



QUEENSLAND  
TREASURY  
CORPORATION

# Review of Queensland's Financial Assurance Framework

This document is a public version of an independent report prepared by Queensland Treasury Corporation for consideration by Government.

The Government supports in principle the general direction of the recommendations and seeks to consult with industry and the community for feedback on the proposed framework.

The Government will consider all feedback provided through the consultation process in finalising any potential change to the current framework.

**FINAL REPORT: VERSION FOR PUBLIC CONSULTATION**

PREPARED BY QUEENSLAND TREASURY CORPORATION

APRIL 2017

## Executive Summary

By its very nature, resource exploration and extraction creates disturbance and changes the environment. Currently, the State has 220,000 hectares of disturbance, with an estimated rehabilitation cost of \$8.7 billion.

The State obtains financial assurance (FA) from the companies that undertake these resource activities (the Industry), to mitigate the financial risk that it (the State) will bear the cost of rehabilitating the disturbed land. The purpose of this review of Queensland's FA framework (the Review) is to assess the current system and recommend improvements.

### Review of the current FA system

The current FA scheme is one of individual responsibility: for each resource site, an estimate of the likely rehabilitation cost is made and the holder of the environmental authority (EA holder or operator) for that site provides surety, generally in the form of a bank guarantee<sup>1</sup>.

The key advantage of the current system is the provision of assurance by regulated third parties with very low risk of default (ie, banks). Using a risk-based modelling approach, however, the current FA system (Status Quo) is estimated to cost the State \$73 million over a 5 year period.

The key disadvantages with the current system are:

- if the FA held is less than the rehabilitation cost, the State has no source of funding for the shortfall. In one recent example of an

insolvent company, the FA held is \$3.6 million and the upper estimated rehabilitation expense is \$80 million.

- Reasons the FA held may be less than the rehabilitation cost include:
  - availability of discounts to operators based on specific criteria
  - underestimation of the rehabilitation cost, and
  - operators who delay the process to update their FA.
- Currently, discounts reduce the surety held by \$1.2 billion but this reduction is not based on the underlying risk to the State. One reason for providing discounts was to promote progressive rehabilitation but there is no evidence this has occurred.
- The underestimation of the rehabilitation liability can arise from:
  - the use of different tools to calculate rehabilitation costs, though all tools are approved by the Department of Environment and Heritage Protection (EHP), and
  - the use of out-of-date contractor rates or schedules.
- The cost of the bank guarantee system is very onerous for small to mid-sized operators, in terms of both bank fees and the balance sheet impact. The narrow range of banks that provide these guarantees have indicated that the cost will increase and conditions tightened.

In summary, Status Quo does not protect the State's financial interests, is expensive for Industry and does not promote good environmental outcomes.

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<sup>1</sup> For FA greater than \$50,000. FA less than \$50,000 is generally in the form of cash.

## Key initiatives to reduce FA risk

Irrespective of the FA system adopted, there are a number of initiatives (the Initiatives) that will improve the outcome for the State through reduced exposure and proactive management of the remaining risk.

Implementation of the Initiatives will require clear policy parameters, a strong program governance framework with clear roles and responsibilities, broad stakeholder engagement, and a commitment of resources and funding.

### *Rehabilitation policy development*

Through its public statements, Industry has committed to delivering high standards of rehabilitation and to progressively rehabilitate sites over the life of the operation. Currently however, of the 220,000 hectares of disturbance, approximately 18,000 hectares (8 per cent) is classified by the Industry as progressively rehabilitated. Disturbed land that has been certified as rehabilitated totals 556 hectares, which is 0.25 per cent of the total current disturbance.

The articulation of clear whole-of-Government expectations for rehabilitation and the collection of good quality data to evaluate performance are required to underpin a framework to improve the level of rehabilitation. This framework would enable early and ongoing planning and delivery of rehabilitation, provide greater certainty of progressive rehabilitation and certification requirements, address the issue of residual risk and support the development of a rehabilitation service industry.

### *Management of sites in care and maintenance (C&M)*

Sites in C&M have a higher risk and therefore should have a higher profile with the regulator and be obliged to meet stricter reporting requirements. These could include:

- Require the operator to identify in their Plan of Operations (PoO) the conditions that would trigger their site to go into C&M.
- Require an operator to advise the State when their site goes into C&M and submit a plan on the activities that will be undertaken during this phase (including progressive rehabilitation).
- Set limits on how long a site can be in C&M before requiring rehabilitation (progressive and final) and, ultimately, enforce closure through tenure relinquishment and subsequent EA surrender.

### *Approval process on the sale of resource asset*

Currently there are a number of significant Queensland resource assets for sale. The State needs to establish clear guidelines and processes to signal to the market what the requirements are for acceptable counterparties and to enable the prompt assessment of any proposals. A loophole also needs to be closed that allows a resource company to be sold, distinct from the underlying assets, without the State having the ability to reassess the terms of the tenure and EA approvals for the new owner.

### *Other initiatives*

- Expansion of the forms of surety accepted by the State.
- Improved estimation of rehabilitation costs.
- Improved data and analysis by the regulator.

- Strong governance framework with clear roles and responsibilities.
- Revised FA system for operators with FA of less than \$50,000.

### Alternative FA option: the Tailored Solution

Following a global jurisdictional review, two alternative FA systems were considered in detail by the Review, both underpinned by implementation of the Initiatives outlined above:

- An 'Enhanced' Status Quo, with no discounts offered, and
- A Tailored Solution, which segments the current portfolio of operators based on size and risk and provides a pooled fund approach for the majority of operators.

The Enhanced Status Quo is estimated to increase the current cost to Industry by 27 per cent and, while significantly reducing the State's

financial risk, would still result in unfunded rehabilitation liabilities. It is therefore not the recommended alternative.

Because of the non-homogeneous nature of the portfolio, a pooled model would not be able to accumulate a sufficient fund balance to pay the rehabilitation costs if a very large operator failed. The Tailored Solution recognises this issue and has been structured to reflect the different segments in the portfolio.

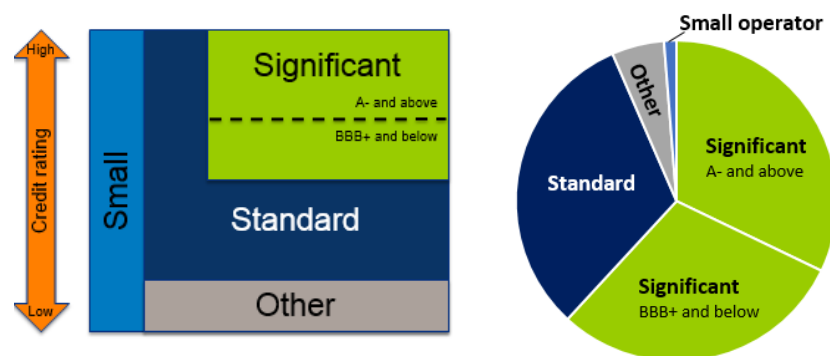
The components of the Tailored Solution are summarised in the following table, with risk assessed by the company's credit rating (for the purposes of this Review, the Standard and Poor's (S&P) rating scale has been used, but alternatives could be implemented in practice).

### SUMMARY OF TAILORED SOLUTION

Group name	Size	Risk	Rehab Cost	No. of Operators	FA device	FA provided by
Significant A	>5% of portfolio	A- & above	\$2.8 billion	< 5	Selected Partner Arrangement	Scheme, operated by Government
Significant B	>5% of portfolio	BBB+ & below	\$2.6 billion	< 5	Third party surety	Approved financial institution
Representative	<5% of portfolio	B- & above	\$2.8 billion	134	Rehabilitation Fund	Fund, operated by Government
Other	<5% of portfolio	CCC+ & below	\$0.5 billion	< 10	Third party surety	Approved financial institution
Small Operator	<\$50,000	Any rating	\$0.1 billion	~3,600	Not part of Tailored Solution (separate solution in Initiatives)	
Total			\$8.7 billion			

The five segments are depicted in the following diagram based on credit rating (left side) and estimated rehabilitation cost (right side).

#### SEGMENTATION OF RESOURCE ENTITIES



Source QTC

#### Form of FA

The Tailored Solution has three devices for the provision of FA:

- The Selected Partner Arrangement (SPA): the State bears the (very low) default risk for large, highly rated operators in return for a contribution that the Government can use to fund other initiatives.
- The Rehabilitation Fund (RF): operators with an acceptable risk profile would pay an annual contribution based on their estimated rehabilitation cost at a rate that reflects their financial risk. Where the

State takes on responsibility to rehabilitate one of their sites, the cost of the work would be claimed from the RF.

- Third Party Surety (TPS): the Enhanced Status Quo, for operators that are:
  - too big for the RF but not rated high enough for the SPA, or
  - represent too high a risk for the RF.

Comparable to the rates currently paid for third party surety, the annual contribution rates proposed for the SPA and RF are:

- 0.5 per cent for entities rated A- and higher
- 1.0 per cent for entities rated BBB+ to BBB-, and
- 2.75 per cent for entities rated BB+ to B- and non-rated<sup>2</sup>.

The applicable rate would be applied to a resource entity's estimated rehabilitation cost to determine the contribution amount. Using the risk-based modelling approach, the average expected outcome over a five year period is:

#### 5-YEAR TAILORED SOLUTION CASH FLOWS – (\$' MILLION)

Component	Contribution to funds	Expected loss	Interest earned	Admin fee	Net outcome
SPA	80	(4)	5	(16)	66
RF	245	(61)	14	(32)	167

<sup>2</sup> Entities for which no credit rating assessment could be found and were not identified by EHP as high risk have been classified as non-rated for the Review and given a probability of default that approximates a B+ rated company.



Component	Contribution to funds	Expected loss	Interest earned	Admin fee	Net outcome
Surety	-	(9)	-	-	(9)
<b>Total</b>	<b>326</b>	<b>(74)</b>	<b>19</b>	<b>(48)</b>	<b>223</b>

Summarising the previous table, at the end of five years the State would:

- have collected \$66 million from the SPA that it can apply to abandoned mines, innovation or better monitoring of the Industry
- received \$48 million to pay for administration cost of the FA system
- borne \$9 million in rehabilitation costs for operators providing third party surety device, and
- be holding \$167 million in the RF, as protection against future claims. The interest earned on the RF (\$14 million) could be used by the State (reducing the RF balance accordingly).

#### *Other elements*

Business rules have been outlined to manage new entrants, changes to the credit worthiness of existing operators and managing moral hazard and other challenges. Some of these business rules may require policy and/or legislative changes to implement.

Extensive stakeholder engagement was undertaken as part of the Review, with both the peak bodies and members of the Industry, advisors to the Industry and research bodies, regulators in other Australian jurisdictions, the finance industry, environmental groups and bodies representing landholders. Their views have been incorporated in developing the Tailored Solution.

## Recommendation

Developing a custom product for each segment, the Tailored Solution has been designed to:

- take a risk-based approach to managing the portfolio
- develop an improved environmental outcome by providing government with greater funds to complete rehabilitation where the operator is unable to do so
- reduce the financial impact of FA for Industry, and
- provide a source of funding to develop a best practice FA regime and associated projects such as an expanded abandoned mines program.

The Tailored Solution does expose the Government to potential loss in extreme scenarios. The risk is however very low and the exposure is less than the current Status Quo.

Assessing the FA options against the four desired outcomes, the Tailored Solution was rated the highest overall in:

- delivering a high level of environmental performance
- protecting the State's financial interest
- not a disincentive to Industry, and
- satisfying community expectations.

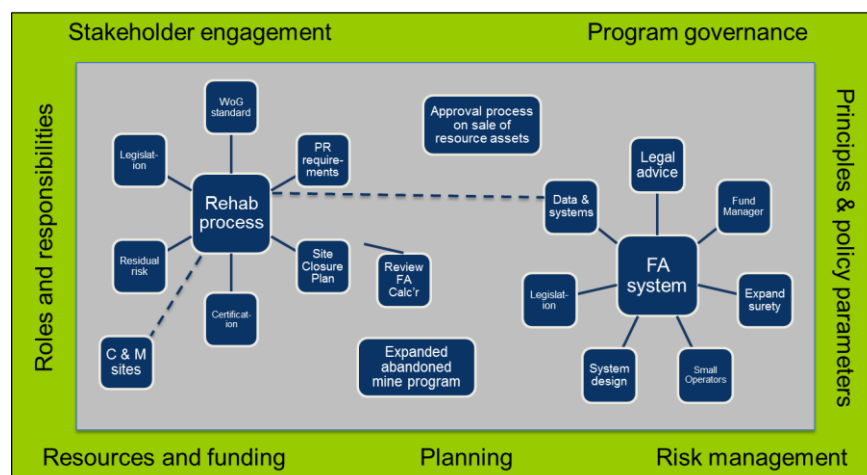
Taking all these factors into account, the Review recommends the Initiatives and the Tailored Solution for consideration by Government.

## Implementation program

If agreed to by Government, the recommendations in this Review will require substantial changes to legislation, administrative responsibilities and funding arrangements. The number of stakeholders involved in the Review (both internal to government and external) provides an insight into the scale of the implementation task. Transitional arrangements are likely to be complex.

While outside the scope of the Review, the following diagram summarises the key implementation tasks, and the framework required to unpin it.

### IMPLEMENTATION PROGRAM



Source QTC

The two principles key to the success of the implementation program will be getting clarity on what the acceptable outcomes are to Government (principles and policy parameters) and identifying who is responsible and

accountable for the different functions in the long term (roles and responsibilities).

As highlighted in this Review, FA is one element on the continuum of exploration, development and rehabilitation, with a number of agencies and legislative provisions governing different elements. Engagement with Industry along that continuum needs to be seamless, avoiding both overlaps and gaps in the process.

The current regime (unlike that in some other jurisdictions) deals with FA separate from tenure. Considerations, conditions and information requirements in the granting of mining leases (ML) need to align with the objectives of the FA regime. Clarity around roles and responsibilities of agencies under the new framework is critical to its success.

For roles and responsibilities, it is recommended that a thorough, independent review of the current allocation of responsibilities be undertaken and recommendations made on where specific functions most appropriately reside, from the perspective of both internal government processes and engagement with external stakeholders.

Implementing a new FA system will require additional skills and capabilities (eg, management of the funds, detailed assessment of credit risk), introducing other agencies into the existing process.

A program plan should be developed, to coordinate the multiple implementation projects and manage the interdependencies.

It is recommended the Government establish a properly resourced, funded and empowered taskforce to complete the required work and stakeholder consultation to enable all Initiatives and the Tailored Solution

to be implemented in a staged approach, as part of a comprehensive package of reform.



