.	Unlikely	Minor	Low
Network Performance	Although 80 per cent of threatened bird strikes are concerned with outages, the short duration and low number of customers concerned with these outages means that the appropriate risk rating is Low.	Unlikely	Negligible	Low
Regulatory Compliance	Estimated that for every 33 threatened bird deaths (once per year at current strike rate), compliance to the Environment Protection and Biodiversity Conservation Act 1999 will be questioned and TasNetworks will receive a 50,000 penalty unit fine. This risk rating is Low.	Unlikely	Minor	Low

Reputation	Estimated that for every 20 threatened bird deaths, the local/state media will develop a story. This is in line with TasNetworks previous experience of appearing in media articles related to threatened birds. This risk rating is Low.	Unlikely	Minor	Low
Safety and People	<p>Staff less engaged with potential to resign due to TasNetworks' lack of commitment to ensuring environmentally sustainable operations. This risk rating is Low.</p> <p>0.3 per cent likely for a threatened bird incident to cause a grass fire resulting in <\$500k damage due to broken conductors, EDO operation or carcass alight. This risk rating is Low.</p>	Rare	Negligible	Low

Section 2 (Gated Investment Step 2)

5. Preferred Option:

Option 1 is the preferred option. It satisfies the objectives outlined in Section 1 of this Investment Evaluation Summary (IES), balancing risk reduction with customer affordability. Option 1 is the continuation of the current mitigation program, and thus does not see an increase in expenditure.

The benefits of this option include an overall risk reduction associated with threatened bird strikes on the distribution network, by reducing both the likelihood and severity of threatened birds coming into contact with distribution network assets and is the preferred economic option based on NPV analysis including cost of risk.

5.1 Scope

Install bird mitigation devices in high-risk areas, at a rate of 68km per year, to mitigate the unacceptable risks associated with threatened birds contacting TasNetworks' distribution overhead infrastructure. This specifically includes retrofitting bird flight diverters mid-span on conductors, and bird perches at the pole-top.

Live-line work is preferred where appropriate to limit outages.

5.2 Expected outcomes and benefits

The expected outcomes and benefits of the preferred option are as follows:

- reduce TasNetworks negative impact on the environment, specifically the fatality frequency of endangered birds due to overhead infrastructure;
- reduce TasNetworks business risks by mitigating contact between endangered birds and the overhead network;
- alignment with strategic asset and risk management plans;
- compliance with relevant regulatory requirements; and
- meet performance objectives identified in TasNetworks Corporate Plan 2017.

5.3 Regulatory Test

The asset retrofits within this program do not require a Regulatory Investment Test for Distribution (RIT-D) as per the requirements of the NER.

6. Options Analysis

Completion of options analysis has been undertaken using a modified Net Present Value (NPV) tool, to include Risk Cost. Risk Cost represents the expected annual cost of risk events (\$ million) associated with the failure of asset. The business as usual case (BAU) base case definition applied in the options analysis is aligned to AER repex planning guideline. The NPV outcomes for all options considered, is relative to the BAU base case. The NPV tool has also been modified to include a Basis of Preparation. This enables increased transparency of the methodology and analysis undertaken, outlining methodology, key inputs, key assumptions. The Risk Cost methodology is represented as below:

Annual Asset Risk Cost = Probability of Asset Failure (PoF) * Asset units (No) * Likelihood of Consequence of Failure (LoC) * Cost of Consequence (CoC).

The analysis of all options is aligned with the Australian Energy Regulators application note for asset replacement planning, to ensure alignment of our approach. The risk cost categories, likelihood and consequence ratings are aligned with TasNetworks Corporate Risk Framework. The categories can also be mapped to the AERs repex planning guideline.

AON, TasNetworks corporate insurer provided Cost of Consequence (CoC) and Likelihood of Consequence (LoC) data. We have also analysed our assets and sought additional benchmarked data to develop Likelihood of Failure, Likelihood of Consequence and Cost of Consequence when it can be obtained.