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## Acronyms and definitions

TERM	DEFINITION/DESCRIPTION
AMEC	Association of Mining and Exploration Companies
AMLPL	Abandoned Mine Lands Program, operated by DNRM
APPEA	Australian Petroleum Production & Exploration Association Ltd
APRA	Australian Prudential Regulation Authority
B	Billion
CORA	Environmental Protection (Chain of Responsibility) Amendment Act, amending the EP Act
DNRM	Department of Natural Resources and Mines
DRE	New South Wales Division of Resources and Energy, a branch of the NSW Department of Industry
EA	Environmental Authority
EDO	Environmental Defenders' Office
EHP	Department of Environment and Heritage Protection
EP Act	Environmental Protection Act 1994
FA	Financial Assurance
FA IDC	Financial Assurance Interdepartmental Committee
FY	Financial year ending 30 June
Interim Report	The interim report issued for this Review in September 2016.
M	Million

TERM	DEFINITION/DESCRIPTION
M&G	BHP Billiton Marine & General Insurance Pty Ltd
Mackay Con	Mackay Conservation Group
ML	Mining lease
NAB	National Australian Bank
P&G	Petroleum and gas
Peabody	Peabody Energy Australia Pty Ltd
PL	Petroleum lease
PoO	Plan of Operations
QCC	Queensland Conservation Council
QFF	Queensland Farmers Federation
QRC	Queensland Resources Council
QT	Queensland Treasury
QTC	Queensland Treasury Corporation
Review	The review of Queensland's Financial Assurance framework
ToR	Terms of Reference
WA MRF	Western Australia Mining Rehabilitation Fund
WBC	Westpac Banking Corporation
WPS	Wildlife Preservation Society of Queensland
WWF	World Wildlife Fund

# 1 Project background

## 1.1 Terms of Reference and scope of the Review

By its very nature, resource exploration and extraction creates disturbance and changes the environment. The State obtains FA from the companies that undertake these activities, to mitigate the financial risk that it (the State) will bear the cost of rehabilitating the disturbed land.

The Government established a Financial Assurance Interdepartmental Committee (FA IDC) to conduct a review of Queensland's FA framework (the Review). The purpose of the Review is to assess the current FA scheme and evaluate alternative options for consideration by the Government.

The FA IDC comprises:

- the Under Treasurer, Queensland Treasury (QT) as Chair
- the Director General of EHP
- the Director General of the Department of Natural Resources and Mines (DNRM), and
- the Executive Director, Environment Policy, the Department of the Premier and Cabinet.

Terms of Reference (ToR) were approved by the FA IDC on 12 July 2016. Queensland Treasury Corporation (QTC) was appointed to undertake the Review. The ToR state:

*The review will be limited to the review of the FA framework and an assessment of alternative models, but will need to be cognisant of the many other factors that will have an impact on the performance of any FA model. It may be that other areas of reform, outside of the FA framework are recommended for review by the external reviewer.*

During the Review, QTC obtained the FA IDC's approval to broaden the scope of work to consider, as it pertains to FA and to the extent of QTC's expertise:

- rehabilitation policy (refer to Section 6.1)
- the calculation of rehabilitation cost estimates (refer to Section 5.2)
- care and maintenance (refer to Section 6.2), and
- abandoned mines (refer to Section 6.7).

## 1.2 Interim report

An interim report for the Review was issued in September 2016 (Interim Report), primarily focused on:

- determining an agreed data set for the FA currently held
- establishing the risk management principles to be used for the Review in evaluating FA options
- documenting the factors that create a rehabilitation liability and the suite of tools Queensland currently uses to manage the risks of that liability, and
- identifying the key learnings from Queensland's experience to date and from other jurisdictions.

The Interim Report produced an agreed data set, confirmed by EHP and DNRM on 1 September 2016 as ‘sufficient for making policy decisions’. Key findings in the Interim Report were:

- The Industry is not homogenous in terms of the size of operators, level of risk or financial strength.
- Because of the system of discounts, the FA held is less than the estimated rehabilitation cost.
- Less than half the value of FA held is determined using EHP’s FA Calculator.
- Data on the amount of progressive rehabilitation (PR) in Queensland is not collected in a systematic manner by EHP, but initial analysis by EHP indicates that the area of land under progressive rehabilitation is small compared to disturbed land. The area of certified PR is negligible.
- No global jurisdiction has been identified as having an ‘ideal’ solution to the rehabilitation/FA issue.
- The failure of the largest resource entities, while a low probability, would have a material impact on the Industry and on the State more broadly.

The Interim Report was prepared on a commercial-in-confidence basis and presented to Cabinet. It is therefore not available to the public but the key findings are reflected in this report.

### 1.3 Scope of stakeholder engagement

Rehabilitation is a critical issue for both the Industry and the community, and this importance was reflected in the willingness of all stakeholders to engage and share their views and, where required, provide additional data to support their statements.

Extensive stakeholder engagement was undertaken to:

- understand the issues and concerns with the current FA scheme
- gather or confirm data to strengthen the analysis undertaken
- seek ideas on alternative solutions, and
- test the recommended solution.

In the majority of instances, the stakeholder engagement was face to face, either with individual entities or in group forums. Key stakeholders, being the peak bodies and environmental groups, were engaged multiple times over the period of the Review.

The list of entities engaged is set out in Table 1.

**TABLE 1: STAKEHOLDERS ENGAGED**

Segment	Entities			
Peak bodies	QRC	APPEA	AMEC	
Industry	BHP Billiton	Rio Tinto	Glencore	Peabody
	APLNG	Arrow Energy	Cockatoo Coal	Origin
	Santos	Senex	U&D Coal Ltd	QCoal Pty Ltd
	Anonymous <sup>3</sup>			
Environmental groups	Lock the Gate	WWF	EDO	Mackay Cons
	QCC	WPS		
Landholders	QFF	AgForce Qld		
Finance	ANZ	Marsh	M&G	WBC
	NAB	BNP Paribas	Assetinsure	
Industry consultants	Accent Environmental			
	Northern Resource Consultants			
	SLR Consulting			
	UTM Global Pty Ltd			
	Energy & Resource Insights			
	WPS Parsons Brinckerhoff			
Other jurisdictions	WA MRF	NSW DRE		
Research	Sustainable Minerals Institute			

<sup>3</sup> This Industry operator asked that their name not be disclosed.

Segment	Entities	
Other	QAO	CORA Working Group

Section 3 summarises the key feedback provided by these stakeholders.



## 2 Evaluation approach

### 2.1 Objectives of the Review

As contemplated in the ToR, the objectives of the Review are to provide Government with:

- a fulsome understanding of the advantages and disadvantages of the current FA policy settings using evidence based analysis and risk assessment, industry and government feedback and experiences in other jurisdictions, both across Australia and overseas; and
- an assessment of a range of alternative FA models (e.g. Prudential Fund; pooled model; risk evaluated FA framework), including the advantages and disadvantages for government (with a particular emphasis on risk to the State) and industry, including a preferred recommendation.

### 2.2 Constraints

The Review was not constrained in the options or outcomes that would be considered by Government. The FA IDC did advise that a solution that also provided funding for abandoned mines would be beneficial.

As advised by the FA IDC, obtaining a complete and accurate data set was not possible within the timeframe for the Review. QTC accepts the agreed data set as sufficient for making policy decisions but notes that data errors and inconsistencies discovered during the Review reduced QTC's confidence in undertaking detailed analysis on subsets of the data.

### 2.3 Government's risk appetite

During the course of the Review, options were presented to the FA IDC and none were advised to be outside the Government's risk appetite.

### 2.4 Evaluation criteria

The ToR state that, in determining a method to compare and assess alternative FA approaches, the FA IDC agreed the Government should seek to achieve an FA system that:

- delivers a high level of environmental performance
- protects the State's financial interest
- does not present a disincentive to investment in the resources sector, and
- provides an outcome that satisfies community expectations.

The desired outcomes were used to derive the evaluation criteria as follows:

#### *Environmental performance*

FA is a tool for managing the State's financial risk in relation to rehabilitation and there is no evidence of it also being an effective device for promoting environmental performance (refer Section 3.4).

The Review has identified Initiatives critical for managing the State's rehabilitation risk and elevate environmental performance (refer

Section 6). This evaluation criterion assesses how well an FA option supports the delivery of those Initiatives.

#### *Protect the State's financial interests*

Unless the resource site can be sold to a third party, when an operator fails the State may become responsible for the rehabilitation of the on-site disturbance, particularly where it is causing or has the potential cause significant environmental harm.

Using a risk based approach, the Review has modelled a range of outcomes to derive an average annual loss (the expected loss or EL) and a one in 200 year loss (the unexpected loss or UEL), to determine a range of potential net financial outcomes for the State.

Each FA system has been evaluated on its ability to protect the State against both the expected loss and the loss in extreme events (ie, the UEL).

#### *Impact on Industry*

Based on stakeholder engagement, the cost to industry of the current FA system is significantly different for the large and mid-tier operators<sup>4</sup> (refer Section 3.1). The evaluation criteria therefore assess the impact on large and mid-tier operators separately, taking into account:

- the direct cost to an operator, and

- the balance sheet implications for an operator, being the provision of cash collateral for the guarantee or a reduction in the company's borrowing capacity.

The impact on the banking sector has been estimated (refer to Section 9) but is not included in the evaluation criteria.

#### *Community expectations*

Community expectations are that Industry undertake rehabilitation to a high standard (addressed through the Initiatives set out in Section 6) and that the State not bear Industry's costs (assessed through the criteria to protect the State's financial interests).

To deliver the desired outcome of satisfying community's expectations, the FA options have been evaluated on:

- their ability to fully fund the required rehabilitation work, and
- their ability to avoid significant losses for the State.

#### *Weighted evaluation criteria*

Based on above, the desired outcomes have been weighted and assigned the evaluation criteria in Table 2. The weighting is based on:

- As an FA system has little capacity in itself to impact on environmental performance, it has been allocated a low weighting of 10 per cent.

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<sup>4</sup> The FA system for small operators is being separately addressed. Refer to Section 6.6  
**Review of Queensland's Financial Assurance Framework**

- As evidenced by recent cases of disclaimed mines, the State is incurring significant costs that are the responsibility of the operator. This evaluation criteria is therefore given a 50 per cent weighting. Recognising the State's risk appetite to be protected from extreme outcomes, the evaluation weighting is shared equally between the expected and the one in 200 event outcomes.
- The impact of FA on Industry is significant and this outcome has been allocated 30 per cent weighting. As the impact of FA systems can be materially different for large and mid-tier players, they are evaluated separately. The evaluation weighting has been split evenly though it is acknowledged large players provide the majority of FA.
- As the community's key requirements are significantly addressed in the above criteria, it receives a low weighting of 10 per cent.

**TABLE 2: EVALUATION CRITERIA AND WEIGHTING**

Objective	Weighting	Evaluation Criteria	Sub-Weight
Environmental performance	10%	How effectively does the option support the Initiatives that deliver a high standard of environmental performance	n/a
Protect the State's financial interests	50%	Effectiveness in protecting against Expected Loss	25%
		Effectiveness in protecting against Unexpected Loss	25%
Impact on industry	30%	Financial impact for large operators	15%
		Financial impact for mid-tier operators	15%

Objective	Weighting	Evaluation Criteria	Sub-Weight
Community expectations	10%	Ability to fully fund the required rehabilitation work	5%
		Ability for the State to avoid significant losses	5%

## 2.5 Evaluation ratings

Each FA scheme has been rated on its effectiveness to meet the qualitative evaluation criteria using a zero to five scale, as defined in Table 3.

**TABLE 3: RATING SCALE**

Rating	Description
0	Totally fails to satisfy the requirement
1	Very low standard, clearly inadequate, several definite weaknesses or a major weakness
2	Low, does not meet minimum standards, some obvious weaknesses
3	Adequate, satisfies minimum standards, meets criteria however a few weaknesses
4	High standard, some definite strengths
5	Very high standard, exceptional outcome, definite strengths

### 3 Stakeholders' views

Stakeholder engagement was conducted on a confidential basis. Where the feedback provided could be attributed to an individual entity, it has been deleted from this public version of the report.

#### 3.1 Industry

As noted in the Interim Report, the Industry is not homogeneous, with the key divides being the size of the operator and the type of resource. This section summarises the key comments provided by Industry, though it is noted individual entities may not support all the comments noted below:

- Mid-tier operators identified the Western Australian Mining Rehabilitation Fund (WA MRF) as a good model, but otherwise no other jurisdiction's FA system was nominated for consideration.
- In considering any change to the current FA system, Industry focus is on the cost rather than the form of instrument used.
- Industry objections to socialising costs in a pool have reduced, other than to the extent contribution rates are increased post-establishment because high risk operators are a drain on the fund. The issue of moral hazard therefore needs to be addressed in any proposal.
- Industry does not support a 'one size fits all' FA scheme, with:
  - mid-tier operators preferring a pooled model
  - larger operators preferring not to be pooled, and
  - petroleum and gas (P&G) operators preferring not to be pooled with mining (coal and mineral).
- The requirement for bank guarantees is becoming more challenging for Industry as costs increase, the conditions attached become more onerous and the banks' appetite to provide the product decreases.
- Operators advised that banks specifically identified Basel III<sup>5</sup> as the reason they were hardening their approach to the provision of bank guarantees. By way of example, an ASX listed entity with significant market capitalisation is now required to provide cash to back their bank guarantees.
- One operator advised that the bank fees they have paid for the last five years are less than half the historical rate. Recently, however, their banks have indicated fees on new guarantees will rise significantly.
- For mid-tier operators the FA bank guarantees often have to be cash collateralised, increasing the capital requirements and therefore reducing the financial viability of their projects.
- Some commented that the estimate produced by the FA Calculator overstates the rehabilitation cost, but Industry's key issue appears to be that the resulting FA requirement does not reflect the underlying risk to the State. Factors that impact on the risk, and therefore the amount of FA required, include:

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<sup>5</sup> An international regulatory accord on reforms designed to strengthen global capital and liquidity rules with the goal of promoting a more resilient banking sector.

- financial capacity of the operator (including any parent company guarantee)
  - viability of the operation (including the remaining life of the resource)
  - the operation’s position on the cost curve
  - type of commodity, and
  - the (significant) value of the ‘scrap’<sup>6</sup> on site. (Subsequently, Industry operators acknowledged this scrap was not always available to Government and therefore cannot reduce FA.)
- Industry believes the rehabilitation estimate should be calculated on a net present value basis (see comments in Section 5.2).
  - The pre-requisites for accessing FA discounts are too restrictive and operators are penalised twice for infringements: through the initial fine and the loss of FA discounts.
  - As well as the financial benefit of reducing the cost of FA, securing discounts is seen by operators as recognition they are a good corporate citizen.
  - Issues arising from the requirement on Industry to provide third party quotes in calculating their rehabilitation liability include:
    - some quotes include a significant contingency to cover the requirement to be valid for the period of the PoO, and
    - as Industry does not intend to actually engage the contractor for the work, they are obliged to pay for the quotes.
  - FA schemes need to be able to cater for joint venture arrangements appropriately.
- More broadly, Industry would like:
    - more meaningful engagement with EHP
    - a strategic vision of the final land use determined at the approval stage
    - certainty around rehabilitation standards and certification
    - acceptance by EHP of suitably qualified third party advice
    - development of a process around residual risk, and
    - closure planning be done well in advance of the closure date.
  - Western Australia’s ‘Guidelines for Preparing Mine Closure Plans’ is jointly sponsored by the WA Department of Mines and Petroleum and Environment Protection Authority. The collaborative agency approach and outcomes sought were highlighted as an example of regional best practice, elements of which could be replicated in Queensland.
  - Without certainty on the standard required for relinquishment, it is difficult for the local operations of multinational companies to obtain funding for rehabilitation.
  - Projects on vacant brownfield sites can become uneconomic if the rehabilitation cost estimate includes the cost of rehabilitating pre-existing damage outside the new operation’s proposed area of disturbance.
  - One operator expressed a view that because rehabilitation is not certified it is not possible to get FA reduced. That operator therefore sees little incentive to undertake progressive rehabilitation.