The summary of costs outlined in section 6.3 below indicates the planned capital expenditure for repex over the 2019-24 period.

6.1 Option Summary

Option description	
Option 0	No planned capital investment.
Option 1 (preferred)	Continue 2018/19 mitigation retrofit program.
Option 2	Defer Option 1 by 5 years.
Option 3	Double 2018/19 mitigation retrofit program.

6.2 Summary of Drivers

Option	
Option 0	<p>Option 0 is the do nothing option. This option does not mitigate the overall risk associated with threatened bird strikes to an acceptable level. This option is not aligned with the objectives and risk mitigation requirements in this IES, or with the strategies in TasNetworks' Asset Management Plan, instituted to allow TasNetworks to maintain distribution system performance in a prudent and efficient manner.</p> <p>Furthermore, this option is not compliant with the PAMA in place between TasNetworks and DPIPWE. This option will therefore see an increase in expenditure by TasNetworks compared to the continuation of our current mitigation practices, as TasNetworks will be in breach of the Environment Protection and Biodiversity Conservation Act 1999 and face a fine of 50,000 penalty units per threatened bird fatality.</p>
Option 1 (preferred)	<p>Option 1 consists of installing bird mitigation devices to overhead distribution assets in high-risk areas, continuing at the existing rate of 68km per year. This specifically includes retrofitting bird flight diverters mid-span, and bird perches at the pole-top.</p> <p>Although the NPV shows that this option is not the most positive, it does implement risk controls which reduce both the likelihood and severity of threatened birds coming into contact with high-risk network assets, and thus reduces the overall risk as per TasNetworks requirements.</p> <p>Option 1 is the preferred option, as TasNetworks is willing to carry the additional risk (compared to Option 3) to put downward pressure on electricity prices.</p> <p>Option 1 satisfies the objectives outlined in this IES and is compliant with the PAMA in place between TasNetworks and DPIPWE, thus preventing any breach of the Environment Protection and Biodiversity Conservation Act 1999. This option is aligned with TasNetworks' Risk Register, the strategies in the Asset Management Plan, and the performance objectives set by the business in the Corporate Plan.</p>
Option 2	<p>Option 2 is the same as Option 1, however the mitigation retrofit program is deferred by 5 years.</p> <p>By deferring the program, both threatened birds and TasNetworks remains at risk, which will remain unchanged over the deferred period. This option therefore is not aligned with the objectives and risk mitigation requirements in this IES, or with the strategies in TasNetworks' Asset Management Plan, instituted to allow TasNetworks to maintain distribution system performance in a prudent and efficient manner.</p> <p>Furthermore, this option is not compliant with the PAMA in place between TasNetworks and DPIPWE. This option will therefore see an increase in expenditure by TasNetworks compared to the continuation of our current mitigation practices, as TasNetworks will be in breach of the Environment Protection and Biodiversity Conservation Act 1999 and face a fine of 50,000 penalty units per threatened bird fatality.</p>
Option 3	<p>Option 3 is the same as Option 1, however consists of installing bird mitigation devices to overhead distribution assets in high-risk areas, doubling the rate of the existing program to adequately manage the risk.</p> <p>This option implements risk controls which reduce both the likelihood and severity of threatened</p>

birds coming into contact with high-risk network assets. It reduces the overall risk to an acceptable level in the most cost-effective manner, as shown by the referenced NPV.

However, this option is based on a flat bird strike rate moving forward and limited available strike data. Although TasNetworks has reported threatened bird strikes over the last decade, the drive for accurate reporting of threatened bird deaths began in June 2017, when it was discovered it was a significant issue. As such, TasNetworks deems it necessary to gather more accurate data for threatened bird strikes and population over the 2019-2024 period, prior to considering the increased expenditure.

This option is compliant with the PAMA in place between TasNetworks and DPIPW, thus reducing the likelihood of any breach of the Environment Protection and Biodiversity Conservation Act 1999.