<sup>6</sup> Includes infrastructure, plant and equipment and stockpiles of the commodity.

### 3.1.1 Cost of bank guarantees

Through the three peak Industry bodies, the data contained in Table 4 was sent to the Industry seeking feedback if the nominated ranges for bank fees on their current FA were incorrect.

**TABLE 4: ESTIMATE OF CURRENT BANK FEES PAID BY INDUSTRY**

S&P rating	Cost range <sup>7</sup>	Approximate mid-point
A- and above	0.25% - 0.75%	0.50%
BBB+ to BBB-	0.50% - 1.25%	0.90%
BB rated	1.25% - 2.50%	1.75%
Non-rated	1.50% - 4.00%+	2.50%
B rated and lower	3.00% - 6.00%+	4.50%

Generally, the feedback received confirmed the ranges adopted and, on the basis that a response was only required if the range was incorrect, the Review has adopted the above as being the indicative cost of the current FA system.

#### *Case study on cost to mid-tier player*

One mid-tier player with FA required of approximately \$30 million currently has a bank guarantee with fees of 3.00 per cent. The annual cost of FA is therefore \$900,000, and their ability to borrow is reduced.

<sup>7</sup> For non-rated and B rated and lower, it is assumed some of the bank guarantees are cash backed and therefore the upper range will approximate their cost of capital.

This company's bank has advised that it will require the guarantee to be cash collateralised in future. Using a weighted average cost of capital (WACC) of 8 per cent<sup>8</sup>, the 'cost' to the company would be \$2.4 million. In addition, the bank advised the fee for a cash collateralised guarantee will be 0.5 per cent, or \$150,000 per annum.

### 3.1.2 Industry consultants

Through the Industry engagement process, a number of their consultants were recommended and the key feedback provided includes:

- Consultants found it very difficult to engage with EHP, with previously settled issues being re-prosecuted and inconsistent decisions made.
- While it is possible to physically stabilise a site, it can never be chemically stabilised, only managed.
- Some rehabilitation work will eventually fail but the disturbance from resource activity may be permanent (eg, acid mine drainage). Depending on the specific circumstances, a solution with a lower cost and continual maintenance may be more effective than a high-quality, expensive 'walk away' option.
- Many operators run on low margins and so rehabilitation will be deferred where possible.

<sup>8</sup> Based on a high-level market scan of the WACC rates for established mining entities. Mid-tier mining operators would be expected to have less debt and less diversified income streams, and therefore a higher WACC than 8%.



- The inquiry into the Hazelwood mine fire in the Latrobe Valley in Victoria found:
  - the FA held was \$15 million
  - the company's estimated the rehabilitation liability at \$75 million, and
  - the inquiry estimated the rehabilitation cost at \$250 million.
- The Hazelwood inquiry produced 170 recommendations, including use of a risk based calculator for rehabilitation costs. One consultant stated that rehabilitation cost calculators produce an estimate that is 30 per cent below the true cost for a standard risk mine.

## 3.2 Community

### 3.2.1 Environmental groups

The environmental groups engaged recognise the economic value provided by the Industry to Queensland. They also believe there is a significant divergence between the public's expectations on rehabilitation and what the actual position is. To meet public expectations there needs to be:

- clear rehabilitation standards set by the State, and
- progressive rehabilitation undertaken by the Industry.

If this expectation gap is not addressed, the environmental groups believe the public will be unwilling to extend the social licence provided to the Industry.

The environmental groups have reviewed the sustainability reports issued by resource companies and they stated the level of rehabilitation ranges from 15 to 30 per cent of the amount of new disturbance: their expectation is that the level should be 100 per cent (ie, a one to one ratio of rehabilitated land to new areas of disturbance). They believe the Industry is focused on financial return and employee safety and that it will require regulation to elevate the environment to be an equal priority. To raise Industry's focus on rehabilitation, one of the groups has issued a paper recommending companies provide FA in the form of a cash deposit held by Government.

The environmental groups would like to collaborate with Government to establish principles for rehabilitation – for instance, whether final voids are acceptable – and to ensure progressive rehabilitation occurs. Other feedback provided was:

- The environment groups would like a process for routine engagement with EHP.
- Improvements are required to the FA Calculators, particularly the introduction of a contingency to reflect the level of uncertainty at different stages in the operation's lifecycle.
- The need to tighten the regulations around care and maintenance, so sites cannot go into 'permanent' C&M and that the State has powers to act where this occurs.
- More active oversight of the Industry by the regulator, with more transparency.
- The potential to use expert panels to assess rehabilitation progress.

- In some cases sites may be left un-rehabilitated in the expectation of further processing and to avoid sterilisation<sup>9</sup> of the resource. A transparent evaluation framework is required to assess the validity for delaying rehabilitation and determine if some form of rehabilitation can occur that allows for future access to the resource. Examples were discussed where rehabilitation had been delayed for decades based on the premise of future commercial use that has not occurred.

### 3.2.2 Land groups

For FA and site rehabilitation, peak bodies representing land groups have an expectation that the current framework protects the State against events and residual risk. Related matters raised included:

- While recognising the economic benefits of the Industry, there was concern over the impact resource activities have on ground and surface water. One specific issue raised was the diversion of run-off rainwater into voids.
- Landowners would like the option to retain infrastructure established for resource activities but have encountered issues in trying to engage with EHP on the topic.

### 3.2.3 Research bodies

The Sustainable Minerals Institute (SMI) at the University of Queensland is a research body that develops ‘practical solutions to the challenges of operating sustainably in the resources sector’.

The comments provided by SMI have been deleted for this version of the report as they were provided on a confidential basis.

## 3.3 Finance

A number of the largest providers of bank guarantees to the Industry were engaged, as well as major insurance brokers seeking to enter the Queensland FA market. Key feedback received was:

- No institution was aware of a case where a guarantee was claimed and not honoured.
- While the guarantee provided to government is unconditional, irrevocable and on-demand, the price of the service to the client is subject to annual review. If the credit risk increases, options available to banks include increasing their charges and seeking progressive collateralisation.
- In the US, two-thirds of guarantees are provided by insurance companies.
- Basel III and an increased focus on capital management is increasing the cost of guarantees to banks and therefore to Industry.
- There have been examples where a bank ‘fronts’ the guarantee with an insurance company behind them. This has been done where the bank is unwilling to accept incremental exposure to the resource company.

<sup>9</sup> Undertaking activities that would prevent future recovery  
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- In managing the risk, correlations are considered and the institutions will mitigate their risk through other mechanisms eg, reinsurance or indirect hedges such as commodity put options.
- The Chain of Responsibility amendments were identified as an issue by a number of banks, with their concerns being managed by the Australian Bankers Association.
- The issue of physical management of guarantees was raised as an operational risk for the State. One bank recommended the State consider a SWIFT<sup>10</sup>-based electronic system to ensure the guarantee securities and data are safe, current and there is a clear audit trail. SWIFT may restrict the solution to banks but other options, such as distributed ledger technology<sup>11</sup>, could be considered in time.

### 3.4 Key messages

#### *Engagement with EHP*

A consistent theme from Industry, consultants and community groups is their desire to have more effective engagement with EHP.

Suggestions on how that can occur included:

- regular forums and opportunities for formal and informal stakeholder engagement on policy matters
- proactive involvement on operator-specific matters, including regular site visits, and

- a standard approach applied across the Industry and the provision of clear guidelines.

These suggestions are consistent with the development of the Initiatives in Section 6.

#### *Holding FA in cash*

The environmental groups' proposal that operators provide their FA in cash to incentivise progressive rehabilitation is not seen as feasible, or necessarily effective. The impost on Industry of providing approximately \$9 billion in cash to the State would potentially make many operations uneconomic and the implications for sovereign risk would be significant. There is also a risk that, in the event of insolvency, a liquidator may have a claim over the funds held as FA.

#### *Calculation of FA*

Acknowledging some operators have specific issues, generally the Industry's complaints about the FA Calculator were not substantiated. On delving into the concerns expressed, a number of operators clarified their position to be that FA should be lower to reflect the true risk to the State, not that the FA Calculator itself was over-estimating the cost.

<sup>10</sup> Provision of secure financial messaging through the Society for Worldwide Interbank Financial Telecommunications.

<sup>11</sup> A distributed ledger is a form of shared and synchronised encrypted digital database geographically spread across multiple sites (referred to as blockchain).

### *Cost of bank guarantees to Industry*

There is a body of evidence that the fees charged by banks are increasing and the conditions being imposed are more onerous, both as a result of regulation (Basel III) and the banks' view of the sector.

Industry provided evidence that the current FA scheme has a significant financial impact for some operators:

- The requirement to cash back a guarantee means the cost of the guarantee is at least the entity's weighted average cost of capital plus the fee charged by the bank (between 0.5 per cent and 0.9 per cent). In some cases, the entity may earn interest on the cash held, but not in all examples given.
- The size and quality of the operators that need to provide cash to back their guarantees was greater than expected. One entity with significant FA advised that its bank is now inserting clauses that allow the bank, at its discretion, to require the guarantee to be cash collateralised.
- In discussions with mid-tier operators, the cash required to back a bank guarantee for the FA was almost or equal to the investment required to secure tenure and develop the operation.

## 4 Jurisdictional update

A global jurisdictional review was provided in the Interim Report. This report provides an update on specific jurisdictions and, in preparation for Industry consultation, consideration is given to Queensland's competitive position relative to other Australian states.

### 4.1 Comparison of competitive position between Australian jurisdictions

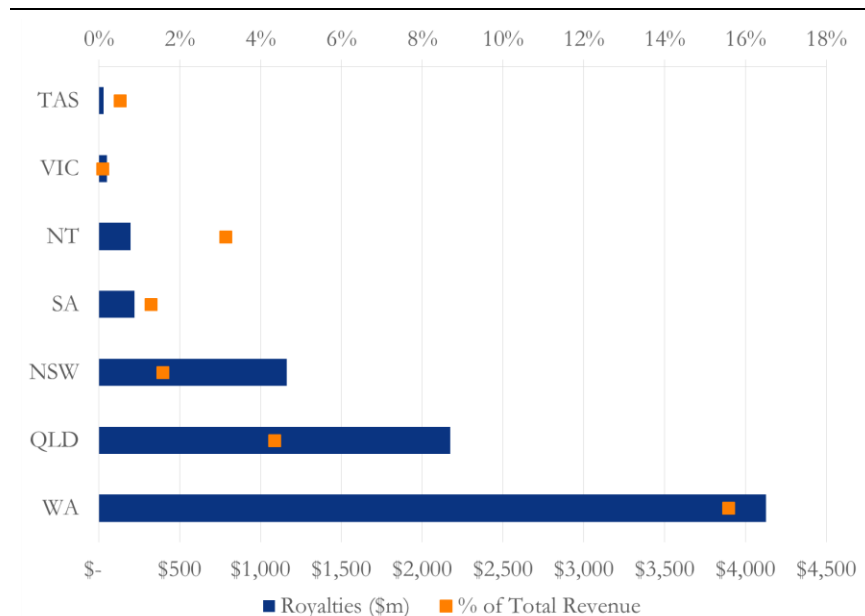
Within Australia, the wage environment, level of sovereign risk and general regulatory environment are relatively equal. Comparing Queensland's competitive position in the resources sector relative to other Australian states is challenging. But as Industry will respond to any change to the FA system that they perceive will be a disincentive to investment, it is important to understand whether such a change creates a competitive disadvantage for them.

In looking across Australian jurisdictions at how they support and manage the Industry, it is important to understand the relative importance of resources to each state or territory. Table 5 sets out the total royalty income earned by each state in FY2016 (lower axis, in millions of dollars) and what that revenue represents as a percentage of the jurisdiction's total budget (upper axis).

The resources sector is most significant in WA, with royalty revenue of \$4.1 billion, representing 15.6 per cent of the government's revenue.

With significant royalty revenue in Queensland and NSW also, the analysis for the remainder of this section focuses on these three states.

**TABLE 5: ROYALTY REVENUE IN AUSTRALIAN JURISDICTIONS - FY2016**



*Source Each state's financial report for FY2016 or, where not available, the FY2017 budget*

Looking at costs specific to the Industry, there are three categories considered:

- royalties
- resource-related fees and charges, and
- the cost of FA.

For simplicity, jurisdictional differences in other charges, such as payroll and land tax, are not considered as they are not unique to the Industry.

#### 4.1.1 Royalties

Royalty regimes vary between Australian states and for different commodities within a state. A combination of value-based (or *ad valorem*) and specific-rate (set amount per ton) methods are used to calculate the amount of royalty payable. Table 7 provides a high-level overview of the royalty regimes adopted in Queensland, Western Australia and New South Wales.

**TABLE 6: STRUCTURE OF ROYALTY CHARGES, SELECTED STATES**

Mineral type	Queensland	WA	NSW
Coal	7% to \$100/t plus additional rates above \$100 and above \$150/t	Export coal 7.5% Domestic: specific rate	Deep u/ground 6.2% Other u/ground 7.2% Open cut 8.2%;
Minerals	Various, from 2.5% to 5.5%	Bulk 7.5%, Concentrates 5%, Metals 2.5%	4% ex-mine or specified rate
P&G <sup>12</sup>	10% of wellhead	10% of wellhead & 12.5% for secondary production licence	10% of wellhead

<sup>12</sup> In addition to state royalties, there is Commonwealth excise on all oil and condensates

For the selected states, value-based royalties are the most widely adopted, applying to the majority of commodities. Value-based royalty rates vary between 1.65 per cent and 12.5 per cent depending on the commodity. A lower rate typically applies to mineral products that have undergone processing.

In Queensland, variable value-based rates apply in increments for coal, depending on average price. At \$150 per tonne, the effective royalty rate is 8.83 per cent: at \$200/tonne, the effective rate increases to 10.375 per cent. This compares to New South Wales, where royalty rates for coal are linked to the type of mine, with higher-cost underground mining attracting lower royalty rates.

Specific-rate royalties are utilised in Queensland, New South Wales and Western Australia and typically apply to low-value basic raw materials and some industrial minerals. Western Australia is the only state with several value-based rates linked to a benchmark.

For these reasons, as well as the variability in approaches used to calculate the royalty base (the sales value less deductions), comparison of the value-based rates applied to coal and minerals by Australian jurisdictions is difficult.

Petroleum royalty rates are generally set at 10% of the wellhead value through WA also has a 12.5% rate applied to the wellhead value for a secondary production licence.



#### 4.1.2 Fees and charges

As with royalties, fees and charges are not readily comparable between the selected states and different government agencies are responsible for administering them.

Table 7 provides an overview of the key fees and charges in the selected states. Noteworthy is NSW's annual administrative fee on all FAs, levied at 1 per cent of the estimated rehabilitation liability.

**TABLE 7: SUMMARY OF FEES AND CHARGES, SELECTED STATES**

Mineral type	Queensland	WA	NSW
Application fee (Mining Lease)	\$4,279.00 - coal \$1,526.00 - majority of other minerals	\$467.90	\$10,000.00
Annual rental fee (Mining Lease)	\$58.15/ha	\$17.05/ha or part thereof	\$6.50/ha
Application fee (Petroleum Lease)	\$4,279	\$6,102	\$50,000
Annual rental fee (Petroleum Lease)	\$145.40/sq km	\$16,532/block <sup>13</sup>	\$10,000/block or \$133.33/sq km
Annual admin fee	Nil	Nil	1% of rehab cost

<sup>13</sup> The definition of what constitutes a block is consistent between states.

In addition to state charges, operators will have to pay local government rates and charges. These can vary by local government area and so have not been quantified here.

#### 4.1.3 Financial Assurance

In Queensland and NSW, FA is in the form of a bank guarantee. In WA, operators under a State Act currently provide no form of FA, while other operators with a minimum liability of \$50,000 are in the Mining Rehabilitation Fund.

**TABLE 8: SUMMARY OF FA SCHEMES, SELECTED STATES**

Criteria	Queensland	WA	NSW
Form of FA	Bank guarantee and cash, with an insurance bond accepted from one entity	Bank guarantee, pooled arrangement or, if under a State act, none	Bank guarantee and cash
Calculation of rehabilitation cost	Sophisticated State calculator and operators can use their own	Simple State calculator only	Sophisticated State calculator, similar to Qld. Operators own calculator rarely accepted
Assessment frequency	Up to 5 years	Annual	Up to 5 years

Criteria	Queensland	WA	NSW
Discounts offered	Up to 30% of estimated rehab cost	Not applicable	No
Cost of predominant form	0.5% to 6%+ if cash backed	1.0% (zero if under a state act or liability is less than \$50,000)	Assume similar to Qld
Level of physical monitoring	Unspecified	At least once in 4 year cycle	Scheduled based on risk assessment

WA would appear to have the lowest cost scheme, with no FA required for the largest operators and a low contribution rate to the WA MRF. NSW would appear to be the dearest, with the departments calculator predominantly used and no discounts.

#### 4.1.4 Global rating index

The Fraser Institute<sup>14</sup> undertakes a global survey of mining companies on an annual basis to produce its Investment Attractiveness Index<sup>15</sup> (IAI). The IAI looks at the resource potential and policy perception for various jurisdictions, which includes an assessment of their tax and regulatory environment.

In the latest IAI, Queensland ranked 16<sup>th</sup> globally, behind WA (1<sup>st</sup>), the Northern Territory (7<sup>th</sup>) and South Australia (10<sup>th</sup>). NSW ranked 38<sup>th</sup>.

<sup>14</sup> An independent Canadian think tank whose mission is to measure and communicate how government policies affect the life of Canadians  
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The IAI considers a number of different criteria, and a key factor that differentiated the ranking of the three selected states was uncertainty concerning environmental regulations, with the elements and scores summarised in Table 9.

**TABLE 9: FRASER INSTITUTE SCORE, REGULATION UNCERTAINTY**

Factor	Queensland	WA	NSW
Encourages investment	9%	21%	3%
Not a deterrent to investment	34%	52%	14%
Overall score	43%	73%	17%

The Canadian province of Saskatchewan had the best percentage score in this category, of 94 per cent, but it is noted that other jurisdictions in the top ten were Burkina Faso and Ethiopia. (Saskatchewan was identified by one stakeholder as a jurisdiction with a good residual risk tool).

#### 4.1.5 Overall competitive position

As raised at the start of this section, comparing the cost for resource entities to operate in different jurisdictions is challenging: the cost is unique for each operator.

<sup>15</sup> <https://www.fraserinstitute.org/studies/annual-survey-of-mining-companies-2015>

Royalties represent the largest cost to Industry and, for coal in Queensland, the effective rate depends on the market price, making the cost to Industry something that varies over time.

A broad survey is probably the best indication of the competitive position, or at least Industry's perception of it. On that basis, Queensland is well placed globally, and in the middle of the selected States.

## 4.2 Western Australia

The comments provided by WA MRF have been deleted for this version of the report as they were provided on a confidential basis.

## 4.3 New South Wales

The comments provided by DRE have been deleted for this version of the report as they were provided on a confidential basis.

## 5 Estimate of rehabilitation cost

Prior to undertaking any financial modelling of FA systems, the Review assessed the reliability of the current rehabilitation liability estimate.

### 5.1 Review of case studies on FA claimed

The seven cases where the State has claimed FA or is in the process of making a claim were examined in the Interim Report.

In most cases, the operators were small to mid-tier and had ceased operating prior to the EP Act or before the 2013 FA Calculator was released. These cases do not assist in assessing the reliability of the current process for calculating the rehabilitation liability, though it is noted the operators used tactics to delay EHP when new PoOs were required.

For two cases, there is data that enables us to compare the current estimated rehabilitation cost to an estimate made using the FA Calculator while the company was still operating. The details are summarised in Table 10.

**TABLE 10: FA CALCULATOR ANALYSIS**

Operator	Estimated rehab cost	FA held	FA calculator estimate
Entity A	10.0M	2.0M	6.9 – 9.8M
-shortfall factor		x5.0	x1.4 – 1.0

Operator	Estimated rehab cost	FA held	FA calculator estimate
Entity B	13.0 – 80.0M	3.6M	29.0M
-shortfall factor		x3.6 – 22.2	x0.4 – 2.8

With Entity A, the operator lodged an updated PoO that estimated the rehabilitation cost at \$6.9 million, which EHP reviewed and estimated the cost to be \$9.8 million.

EHP advised the difference between the two estimates arose because:

- some activities were not included in the operator's estimate
- the input quantities for some activities were lower, and
- some of the pricing was disputed.

The current estimated rehabilitation cost of \$10 million is 40 per cent higher than the operator's 2015 estimate but is aligned with the EHP assessment. Because the company was placed into liquidation before the matter was resolved, it is possible that the FA Calculator provided an accurate estimate in this instance.

In the case of Entity B however, the FA Calculator's estimate of \$29 million is below the upper rehabilitation estimate by a factor of 2.8 times. In this instance, Entity B was using innovative technology and the environmental harm was not foreseen.

Key learnings from the analysis of the case studies are:

- all calculations of the rehabilitation cost should be current, with additional scrutiny for sites that are not operating
- there should be proactive, regular engagement with operators and prompt enforcement action where there is non-compliance, and
- for non-standard activities, an assessment should be made whether standard processes are appropriate and, where not, have bespoke processes devised for them. Examples of bespoke processes include additional monitoring techniques, mandatory reporting of key environmental measures on a regular basis, and the addition of activities in the FA Calculator.

## 5.2 Assessment of the rehabilitation cost estimation process

From stakeholder engagement and analysis of the data, a number of questions arise about the rehabilitation cost estimation process. These are:

- **Consistent calculation:** preliminary analysis of the data indicated a significant difference in the rehabilitation cost per hectare produced by Industry and EHP FA Calculators. Some of the difference relates to unreliable data on the area of disturbance but the allowance of different calculators increases the risk that the estimation of rehabilitation costs is not consistent or comparable

across the Industry. To ensure a consistent approach to estimation, the Government could mandate<sup>18</sup> the use of EHP's FA Calculator.

- **Accuracy of rates:** the FA Calculators use a Table of Values (ToV) with standard third party contractor rates to calculate the rehabilitation cost. Industry disputes the ToV rates as too high however the tool does allow for the use of operator-sourced quotes. A key challenge with these quotes is obtaining them for the period of the PoO, which can be up to five years, and ensuring the rates are accessible to EHP (ie, the quote is not reserved only for the site operator).

Another issue is the currency of the ToV rates, last updated in 2013. EHP is currently finalising a revised calculator with an updated ToV. There has been no formal assessment of the impact of the new calculator across the whole Industry but EHP estimates the net impact will be an uplift to estimates by 5 per cent. With Industry calculators there is no formal review process for default third party rates used.

- **Contingency:** there should be provision for contingency included in the FA Calculator, with the factor determined by the level of uncertainty regarding rehabilitation costs eg, higher in the early phase of a resource project, lower as progressive rehabilitation provides a better understanding of the site.
- **Project overheads:** feedback from the environmental groups and DNRM indicates the project management and the monitoring and maintenance allowances may be insufficient. A formal assessment should be made and the FA Calculator adjusted if required.

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<sup>18</sup> EHP should engage with Industry to ensure any key differences between EHP and Industry's calculators are considered and addressed, there is clear policy and  
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guidelines on the required rehabilitation standard and operators are required to have Mine Closure plans.

- **Net present value (NPV):** Industry holds the view that because rehabilitation expenditure will occur over an extended period, the cost should be discounted. However, discounting is not appropriate as the third party quotes are unlikely to be fixed for the life of any rehabilitation project, and the required escalation would offset any reduction from discounting.
- **Term:** the rehabilitation cost estimate in the PoO can be for periods of up to five years. More frequent review of the cost estimate should provide a more accurate assessment.
- **Accounting standards:** accounting standards require companies to recognise the cost to close down their resource operations. While the purpose and scope of the estimate is different to the EP Act requirement for a rehabilitation cost estimate, there should be some commonality between the two. Some Industry operators advised their FA estimate is the basis for their accounting estimate, while others said the two processes were completely separate. Confidence in both estimates may increase if there was the ability to reconcile.
- **Other calculators:** Only one stakeholder nominated another jurisdiction – Nevada in the United States – as having a better process. Nevada’s Standardised Reclamation Cost Estimator<sup>19</sup> looks very similar to the FA Calculator but with more worksheets and activities. An assessment of this tool should be made and any learnings reflected in the FA Calculator.

### 5.2.1 Views from developer of FA Calculator

The consulting firm that developed the FA calculators used by NSW, Victoria and Queensland also developed or contributed to calculators used by both the mid-tier and the largest resource companies in the State.

The consultant noted that the rehabilitation industry is in its infancy with little certified rehabilitation that can be used to assess the accuracy of any calculator. However:

- The ToV has been populated using data from recent actual or quoted work and provided to Industry bodies and, through them, to operators, for review and challenge.
- Project management costs in the private sector range from 8 to 12 per cent of the direct cost. The FA Calculator uses 10 per cent.
- The cost of environmental maintenance and monitoring is very difficult to estimate and would vary based on location (eg, higher near a national park).

The impact of the updated rates in the 2016 FA Calculator have not been assessed by the consultant for an individual operator. They did a rate comparison and found labour costs had decreased, diesel was unchanged and waste management, capping bores and mobilisation and demobilisation costs had risen. As mentioned previously, EHP estimates there will be a small net uplift to the overall rehabilitation liability.

<sup>19</sup> <http://www.nvbond.org/about.htm>



The consultant supports the concept of a risk based contingency, and possibly discount, to take account of different issues at different sites. For instance, the soil conditions, revegetation and acid mine drainage could be very different for mines at different locations.

### 5.3 Baseline adopted for modelling

Based on the analysis in the previous sections and the Interim Report, the key risks regarding the rehabilitation cost estimate in the agreed data set are:

- updated rates in the revised FA Calculator have not been used
- Industry calculators may understate the estimated cost, and
- for EAs that either do not have to submit a PoO, or have not had a PoO trigger that requires the use of the current (2013) FA Calculator, the estimate is likely to be understated

Unfortunately, the precise uplift required because of these issues cannot be determined from the information available<sup>20</sup>. Based on discussions with EHP, the uplifts adopted to address the potential understatement in the current rehabilitation cost estimate of \$8.1 billion increases the total to \$8.7 billion.

The uplifted estimated rehabilitation cost is assumed to represent the average expected rehabilitation cost for each site, recognising that the

actual cost will be in a range around that average (refer to Section 9.1 for further information).

### 5.4 Recommendations

In addition to improving the accuracy of the existing data set, recommendations specific to the calculation of the rehabilitation cost estimate are:

- Mandate the use of the EHP FA Calculator and rollout the revised version. It is noted that mandating the use of the EHP calculator is likely to be met with significant industry resistance given the investment made in developing their calculators. This resistance can be mitigated by engaging with Industry to identify concerns and develop a calculator that addresses all material issues.
- Introduce a risk-based contingency that reflects the potential variability in outcome. Inclusion of a contingency will require legislative change<sup>22</sup>. Factors that could be used to determine the level of contingency could include:
  - where the resource operation is in its project lifecycle (early stage, higher contingency)
  - the location and type of activity
  - the amount of progressive rehabilitation undertaken, and
  - the current status of operations.
- Test the current project overhead allowances against the State's experience.

<sup>20</sup> For instance, there is no date indicating when the rehabilitation estimate was last updated, to enable an assessment of how many pre-date the FA Calculator.

<sup>22</sup> Based on *Citicorp Corporation Limited v Chief Executive, Department of Environment and Heritage Protection* (No. 5) [2016] QLC 62 (31 October 2016)

- Based on risk criteria, reduce the term of a PoO to increase the frequency of the rehabilitation cost estimates, potentially annually.
- Establish a project with Industry to align the FA Calculator with the accounting requirements, where possible.
- Establish a process for the regular review of both the Calculator and the Table of Values.
- Analyse the Nevada calculator to identify whether there are any elements that should be adopted in the FA Calculator.
- Consider a process that involves independent third parties in verifying rehabilitation cost estimates.

## 6 Initiatives to improve management of the State's rehabilitation exposure

From the work completed for the Interim Report and the learnings from the stakeholder engagement, there are a number of proposals that should form the foundations to improve the management of the State's rehabilitation exposure.

Changes to improve the estimation of rehabilitation costs were outlined in Section 5.4. Other proposals that can be implemented, irrespective of the FA system adopted are:

- rehabilitation policy development, encompassing residual risk
- management of care and maintenance sites
- improved data and information systems
- clear governance framework
- approval process for sale of resource assets
- FA for small operators, and
- expansion of the abandoned mine program.

Collectively, these seven proposals, and the revision to the FA Calculator (in Section 5.4) are referred to as the Initiatives. A high-level implementation plan encompassing these Initiatives is contained in Section 11.

### 6.1 Rehabilitation policy development

The gap between the area of land disturbed and rehabilitated has grown over recent years: current estimates are that the rehabilitated area is approximately 9 per cent of the disturbance. The areas of certified rehabilitation represents less than one quarter of one per cent of the area of land disturbed.

These low rates of rehabilitation are likely to result in:

- poor environmental outcomes due to greater emissions of contaminants from sites
- poor community acceptance of mining activities in their communities
- increased cumulative liabilities for rehabilitation
- opportunity costs of failure to convert to alternative economic uses, and
- increased likelihood of the transfer of costs to the state from mines that disclaim tenure and/or are abandoned.

The requirement for an operator to rehabilitate the land is articulated through conditions included in their EA. Industry has committed itself to delivering high standards of rehabilitation and to progressively rehabilitate over the life of the operation.