6.3 Summary of Costs

Option	Total Cost (\$)
Option 0	\$0
Option 1 (preferred)	\$4,750,000
Option 2	\$4,750,000
Option 3	\$9,675,000

6.4 Summary of Risk

The NPV has shown that Option 3 is the most cost effective option to reduce the environmental sustainability, bushfire ignition, customer reliability, legislative, corporate reputation and financial risks associated with threatened bird strikes on the distribution network. However, TasNetworks deems it necessary to gather more accurate data for threatened bird strikes and population over the 2019-2024 period, now that reporting has increased to an acceptable level, prior to considering the increased expenditure.

Option 1 therefore is the preferred option as it reduces the risk to threatened birds and maintains a Medium risk profile as per TasNetworks requirements, whilst not requiring an increase in expenditure. Although not the most positive NPV, TasNetworks is willing to carry the additional risk to put downward pressure on electricity prices.

Option 1 will also be paired with the design review for TasNetworks' distribution overhead network, which is currently underway in the 2018/19 financial year, to further reduce the risk to threatened birds moving forward.

6.5 Economic analysis

Option	Description	NPV
Option 0	No planned capital investment.	-\$39,981,773
Option 1 (preferred)	Continue 2018/19 mitigation retrofit program.	-\$17,349,176
Option 2	Defer Option 1 by 5 years.	-\$23,166,526
Option 3	Double 2018/19 mitigation retrofit program.	\$97,128

6.5.1 Quantitative Risk Analysis

A quantitative risk analysis has been completed including the cost of risk as described in section 6 above. The most positive option has not been selected as the preferred option in this IES. Rather, a lower value of capital expenditure has been selected until TasNetworks is able to collate additional bird strike data.

6.5.2 Benchmarking

Other Australian utilities are not facing the same level of threatened bird strikes as Tasmania and therefore have no cause for a specific annual program to mitigate the associated risks.

TasNetworks do however, benchmark internally in terms on number of threatened bird strikes per year, as well as aligning themselves with international utility best practices in terms of mitigation devices utilised. Furthermore, TasNetworks work closely with local wildlife centres, DPIPW and threatened bird experts in Tasmania to better understand their impact on the species.

6.5.3 Expert findings

TasNetworks has actively engaged with multiple entities to improve its knowledge on Tasmanian threatened birds and how to mitigate the risk the OH distribution network presents in the most effective manner. This includes:

- sponsoring the University of Tasmania to better understand the flight patterns of juvenile wedge-tailed eagles, the main species impacted by the distribution network;
- consulting with other Australian utilities and standardising the use of bird flight diverters which were designed based on the works by Avian Expert: Professor Graham R. Martin and his book "The Sensory Ecology of Birds" 2017 (ISBN 978-0-19-969453);
- engaging with EnviroDynamics to undertake a literature review into raptors, considering national and international works, and local threatened bird strike history, to guide the prioritisation for planned works over the next 10 years based on a risk profile; and
- hosting biannual meetings with Tasmanian raptor experts to ensure timely access to the latest information and to ensure alignment with local knowledge.

6.5.4 Assumptions

The quantitative risk assessment and NPV have the following assumptions:

- works will be evenly distributed per year over the regulatory period;
- the estimated life of the mitigation equipment in 20 years;
- 10 per cent of the 15,110km of overhead distribution network is estimated as the highest risk area to threatened birds;
- the cost of mitigation is estimated at \$14,000 per km; and
- the threatened bird strike rate moving forward remains flat at 33 incidents per year for Option 0 – do nothing.

Upon TasNetworks discovering the extent of their impact on threatened birds in June 2017, reporting requirements and awareness increased. As such, 2017/18 incident data is the only data deemed accurate enough to determine the strike rate for the quantitative risk assessment.

The cost of mitigation is estimated based on TasNetworks previous works and considering the use of two styles of bird diverters. TasNetworks requires the use of two styles of diverters due to unique line properties at individual sites. Both the usage and cost of installing perches on poles in minimal compared to the cost of installing bird diverters mid-span, and has thus been disregarded in unit rate estimates.