For instance:

- *The resources sector does not consider rehabilitation as something that begins towards the end of the operation, but rather a process that begins in the*

*planning phase. To keep the disturbance footprint at minimum, resource companies aim to progressively rehabilitate the land as operations advance....*  
Queensland Resources Council website<sup>23</sup>

- *Rehabilitation of the land disturbed by mining needs to not be an afterthought, only starting towards the end of an operation but should instead be a continual activity. Responsible mining companies should undertake rehabilitative actions, including remedy of environmental risks, return of disturbed land and stabilisation of creeks and drainage channels across the full lifetime of an operation.*  
International Council of Mining and Metals<sup>24</sup> website.
- *Responsible environmental management over the life of a mining operation is essential for successful rehabilitation..... rehabilitation is undertaken not only at the end of a mine's life, but progressively during the mining process. This enables companies to meet rehabilitation obligations and minimise risk over the life of the operation.*  
Minerals Council of Australia, Mine rehabilitation in the Australian minerals industry (page 4), February 2016
- *Progressive rehabilitation aims to return a combination of grazing and bushland to all disturbed areas*  
BMA Norwich Park (East Pit) Coal Mine Proposal
- *Closure planning is integrated into operational activities. For example, progressive rehabilitation and remediation of any contamination minimises the restoration work required at closure, and ensures final rehabilitation is efficient and effective*  
Rio Tinto, Planning for post-mining land use<sup>25</sup>, 2013

Despite these public statements, the annual financial statements of the major resource entities show less than 7 per cent of the provisions for environmental restoration is classified as a current liability.

The development of clear whole of government expectations for rehabilitation would help guide decisions and clearly articulate the government's expectations for rehabilitation. EHP is proposing a Mining Rehabilitation Reform Project (MRRP)<sup>26</sup> to address opportunities to improve rehabilitation performance.

Without improved rehabilitation performance, the State will remain heavily reliant on the FA system. The MRRP plan identifies seven precursors to improve rehabilitation performance. These precursors provide the elements of a framework for an enhanced rehabilitation strategy and are:

- Clear whole of government expectations to guide decisions and clearly articulate the government's expectations for rehabilitation including subsequent land use, progressive rehabilitation, ongoing management areas and grant of tenure.
- Early and ongoing planning for rehabilitation, including setting strategic and achievable objectives for the life of mine and milestones to track progress throughout the operation.
- Enforceable requirements for progressive rehabilitation.

<sup>23</sup> <https://www.qrc.org.au/policies/rehabilitation/>

<sup>24</sup> Members include BHP, Mitsubishi, Rio, Glencore and Anglo-American.

<https://www.icmm.com/en-gb/environment/mine-closure/land-rehabilitation>

<sup>25</sup> <http://www.riotinto.com/sustainabledevelopment2013/governance/closure.html>

<sup>26</sup> On completion of the MRRP, EHP would look to extend the framework to the P&G sector

- Clear completion criteria and signoff requirements, including addressing the issue of residual risk.
- A viable rehabilitation service and technical support sector in Queensland that has the technical skills, services, experience and equipment to ensure cost efficient, effective rehabilitation.
- Ongoing assessment of rehabilitation performance to build shared understanding between the state, the mining company and the community about what the ultimate outcome for a site will be.
- High quality data to evaluate the sector's performance, including having a better understanding of current level of rehabilitation and to evaluate the sector over time.

EHP has identified the first and last prerequisites as the MRRP priorities. The importance of high quality data is discussed further in Section 6.3.

EHP proposes collaborating with DNRM, the Department of State Development, Infrastructure and Planning and the Department of Agriculture and Fisheries to deliver clear whole of Government expectations. To gain endorsement from Government, comprehensive and effective stakeholder consultation will be a key feature of this task.

The objectives of the MRRP are to:

- maximise the area of mined land that is able to sustain a post-mining land use
- minimise the time required to attain the post-mining land use though efficient mine operation and planning

- increase public confidence that mined land is being properly managed and rehabilitated
- reduce taxpayer exposure to potential environmental problems
- grow an efficient rehabilitation industry in Queensland.

The MRRP is incorporated into the overall implementation plan for the Review – refer to Section 11.

Benefits to the State:	Improved environmental outcomes including reduced erosion and sediment release, and improved water quality
	Reduced exposure to potential rehabilitation costs
	Earlier return of land to alternative uses, providing potential employment and economic benefits
	Growth in rehabilitation expertise and services industry
Benefits to Industry:	Certainty on the required rehabilitation task, enabling better planning and coordination, reducing costs
	Maintenance of their social license to continue resource activities
	Development of intellectual property on rehabilitation practices.

## 6.2 Management of care and maintenance sites

A resource operation is in care and maintenance (C&M) when production ceases and the site is managed to enable operations to commence at a later date.

Currently C&M is not a defined term in any act administered by EHP or DNRM and there is no formal requirement on operators to advise when the rights granted by the State to extract the resources are not being exercised.

While genuine operational issues may cause a site to go into C&M – eg, a (temporary) fall in the commodity price makes the operation uneconomical – it is also seen by some as a mechanism for operators to defer rehabilitation costs indefinitely.

Sites in C&M present a higher risk to the State with less operator personnel on site to maintain vital infrastructure and monitor performance. Progressive rehabilitation activities may cease and, under current processes, EHP and DNRM may have less visibility of the site. Entering into C&M may be a precursor to the operator's default. Often such sites slowly decline and only have their profile raised when environmental harm spreads to adjoining properties. The State also loses the opportunity to earn royalties. The interests of the State in C&M therefore crosses a number of portfolios.

A plan should be developed to ensure C&M sites have an elevated profile. Options for improving management could include:

- Requiring operators to identify in their PoO the conditions that would trigger their site to go into C&M.
- Requirement for operators to inform Government of the trigger that has caused them to enter into C&M, what is required to enable a return to production, and the expectation on how long they will be in C&M.

- Requirement for operators to provide EHP with an update on progressive rehabilitation and revised PoO during C&M.
- Clear requirements on operators in C&M as the period their site is in C&M extends, which could include:
  - requirement to increase level of progressive maintenance
  - mandatory review to determine whether the ML or Petroleum Lease (PL) continues, and
  - potentially, the eventual automatic surrender of the ML or PL.
- Annual review of the rehabilitation cost estimate and consideration on whether any loading is required to reflect the higher risk of C&M sites.
- Depending on the system in place, review the form of FA to ensure it continues to be appropriate.

Benefits to the State:	Better understanding of the state of distress within the Industry
	Earlier identification of sites at risk, enabling better management
Benefits to Industry:	Clarity on the processes required for sites in C&M
	Retention of social license for the broader Industry

## 6.3 Improved information systems

To understand the rehabilitation exposure and the risk to the Government, reliable, accurate and timely information is required. The Interim Report highlighted the urgent need for a system to produce such a data set for the current FA system.

Additional data will be required to monitor risks and provide enhanced reporting, including:

- the growing gap between new areas of disturbance and the area under rehabilitation
- the number of sites for sale
- the number of sites in C&M
- the impact of current commodity pricing on the viability of specific segments of the Industry
- the mix of operators along the cost curve
- the remaining life of resource projects
- the outlook for future royalty revenue, and
- the financial strength (based on credit rating) of the Industry and how it is relative to 12 months ago.

Extensive planning will be required to design an information system that can appropriately meet the Government's needs and, with the ability to capture and analyse key data, equip agencies to monitor and respond effectively to manage risks.

Benefits to the State:	Accurate determination of the potential cost
	Ability to proactively identify risks across the industry and act promptly
	Ability to monitor progress and act where it is below expectations.
Benefits to Industry:	Ability to engage with operators to assist them manage issues identified

Effective management of risks will enable minimisation of the cost of FA scheme

## 6.4 Governance framework

As occurs in other jurisdictions, management of the resources sector is split across government agencies. Some of the roles for each agency are determined by legislation, by regulation and by historical practice.

An independent review of the current roles and responsibilities should be undertaken to identify issues with current practices and to recommend streamlined processes going forward. Two examples of where this streamlining is already occurring are:

- FA record keeping, which is currently shared by the two agencies but in the process of being transferred to EHP, and
- delivery of rehabilitation for disclaimed tenures which has been delivered by EHP but is being transferred to DNRm's AMLP.

As noted in stakeholders' views (refer to Section 3.1.2), there is a perception of inconsistent application of rules and processes by EHP. The proposed rehabilitation policy development in Section 6.1 will assist in resolving these issues, but internal processes in each agency should also be reviewed, ideally in consultation with external stakeholders.

An assessment of the financial and data skills required for an effective FA system should also be considered. Some of the required skills to operate the system do not exist in EHP or DNRm – for instance,



assessing the financial capability of operators – and those functions should be outsourced to areas in government that already have the required capabilities.

Some changes may require amendments to legislation or regulation to ensure a clear framework for agencies to work in. For instance, the AMLP taking over rehabilitation of disclaimed sites may warrant clarification to ensure their costs can be claimed from FA.

Benefit to the State:	Efficient delivery of services in a coordinated manner. Consistent decision-making
Benefit to Industry:	Consistent decision-making and communication

## 6.5 Approval process on the sale of resource assets

A number of significant resource assets in Queensland are currently for sale. Where resource assets are subject to transfer or disposal, it is possible that the proposed transferee will represent a material difference in credit quality from a State perspective. Given the possibility of material increases in risk to the State as a result of asset transfers or disposals, the State needs to establish clear guidelines and processes to signal to the market what are the requirements for acceptable counterparties and to enable the prompt assessment of any proposals.

The sale of a resource asset requires the approval of DNRM, to transfer the tenure to the new owner. As the holder of tenure must be the

holder of the EA, the EA is simply transferred to the new tenure holder: there is no approval of the transfer of the EA. Coordination between the agencies on such transactions is therefore critical.

Where the sale of the resource asset occurs through the sale of shares in a company however, there is no right of review for the State the change of ownership. As a result, resources activities can be conducted by stakeholders that have not undergone any assessment by the State of their suitability. There are legal complexities, including companies' rights under the federal Corporations Act, which would need to be addressed in seeking to resolve this issue, but it is recommended the State seek to have the right to review the EA conditions where there has been a change of control or other material event to the entity.

Benefit to the State:	The State is dealing with operators with acceptable risk profiles and subject to appropriate controls
Benefit to Industry:	Clarity on acceptable counterparties for sale or transfer transactions

## 6.6 FA for Small Operators

The agreed data set contains approximately 3,600 smaller resource activity operators. These operators are able to comply with specific criteria relating to the type of activity, scale of disturbance and location, and currently provide FA based on simplified calculations or rates. These activities are approved under the EP Act as standard or variation approvals.

Activities subject to standard and variation approvals are generally considered to have more well-known environmental risks that can be managed or mitigated through standard conditions with a lower level of assessment than those activities that must apply through the site-specific application process. For many of these activities, the applicable FA rates have not been updated since 2001.

Looking at activities that have a total rehabilitation liability of less than \$50,000, the operators are generally small to medium explorers for gems, precious metal, coal, conventional oil and gas. However the categorisation will also capture small scale production activities, particularly small mining operations. Collectively, the Review will refer to them as Small Operators

Based on a preliminary assessment, EHP is proposing to undertake a review of the Small Operators, considering:

- the environmental impacts of small mining
- the current regulatory arrangements and FA amounts
- options to improve the calculation of the rehabilitation liability
- the appropriate forms of FA for Small Operators, and
- the implementation requirements for any change to the current system, including:
  - public consultation
  - legislative amendments, and
  - transition arrangements.

Based on EHP's project addressing the issues around Small Operators, the Review will focus on FA systems to manage the other, larger operators that provide the majority of the FA held.

## 6.7 Expansion of the abandoned mine program

The AMLP undertaken by DNRM is outside the scope of the Review. The FA IDC did advise however that any solution that could provide additional funding to the AMLP would be beneficial. DNRM was therefore requested to provide information on what the requirements of the AMLP are, how additional funding would be applied and what the benefits would be to the State.

Estimated at over 15,000 legacy sites across Queensland, the AMLP's focus is on approximately 3,500 abandoned mine sites on public land, of which 20 are significant..

The AMLP has developed a draft expanded program of works for the more significant abandoned sites, being those that if not remediated over the next 10 years would represent an ongoing, and likely increased, risk to public safety and the environment.

Until funding is available to undertake significant improvement works on these sites, the AMLP applies its recurrent funding of approximately \$6 million per annum (net of depreciation) to reduce the health and safety risks from abandoned mines. For instance, \$3 million per annum is spent on management of the historic Mt Morgan mine to minimise

acidic seepage and run-off that results in visible pollution in rivers up to 40 kilometres downstream from the site.

The final program should be developed based on best practice scientific analysis, stakeholder engagement, data collection and reporting. A good example cited by one stakeholder is British Columbia's Crown Contaminated Sites Program.

## 7 Assessment of current FA scheme

### 7.1 Overview of current scheme

The current FA scheme was described in the Interim Report and, in summary, the key elements are:

- An estimate of the rehabilitation cost is provided for site-specific EAs and EAs for Mining and Petroleum Leases for the maximum disturbance that will occur during the period of their PoO.
- The estimate can be calculated using the FA Calculator provided by EHP or an EHP approved Industry calculator.
- Operators inconsistently or subjectively interpret items in the calculator which can result in an insufficient amount of FA being held.
- The FA required can be less than the estimated rehabilitation if the EA holder is eligible for discounts of up to 30 per cent. Discounts are provided based on:
  - financial health of the operator
  - progressive rehabilitation and certification of the site, and
  - waste management practices at the site.
- The FA must be provided by an Australian Prudential Regulation Authority (APRA)-regulated bank rated A- or above, unless EHP agree to accept the FA in cash<sup>28</sup>
- One entity uses its captive insurer to provide the guarantees.

- FA for standard EAs<sup>29</sup> is based on a 2001 schedule of rates and specific risk criteria for the operator (eg, area, nature of activity).
- Per the agreed data set, the FA held is \$6.9 billion and the calculated rehabilitation liability is \$8.1 billion, the difference of \$1.2 billion due to the provision of discounts.
- Per the analysis in Section 5, the current estimated rehabilitation liability is \$8.7 billion.

### 7.2 Qualitative assessment

A financial assessment of the current FA scheme, or status quo, is provided in Section 9. On a qualitative basis, the following advantages and disadvantages of the current scheme are noted.

#### *Advantages*

- The State's assurance is provided by regulated third parties that have very low risk of default.
- All significant disturbances are put through an approved calculator to determine the estimated rehabilitation cost.
- Operators can be recognised and rewarded for positive behaviour through discounts on their FA.

#### *Disadvantages*

- A third party surety system can never generate positive cash flow for the State. It is structured to minimise the cash outflows.

<sup>28</sup> Predominantly Small Operators.

<sup>29</sup> Includes variation applications

- Where the FA held is less than the rehabilitation cost, there is no source of funding for the shortfall<sup>30</sup> and, to date, the rehabilitation work is reduced to the FA amount, following which the site is managed under the AMLP.
- The FA held is likely to be less than the rehabilitation liability because of the discount system.
- The discount system does not necessarily reflect the underlying risk of the operator defaulting. Operators with very different risk profiles may have the same cost of FA.
- Because Industry calculators are permitted, there is not necessarily a consistent basis for calculating or comparing rehabilitation costs.
- The cost of the bank guarantee system is onerous for mid-sized operators, in terms of both bank fees and the balance sheet impact.
- There is a narrow market for the provision of acceptable forms of guarantee and it is getting more difficult and costly for Industry to access.
- The FA held for EAs managed under a mining ERA standard is based on a 15 year old schedule and/or methodology. There has been no contemporary review to determine whether the amount of FA required covers the actual cost of rehabilitating the disturbance.

#### *Other matters noted*

- FA is a tool for managing financial risk, not incentivising progressive rehabilitation. Very little progressive rehabilitation is being done by Industry.

<sup>30</sup> It is noted that CORA enables the State to take legal action in certain circumstances, which may result in the regulator obtaining additional funds.

- The current data set is insufficient to effectively manage the risk, including the ability to track progressive rehabilitation.
- The AMLP receives funding of approximately \$8 million per annum from budget allocations that, after depreciation, provides approximately \$6 million to expend on the mines.

## 7.3 Provision of surety

As contemplated in the ToR, the Review is required to 'investigate the expansion of upfront rehabilitation bonds for resources companies to fully fund long-term rehabilitation activities.' With the exception of one entity's captive insurer and FA held as cash from Small Operators, FA is provided as guarantees from banks that are APRA regulated and have a credit rating of A- or above.

In discussion with industry (refer Section 3.1), expanding the mechanisms permitted for the provision of FA would be a key benefit.

### 7.3.1 Expanding the market

It is recommended that the State expand the market for the provision of upfront rehabilitation bonds, or surety, beyond the Australian regulated banking sector to include other entities (including insurance companies). The criteria adopted should be consistent with the protocols applied by QTC in managing the State's borrowing and investment program.

An alternative surety to a guarantee is an escrow deposit, where cash is placed on deposit with the State or a financial institution, and is held in favour of the State ahead of other creditors. It is recommended the State explore the potential use of other forms of FA, including escrow, which could provide the State both with unconditional access to the relevant funds when this is needed and protect the State's interests in a way which is comparable to FA provided by a bank guarantee

It is recommended the State also explore the potential use of other forms of FA, which could provide the State both with unconditional access to the relevant funds when this is needed and protect the State's interests in a way which is comparable to FA provided by a bank guarantee. This will broaden counterparty diversification. While there are no immediate concerns with third party surety providers, a process of regular review of counterparties, concentration risks and a notional aggregation with other State exposures would further improve effective governance.

## 7.4 Enhanced status quo

The jurisdictional review in the Interim Report found the most common type of FA scheme was based on individual guarantees generally provided by a bank on behalf of the resource operators.

In addition to the changes proposed in Sections 5.4 and 6, the current Queensland FA scheme could be enhanced by the removal of the discount arrangement, so the FA held matches the estimated

rehabilitation cost. The cost impact on the Industry for the Enhanced Status Quo would be significant.

## 8 Alternative frameworks

### 8.1 Options considered

The jurisdictional review in the Interim Report identified two key models for FA:

- the individual responsibility model, where operators provide the state with a guarantee for each site, and
- the pooled model, where operators pay an annual contribution into a fund.

With the individual responsibility model, the guarantee is usually provided by a third party (a bank or insurance company) though some jurisdictions accept:

- insurance policies (Nevada and Ontario)
- trust funds (South Africa)
- company guarantees (North America), or
- pledges of assets (Yukon, limited use).

The Review undertook a high-level consideration of these alternative instruments for use in an individual responsibility model and determined:

- the instruments did not meet the desired outcomes of the Review (refer to Section 2.4), and
- the instruments themselves are rarely used and/or there is limited availability in the market (acknowledging that in some instances a market develops once a need arises).

The Review also considered the Risk Evaluated FA (REFA) model<sup>33</sup>. While the REFA model takes a risk based approach, the principles of individual responsibility and discounting the liability are not compatible with protecting the State's financial interests.

The focus for alternative frameworks therefore was on pooled models. Some work has already been undertaken for this approach by EHP/Projects Queensland (pooled model) and DNRM (prudential model).

In theory, a pool offers the same protection for government at lower cost to industry, provided that:

- participation requirements mitigate the risk of adverse selection and moral hazard<sup>34</sup>
- contribution rates reflect operator risk, and
- systemic/portfolio risks can be mitigated (ie, the risk of multiple events in one time period is low, and/or the fund is sufficiently large).

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<sup>33</sup> Under the REFA model, the amount of FA required is weighted according to the entity's insolvency risk.

<sup>34</sup> The lack of incentive for the operator to take due care of the site as they are protected, by the pool, from the consequences.



Most jurisdictions have retained the individual responsibility model because the above conditions are hard to satisfy without significant administrative complexity. The benefits offered by a pooled model must therefore warrant the additional effort required by government.

The Review initially considered a fund for all operators but identified a number of fundamental issues with such an approach, discussed in Section 8.2. To address those issues, the portfolio was segmented and solutions designed to meet the specific requirements, resulting in the Tailored Solution (refer Section 8.3).

## 8.2 Universal fund

In a universal fund, all EA holders would be mandated to participate in the scheme and pay a contribution reflecting their financial risk, based on their credit rating (actual, implied or assumed).

The approach to modelling the financial outcomes for all options is outlined in more detail in Section 9, but the modelling indicated two main issues with the universal fund, being:

- Very large, low-risk entities distort the fund because, while the probability of default is low, the consequence is significant, and so the outcome has high volatility.
- Large, high-risk entities distort the contribution rate required to maintain a positive balance in the fund because the probability of default is so high.

It would take a fund hundreds of years to accumulate sufficient monies to cover any claim from such operators.

One of the key principles of an assurance fund is reasonable homogeneity of participants and the inclusion of very large or high-risk entities is incompatible with those principles. An alternative option was required.

## 8.3 Tailored Solution

### 8.3.1 Segmentation of the FA portfolio

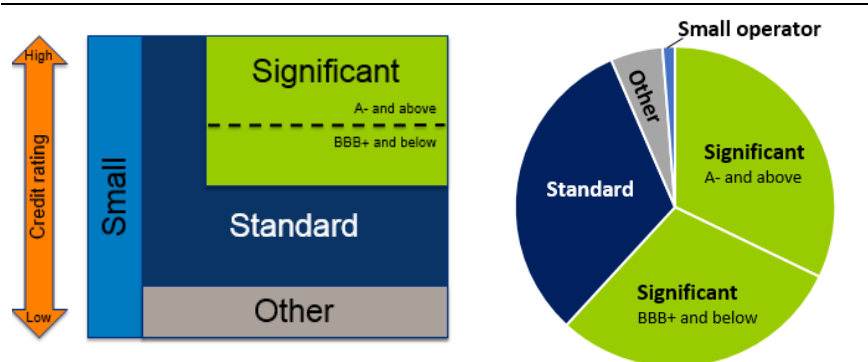
In designing an alternative FA system that takes account of different levels of risk to the State, the portfolio was assessed and resource entities allocated into one of four categories:

- **Significant** resource entities are operators that represent five per cent or more of the State's total rehabilitation cost estimate.
- **Small Operators** are resource entities that have a total rehabilitation cost estimate across all of their EAs of less than \$50,000. These operators are subject to a separate review to be undertaken by EHP – refer to Section 6.6.
- **Other** resources entities are rated close to default (rated CCC+ and below or identified by the State as high risk) and pose a higher financial risk to the State.
- **Representative** resource entities are all those not in one of the other categories and have a homogeneous profile in terms of size

of their estimated rehabilitation cost and being an acceptable financial risk.

These four categories are summarised in the following diagram, depicted based on credit rating (left side) and estimated rehabilitation cost (right side).

**FIGURE 1: SEGMENTATION OF RESOURCE ENTITIES**



Source QTC

It is acknowledged that the segments as depicted in Figure 1 represent the cumulative development of the Industry in Queensland to date and may change in future.

### 8.3.2 Components of the Tailored Solution

The composition and financial risk profile<sup>36</sup> of each segment in Section 8.3.1 was individually considered as part of the Review and a solution adapted to meet their specific profile.

#### *Component 1: the Rehabilitation Fund*

As stated, a principle for an efficient fund is the members be relatively homogeneous in terms of risk and size, without which the range of outcomes is more varied and there is greater inequity between entities.

The Representative resource entities are sufficiently homogeneous for this purpose and a Rehabilitation Fund (RF) can be established for these operators. Members of the RF would pay an annual contribution based on their estimated rehabilitation cost, at a rate that reflects their financial risk.

The financial risk of an operator rating would be determined by a credit ratings agency or, where no rating is available, by assessing the financial data provided by the operator. Should an operator not provided the necessary data, they cannot participate in the RF.

The RF will accumulate contributions and draw-downs would be made to meet the cost of rehabilitation where a site is returned to the State. Options for interest earned on the RF is discussed in Section 8.4.2.

<sup>36</sup> The Tailored Solution does not segment based on commodity, though that could be considered in future – refer Section 8.4.4 for discussion on separating P&G.

### *Component 2: Third party surety*

As revealed in the modelling for the Universal Fund, entities with a higher financial risk or that are very large cannot be effectively managed within a pooled model. These entities are therefore excluded from the RF.

Because entities classed as Other represent a higher a risk to the State, they will be required to provide third party surety. The very large, or Significant entities will also be required to provide third party surety, unless their risk is low enough for them to be eligible for the Selected Partner Arrangement (see Component 3).

As noted in the assessment of the current FA scheme (status quo), the individual responsibility/third party surety model puts a lot of emphasis on correctly assessing the probable rehabilitation cost, and ensuring the FA held matches that estimate. Therefore, as with the Enhanced Status Quo system, there is no discount scheme proposed under the Tailored Solution. Some operators may be able to avail of the expanded surety options set out in Section 7.3.1 to reduce the cost of their FA.

### *Component 3: Selected Partner Arrangement (SPA)*

For Significant resource entities rated A- and above, the financial risk to the State has an extremely low probability of default (historically less than 0.1 per cent per annum) but a very high consequence. This exposure may be reduced if sites can be sold, given default.

To create an income stream that could be applied to improve outcomes for both the Industry and the community, the State could take on the

risk of these entities – the Selected Partners – and charge a contribution calculated using a similar approach to the RF. The State gains a reliable source of funding and the operators benefit by freeing up borrowing capacity. Setting the contributions at the same rate as the RF will demonstrate equitable treatment and enable a seamless transfer between categories if required in the future. For those entities, the cost of the contribution should be similar to the payments they currently make to the surety provider.

Limiting the SPA to entities rated A- or better, the risk of default is very low and if a company's credit rating slips one or two notches, it remains investment grade. As such, it should be able to provide the State with third party surety (although potentially at a higher cost than the SPA).

For this component of the Tailored Solution, the State's main exposure is in scenarios where there is a dramatic change to the credit worthiness of an A-rated entity such that it cannot secure third party surety. Based on S&P historical data, the risk of an A-rated entity migrating to below investment grade (BB+ and below) is between 0.5 and 2.2 per cent over one to three years.

It is critical to the operation of the RF and the SPA that appropriate management actions and controls are in place including maintaining the integrity of data, regular (ie, annual) reviews of the contribution rates, monitoring of experience and participants and adherence to the established business rules.

### 8.3.3 Business rules for the Tailored Solution

#### *New entrants*

For each new EA or where an existing EA is transferred, the following rules would apply to determine which component of the Tailored Solution applied:

- For existing known operators, their additional site would be treated the same as their other sites.
- For new operators with a credit rating, or sufficient financial history to assign a rating, the allocation criteria for the different segments (refer to Section 8.3.1) would apply ie, if Representative, the operator would go into the RF; if classified as Other, they would need to provide third party surety.
- For new operators with no credit rating and insufficient financial history to establish one, third party surety would be required.

#### *Change to rating of existing operator*

Through the improved, regular monitoring processes that will be established, changes to the credit rating of an existing operator should be promptly identified. Using the segmentation rules in Section 8.3.1, operators can be moved between components of the Tailored Solution but discretion should be applied to determine the appropriate course of action. That is, each case should be assessed individually.

For example, an operator that has been in the RF since inception, undertaken all progressive rehabilitation as planned and is in the

process of closing their site, may not be required to provide third party surety because their credit rating is now assessed as below B-.

#### *Moral hazard and other challenges*

One of the risks of a fund approach, as opposed to the individual responsibility of a bank guarantee, is ‘moral hazard’: a lack of incentive to guard against risk as operators are protected from its consequences. The State’s Chain of Responsibility amendments to the EP Act address one aspect of this risk by, among other things, enabling the State to pursue related parties for costs incurred by resource entities.

This risk has been considered and addressed in developing the framework for the recommended model by:

- restricting membership of the RF to known operators with an acceptable risk profile
- improved data and monitoring of operators to identify stressed companies as early as possible and manage the risk accordingly, and
- requirement for mine closure planning from commencement and progressive rehabilitation to minimise the exposure.

Other challenges with a pooled model (referred to in the Interim Report and Section 8.1) are addressed through:

- tiered contribution rates to reflect operator risk (see Section 9.2.2), and
- improved data and monitoring and the exclusion of certain entities so the systemic/portfolio risk is reduced to a reasonable level.

### *Joint ventures and ultimate parents*

The agreed data set does not provide sufficient information to assess joint ventures or identify the ultimate parent companies for all sites.

A key complexity for the current FA system and any alternative is the treatment of joint ventures. Each participant is a separate legal entity, with obligations to the joint venture that can be treated mutually or separately. Irrespective of the option selected, this issue should be addressed as a priority, so proper Industry consultation can occur.

If the Tailored Solution is endorsed as the FA system, clear rules will need to be developed to assess the credit rating to apply to subsidiary companies, and what the requirements are for being able to adopt the parent company rating.

## 8.4 Other considerations

### 8.4.1 Appointment of the funds' manager

The effective operation of the SPA and RF will require complex skills, systems and processes that do not currently exist in either EHP or DNRM.

As noted in Section 6.4, rather than create this capability in those agencies, the State should assess whether there are existing areas within government that could be engaged to provide the required services, in an independent and efficient manner.

### 8.4.2 Interest earned

The SPA and RF will earn interest on the contributions held. Over the first five years of the Tailored Solution FA system, interest earned is forecast to total \$19 million (refer to Section 9.2.4). This interest, while earned on the contributions from the Industry, is not Industry money. The Government can elect to:

- retain the interest in the funds
- use it to fund specific work for Industry's benefit
- use it to fund the AMLP, or
- use it to fund innovation in the sector.

Examples of innovation projects that could be funded with this income stream include:

- research and development (R&D) on the extraction of minerals from tailings dams
- R&D on monitoring tools to assess residual risk, or
- a pilot for mine closure by a third party contractor.

### 8.4.3 Tiered contribution rates

The financial modelling in Section 9 for the Tailored Solution uses a relatively simple tiered system for contribution rates, based on the operator's credit rating. The agreed data set is too limited to warrant any refinement of the contribution rates for different types of commodity or type of mining.

Once the data systems are established and reliable data produced for 'deep dive' analysis, a more refined system of rates could be considered. Any benefits derived from such refinement of pricing should be considered against the added complexity being introduced and the risk operators are incentivised to 'game' the system to achieve a better financial outcome for them.

#### 8.4.4 Separate pool for P&G

In stakeholder engagement, representatives of the P&G sector stated that if a pooled model was proposed, P&G should be in a separate pool to the mining sector. The rationale for the separation is that:

- P&G and mining have different risk profiles, and
- P&G funds should not be used to fix legacy issues from the mining industry (based on previous proposals to direct interest earned to the AMLP)

Acknowledging the P&G industry has a different risk profile to the mining industry, a separate P&G rehabilitation fund would be distorted by a number of large players, similar to the inclusion of oversized entities in the Universal Fund.

It is recommended that the Tailored Solution commence with one RF that includes all resource activities. Once the data systems are established and historical data accumulated, consideration could be given to differential pricing by resource type, or establishing a separate P&G fund.

#### 8.4.5 Insufficient monies in the fund

The RF is designed to provide the Government with the funds necessary to complete the rehabilitation of a site, where the operator is unable to do so, to the standard required under the EA. If the RF has insufficient monies to fund the planned rehabilitation work, the State has the option to:

- schedule the rehabilitation work over a period that will enable the RF to fund it
- reduce the level of rehabilitation being delivered for that site (though this is against one of the key drivers for adopting the pooled model)
- increase the contribution rates paid by Industry, unless the shortfall in the RF is a timing issue and the longer-term forecast is for a positive balance, or
- top-up the RF from Consolidated Funds, to be repaid when the RF has capacity, as occurred in establishing the WA MRF.

It is noted that the SPA has not been designed to hold sufficient funds in the unlikely event that one of the operators is unable to undertake the rehabilitation of their sites. In such a scenario, other factors may be in play for the State, but the options outlined above for the RF are also available.

#### 8.4.6 Reinsurance

Under the Tailored Solution, the fund manager is responsible for analysing the various risks from FA (mostly relating to credit and/or

rehabilitation costs) and may, within the agreed governance framework, consider various forms of risk mitigation.

Assessing risk from a whole-of-State perspective (notionally aggregated with other State risks) and the State's incremental risk appetite, various instruments could be considered including forms of reinsurance<sup>38</sup>, with subject matter expertise support within Government entities including QTC and the State Actuary.

Generally these reinsurance products will reflect market pricing and therefore are most likely to only have value in circumstances where the State has a concentrated exposure it desires to offset or it has a strong view on the need to reduce exposure because of the whole-of-State position.

By way of example if the State was to have a \$1 billion credit exposure to a SPA entity (ie, unsupported by third party surety in the new framework) then the State would collect contributions and could use those monies to buy a credit default derivative from a bank. This decision could be considered in the context of direct (eg, long term assets) and indirect (eg, investments in the GOC ports that ship the commodities and general economic growth) exposures the State has to the entity. The efficacy of the derivative would also need to be considered: in what circumstances will the SPA entity be unstable but the reinsurance counterparty still be stable?

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<sup>38</sup> Options include direct reinsurance, forms of direct/indirect derivative products and whole-of-State offsets.



## 9 Financial assessment of options

Three options for the FA system were selected for financial analysis:

- status quo (SQ) – the bank guarantee FA scheme as currently operated
- enhanced status quo (ESQ) – a bank guarantee FA scheme but without discounts and with the Initiatives assumed to be in place, and
- Tailored Solution (TS) – as outlined in Section 8.3, and with the Initiatives assumed to be in place.

The modelling uses the agreed data set established on 1 September 2016, supplemented with additional data on:

- parent entities
- group credit ratings
- the expected remaining life of the resource, and
- the quartile<sup>39</sup> each site is in on the global cost curve of the respective commodity.

In all options, the rehabilitation liability estimate starts at \$8.7 billion (refer to Section 5.3) in Year Zero, and escalates over time. For SQ, the FA held is the \$6.9 billion in Year Zero and for ESQ, it matches the estimated liability, at \$8.7 billion. For entities providing third party

surety under the TS option, the FA held is assumed to equal the rehabilitation liability for that site (ie, the same as ESQ).

All figures in this chapter are in nominal terms, unless otherwise stated.

### 9.1 Overview of approach

#### 9.1.1 Expected loss (EL)

The financial model developed for the Review is based on individual EAs and for each EA, or site, it estimates the potential requirement for FA using a risk-based approach.

The model estimates an expected loss to the State based on the following elements:

$$EL = Pd \times Rc \times PoNSSGD$$

where:

- Pd is the probability the site's operator will go into financial default and be unable to complete the outstanding rehabilitation work
- Rc is the estimated rehabilitation cost for that site, and
- PoNSSGD is the probability of no site sale given default. That is, for operations that have gone into default, what is the likelihood the site cannot be sold to another operator, and the State will therefore be responsible for undertaking the rehabilitation.

<sup>39</sup> The cost curve ranks sites based on their production costs and categorises them into quartiles, with Q1 being the lowest cost and Q4 the highest cost producers.

Each of these factors is briefly discussed below.

For systems that have third party surety, the formula changes slightly to include the recovery of FA held in determining the cost to the State:

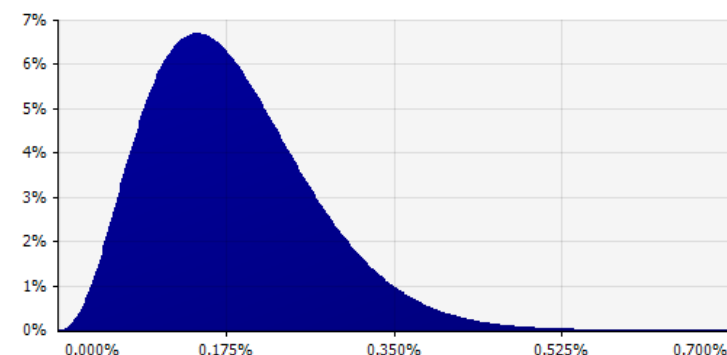
$$EL = Pd \times (Rc - FA) \times PoNSSGD$$

### 9.1.2 Probability of default (Pd)

Probability of default uses S&P historical global weighted-average default rates for a 1 year period over the last 35 years (from 1981 to 2015). Use of these historical default rates assumes they are a good predictor of future default rates. This assumption may not hold true but it has been adopted in the absence of a better alternative.

For each credit rating, the model constructs a distribution of probability of defaults around the average Pd as shown in Figure 2 for a BBB rated entity.

**FIGURE 2: PROBABILITY OF DEFAULT DISTRIBUTION – BBB ENTITY**



*Source QTC*

The distributions (one for each credit rating) are based on a high-level curve of historical default rates<sup>40</sup> and the approach has been confirmed by Queensland's State Actuary as not unreasonable for the purposes of government policy decisions.

In the event the default rates are higher than historical (for instance, due to sustained systematic downturn in the resource sector), a stressed scenario is modelled which assumes the probability of default is doubled<sup>41</sup>.

Given the Industry is closely linked due dependency on commodity prices and through contractual arrangements, when the operator of a site defaults, the probability of other sites defaulting increases. This

<sup>40</sup> The high-level Pd distribution is used to reflect the variation in default rates and is approximated from observations of historical default rates.

<sup>41</sup> This stressed scenario is a proxy for a scenario where entities received a credit downgrade of two notches.

correlation is factored into the modelling using the correlation factors shown in Table 11.

**TABLE 11: CORRELATION OF DEFAULTS**

	Coal	Minerals	P&G
Coal	0.80	0.20	0.50
Minerals	0.20	0.70	0.20
P&G	0.50	0.20	0.95

A high correlation for the probability of default is expected within the same commodity type. For example, P&G entities are assumed to be highly correlated with each other (0.95) because there are three dominant players and cross-selling arrangements in the sector. This correlation is incorporated into the distribution curve.

### 9.1.3 Rehabilitation cost (Rc)

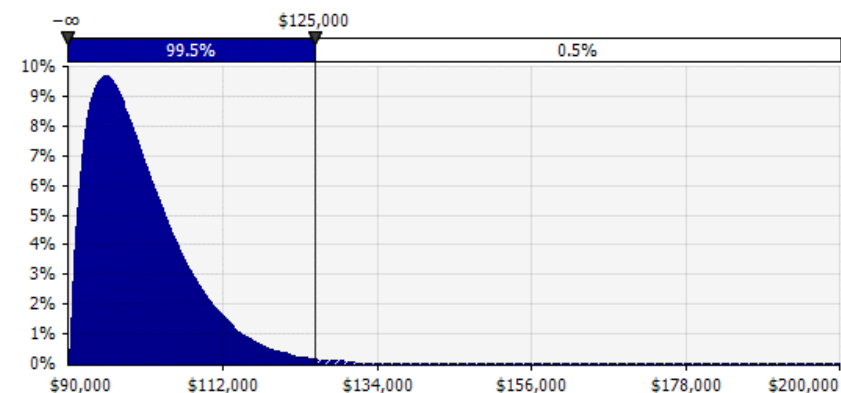
Rehabilitation cost is assumed to be estimated by a revised FA Calculator.

As outlined in Section 5.3, the current rehabilitation cost estimate has been uplifted from \$8.1 billion to \$8.7 billion and recommendations made to improve the reliability of the estimation process.

The modelling undertaken for the Review assumes that, in future, the estimated rehabilitation cost represents the average rehabilitation liability (the Rc) the State would potentially incur.

As with Pd, the modelling for Rc constructs a distribution of outcomes around the average. Figure 3 depicts the distribution constructed for a mineral mine site with an average Rc of \$100 million, based on the actual rehabilitation cost occurring in a range of 0.9 and 2.0 times the average. As shown in the chart, the majority of results are around the average, with 99.5 per cent of the outcomes below \$125 million.

**FIGURE 3: REHABILITATION COST DISTRIBUTION – MINERALS**



Source QTC

The distribution range for coal and P&G sites is 0.9 to 1.5 times the average. The wider range adopted for mineral sites produces a greater variability in outcomes to reflect the more diverse environmental risks associated with such mines. These ranges are estimates only and were

set in consultation with the Review's Working Group<sup>42</sup>. The distributions<sup>43</sup> have been confirmed by Queensland's State Actuary as not unreasonable for the purposes of government policy decisions.

#### 9.1.4 Probability of no site sale given default (PoNSSGD)

The probability of no site sale, given default, recognises that where a site's operator goes into default, the rehabilitation liability is only transferred to the State if the site cannot be sold to another operator.

This factor considers the quality of the site in determining whether there is a likely buyer in the event of default based on a combination of site life remaining and production cost curve, as set out in Table 12.

**TABLE 12: PROBABILITY OF NO SITE SALE, GIVEN DEFAULT**

Commodity	Cost curve	Mine life		
		<5 years	5-10 years	>10 years
Metallurgical coal	Q1	40%	40%	10%
	Q2/Q3	50%	40%	30%
	Q4	60%	50%	40%
Other	Q1	60%	50%	30%
	Q2/Q3	60%	60%	40%

<sup>42</sup> The Working Group comprised representatives of DNRm, EHP, DPC and QT.

<sup>43</sup> Because of the parameters set (high range above the mean, very narrow below), the model can only produce ranges of 0.9 to 1.5 for minerals, and 0.9 to 1.4 for coal.

Commodity	Cost curve	Mine life		
		<5 years	5-10 years	>10 years
	Q4	70%	60%	60%

The rationale is that a high cost (Q4) resource site nearing the end of its economic life is unlikely to have a buyer, which would result in the rehabilitation liability being borne by the State. Metallurgical coal is considered a more attractive resource, therefore a lower PoNSSGD is applied (ie, higher chance of finding a buyer in the event of default).

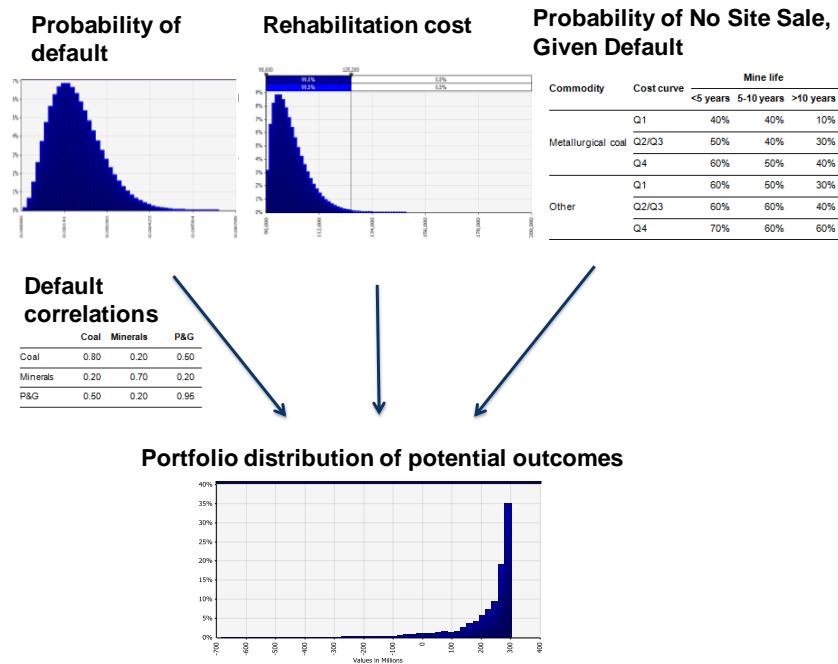
There is little data on the sale of sites where the operator has gone into default, so the probabilities in Table 12 are estimates only and were confirmed as reasonable by the Working Group.

#### 9.1.5 Calculation of expected and unexpected loss

The base formula for expected loss is the average estimated loss to the State. In reality there is likely to be a range of outcomes and this is modelled through the use of distributions for Pd and Rc. A Monte Carlo simulation<sup>44</sup> uses the distributions of Pd and Rc as inputs to derive a distribution of outcomes of losses to the State. The approach is summarised in Figure 4.

<sup>44</sup> A computerised mathematical technique that uses a random sampling of distributions to calculate the range of outcomes for quantitative risk assessment.

**FIGURE 4: INPUT FACTORS USED TO DERIVE DISTRIBUTION OF OUTPUTS**



Source QTC

The average outcome and the 99.5<sup>th</sup> percentile<sup>45</sup> (or the one in 200 year event) can be determined from the resulting loss distribution. There is a potential loss greater than the UEL, being the maximum estimated loss or the 100<sup>th</sup> percentile.

<sup>45</sup> The portfolio of potential outcomes has been shown to be positive where there is an overall gain, or negative where there is an overall loss. The 99.5<sup>th</sup> percentile, commonly used in insurance industry for assessing the amount of capital required to

It is important to consider the range of possible outcomes for the State in order to test the State's risk appetite, particularly given the tail risks associated with the coincidence of multiple adverse events (ie, a scenario where multiple resource entities default, and in each case the rehabilitation costs are significantly higher than that estimated by the FA Calculator).

## 9.2 Other modelling inputs

### 9.2.1 Future growth of the rehabilitation liability

The modelling looks at the outcomes over a five year period, based on five discrete annual scenarios. Each year, the estimated rehabilitation liability is increased to reflect the net additional disturbance that will accrue and the general escalation in costs, as follows:

- the growth in disturbance is:
  - P&G sites, 5 per cent per annum
  - metallurgical coal and minerals, 2.5 per cent per annum, and
  - zero for thermal coals and coal sites that did not specify a type.
- escalation is at 2.5 per cent per annum.

protect the insurer against extreme events, is calculated as the 0.5<sup>th</sup> percentile of the distribution.

## 9.2.2 Contribution rates for funds

It is proposed that differentiated contribution rates be applied to entities participating in the funds, reflecting the risk profiles of those entities.

Contribution rates to the SPA and RF have been set following consideration of:

- The 'insurance rate' determined using actuarial methods applied by insurers to cover average losses plus a return on the notional capital at risk<sup>46</sup>, and
- the cost of the current surety arrangements to Industry.

These rates and the nominated contribution rates are summarised in Table 13.

**TABLE 13: COMPARISON OF RATES**

Credit rating	Insurance rate	Current surety	Nominated rates
A- and above	0.3%	0.25% – 0.75%	0.5%
BBB range <sup>47</sup>	0.7%	0.50% - 1.25%	1.0%
BB & B ranges <sup>48</sup>	2.6%	1.25% - 4.00%+	2.75%

The method for setting contribution rate is based on the credit rating of the operators because of its simplicity and general acceptance as a tool

<sup>46</sup> As advised by State Actuary, the insurance rate is based on minimum contribution rate plus a risk margin (calculated as EL at the 99.5<sup>th</sup> percentile less average EL, multiplied by Government's insurance WACC) plus administration fee.

for assessing financial risk. It is noted that once funds have been established and with the benefit of more reliable data, the Government may consider additional risk factors determine a more segmented approach in the future, incorporating:

- Commodity type
- Mine life
- Production cost curve
- Operator behaviour.

An assessment will need to be made to ensure the added complexity provides a better outcome for the State and Industry.

The contribution rates will be subject to periodic review to reflect changes in the Industry and to ensure the funds remain effective in managing the State's financial risk.

## 9.2.3 Administration fee

The cost to establish the funds (and associated systems) and their ongoing management of the fund will need to be determined. For the purposes of modelling, it is assumed that there is an administration fee embedded in the proposed contribution rates above, at 0.1 per cent of rehabilitation cost for the SPA and 0.2 per cent of rehabilitation cost

<sup>47</sup> Upper and lower end of the range eg, BBB+ to BBB-

<sup>48</sup> Includes non-rated entities.

for the RF. The higher rate of administration fee for the RF is to reflect the higher administration effort required.

#### 9.2.4 Portfolio losses

Using the approach outlined in Section 9.1, a distribution of modelled outcomes was produced for each the three FA systems. These distributions show the cumulative 5-year outcome for the State using Monte Carlo simulations, calculated with 50,000 iterations.

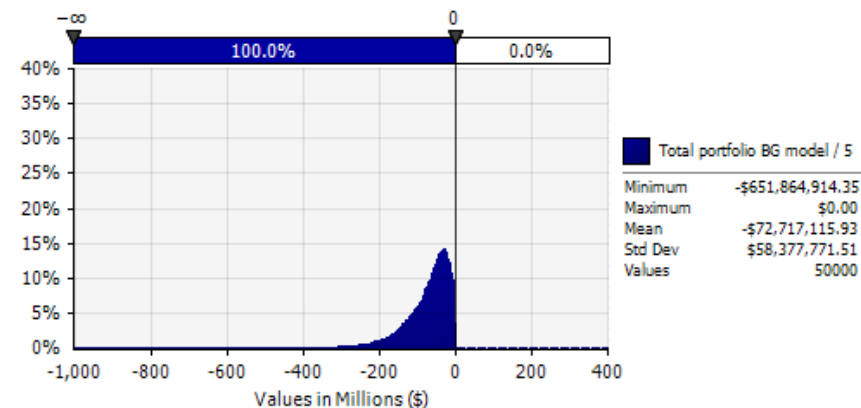
A summary of the EL and one in 200 event outcomes for the three options are shown in Table 14 based on the distributions depicted in Figure 5 to Figure 7.

**TABLE 14: NET FINANCIAL OUTCOME AFTER 5 YEARS (\$'MILLIONS)**

FA Option	Expected outcome <sup>49</sup>	One in 200 outcome
Status Quo	(73)	(307)
Enhanced Status Quo	(11)	(61)
Tailored Solution	223	(212)

<sup>49</sup> Positive figures represent positive Fund balance and those in brackets represent a cost to Government. For Status Quo and Enhanced Status Quo outcomes represent  
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**FIGURE 5: STATUS QUO – 5 YEAR CUMULATIVE PORTFOLIO VIEW**



Source: QTC

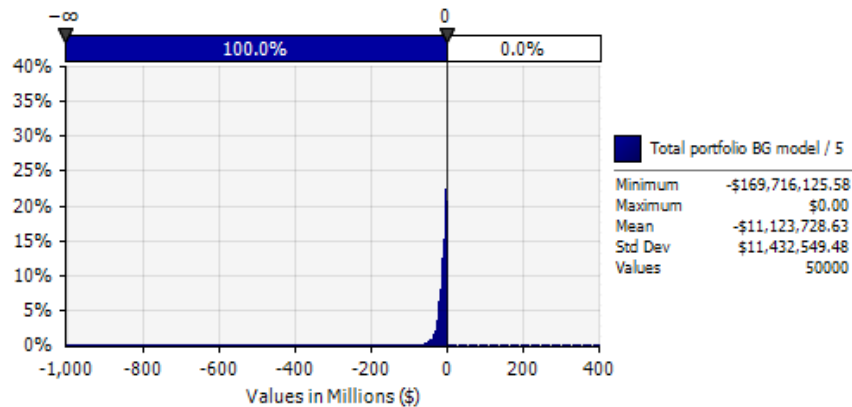
The key points for the Status Quo portfolio view in Figure 5 are:

- As a third party surety FA system, the best outcome achieved is a zero loss for the State.
- The average or expected loss (EL), is \$73 million for the five year period.
- The one in 200 outcome (UEL) for the period is a loss of \$307 million

EL and UEL, while for Tailored Solution outcomes represent a combination of fund balances for SPA and RF and EL/UEL for the third party surety segment.



**FIGURE 6: ENHANCED STATUS QUO – 5 YEAR CUMULATIVE PORTFOLIO VIEW**



Source: QTC

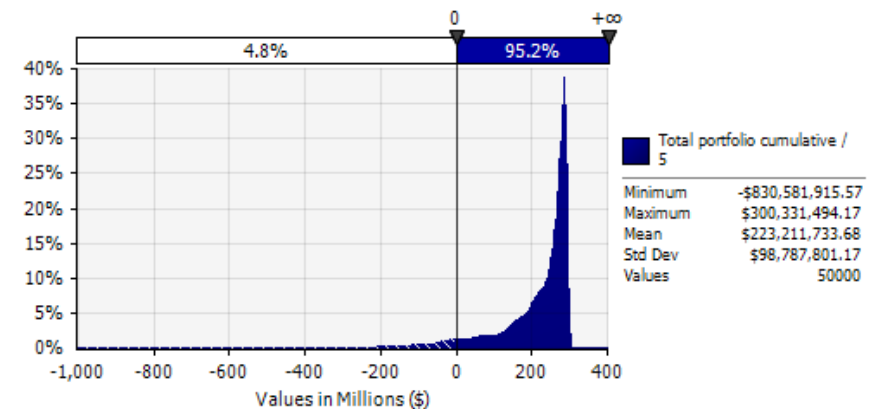
Under the Enhanced Status Quo, Figure 6 clearly depicts the much narrower distribution of outcomes achieved through the removal of discounts and raising of FA held to match the uplifted estimate of the rehabilitation liability. The key points to note are:

- Again, as a third party surety FA system, the best outcome achieved is a zero loss for the State.
- The average or expected loss (EL), is \$11 million for the five year period.
- The one in 200 outcome (UEL) for the period is a loss of \$61 million

<sup>50</sup> The impact of the 5% uplift and the loss of the full 30% discount.

To achieve this better (but still negative) outcome for the State, the impact to Industry of the Enhanced Status Quo option is an increase to the cost of FA by an average of 27 per cent and, for individual site-specific operators the range would be between 5 and 50<sup>50</sup> per cent.

**FIGURE 7: TAILORED SOLUTION – 5 YEAR CUMULATIVE PORTFOLIO VIEW**



Source: QTC

For the Tailored Solution, the objective is for the State to hold funds from which rehabilitation costs can be paid. Figure 7 depicts the consolidated outcome for a system that, unlike the Status Quo and Enhanced Status Quo, comprises three distinct components (being the SPA, the RF and third party surety). The key points to note are:

- The State is projected to hold surplus funds in 95 per cent of instances.

- Based on an expected loss (EL) of \$74 million over the five year period, the State should have a net positive outcome of \$223 million.
- Based on a one in 200 event adverse scenario, the State would have a cash outflow, net of contributions paid by Industry, of \$212 million.

The Tailored Solution represents an approach different to the Status Quo and Enhanced Status Quo due to the incorporated funds' arrangements, which make the range of outcomes look significantly different.

Table 15 summarises key data for the three distinct components of the the Tailored Solution:

**TABLE 15: SUMMARY OF TAILORED SOLUTION CASH FLOWS - EXPECTED LOSS SCENARIO (\$' MILLION)**

Component	Contribution to funds	EL	Interest	Admin Fee	Net outcome
SPA	80	(4)	5	(16)	66
RF	245	(61)	14	(32)	167
Surety	-	(9)	-	-	(9)
<b>Total</b>	<b>326</b>	<b>(74)</b>	<b>19</b>	<b>(48)</b>	<b>223</b>

Contributions to the funds are based on the nominated rates set out in Table 16:

**TABLE 16: NOMINATED CONTRIBUTION RATES**

Credit rating	Nominated rates
A- and above	0.5%
BBB range <sup>51</sup>	1.0%
BB&B ranges <sup>52</sup>	2.75%

The EL for the SPA is a statistical outcome only and left in for consistency. In reality, no claim would be expected from an entity in the SPA and if there was, it would be expected to be significantly larger than the \$4 million shown.

For the RF, the calculated EL is more logical, as it would comprise a number of mid-tier operators who defaulted over the five year period. For the third party surety component, it is the same approach as the ESQ but for a subset of operators: the loss represents the shortfall between the FA held and the rehabilitation liability incurred.

Under the SPA and RF, on the basis surplus funds are held in an investment account, interest will accrue. The model assumes a return of 2.5 per cent on the average balance of the funds over the year, compounding.

The final element in determining the net outcome for the State – the administration fee – reflects standard insurance practice and assumes the contribution rates charged include an administration fee to pay for

<sup>51</sup> Upper and lower end of the range eg, BBB+ to BBB-  
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<sup>52</sup> Includes non-rated entities.

the system. Over the five years, the Government would be paid \$48 million to establish the scheme, and for on-going administration.

Neither the SQ or ESQ options make any contribution to administration of their systems. While the operation of the funds under the TS would incur costs (personnel and systems), much of the data required should be the foundation for any FA system (refer to Section 6.3).

The potential revenue to the State under the TS for the five years is therefore:

- the SPA net outcome of \$66 million
- the administration fees earned of \$48 million
- the interest on the RF of \$14 million, and
- the EL on the SPA of \$4 million, which is not expected to be incurred and therefore increases the net outcome in the SPA.

As noted in Section 8.4.2, interest earned on the funds may be used for other purposes (eg, the abandoned mines program) and so the full compounding effect shown in Table 16 may not be realised.

#### 9.2.5 Stress scenario: probability of default is doubled

The analysis above is based on best-estimate assumptions to determine the Expected Loss. The Review also considered the effect on the

options for FA systems if there is an underlying change in one of the key inputs.

The scenario selected is an increase in the Probability of Default parameter (ie, the probability that a site will go into financial default and be unable to complete the outstanding rehabilitation work). Such a scenario could be associated with:

- a general downturn in the resources sector affecting all participants
- additional defaults associated with moral hazard<sup>53</sup> on the commencement of a pooled arrangement, or
- incorrect rating of underlying entities, given the variety of corporate structures and potential for rating migration for rated entities.

This stress scenario using the probability of default is chosen to illustrate the impact of a change in this parameter where the outcome is not completely within the State's control. It is noted that in such a scenario, the PoNSSGD would also probably deteriorate.

Modelling has been undertaken to estimate the impact if the historical S&P probability of default is doubled, reflecting a stressed scenario where the resources sector experiences a period where higher default rates are sustained over a five year period. This stress scenario is a proxy for credit rating downgrade of two notches.

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<sup>53</sup> The lack of incentive for the operator to take due care of the site as they are protected, by the pool, from the consequences

The stress scenario reflects a change in the underlying experience compared to the assumed experience, distinct from consideration of the Unexpected Loss (one in 200 year event). With the UEL, the underlying long-term experience may be unchanged, but a poor outcome can occur in a single year owing to random fluctuations away from the long-term trend.

Looking at the outcomes from this stressed scenario:

- the Tailored Solution is still expected to produce positive results, and
- the range of possible outcomes for the State increases.

### 9.3 Bank fees

Based on information provided by Industry, it is estimated that banks earn about \$44 million per annum on the provision of \$6.2 billion in guarantees under the current FA system.

This estimate is summarised in Table 17. The bank fees for entities rated below investment grade is based on comments that the majority of these operators would have cash collateralised arrangements. For such arrangements, the Industry advised they paid a fee of 0.5 per cent of the guarantee. For those that do not have to cash collateralise, the fee to the bank could be up to 3 per cent.

**TABLE 17: ESTIMATE OF CURRENT BANK FEES PAID BY INDUSTRY**

Description	FA held \$'B	Bank fee %	Bank fee \$'M
Entities rated A- and above	2.5	0.5	12.5
Entities in the BBB range	1.6	1.0	15.9
Other entities	2.1	0.75	15.6
<b>Sub-total</b>	<b>6.2</b>	<b>-</b>	<b>44.0</b>
FA provided in other forms	0.7	n/a	n/a
<b>Total</b>	<b>6.9</b>	<b>-</b>	<b>44.0</b>

## 9.4 Balance sheet implications

### For the State

The annual Report on State Finances of the Queensland Government, produced by QT, has the following statement in its contingent liability note:

*Financial assurances are required for mining projects to cover the rehabilitation liability should a mining leaseholder fail to undertake rehabilitation. The liability to undertake rehabilitation work remains the responsibility of the mining leaseholder. The State's responsibility in regards to rehabilitation is limited to managing any potential public safety and health risks only. At reporting date, it is not possible to determine the extent or timing of any potential financial effect of this responsibility.*

There is a contingent asset note that refers to the value of FA held in bank guarantee and cash. Other than the cash held of approximately \$45 million, the current FA system is predominantly off-balance sheet for the State.

Under the Tailored Solution, the RF is forecast to be a positive fund that would be recognised on the Balance Sheet, presumably as Cash and other assets held in trust. Based on EL, the RF balance is forecast to be \$167 million at the end of five years and in 15 or 20 years, the RF could accumulate to be a substantial fund for the State.

If the RF is held by QTC, there is the potential for the money to be managed in a way that delivers the best whole-of-State outcome (eg, the fund could count as part of the State's liquidity or offset the State's debt), particularly from a credit rating perspective.

The contributions collected through the SPA are not expected to be held long term. QT may seek independent accounting advice about the implications of the SPA for the State's balance sheet.

### **For Industry**

Discussions with industry indicate that the requirement to provide a bank guarantee can be a significant constraint on an operator's balance sheet. By offering a fund option, there will be less utilisation of the credit capacity, freeing the balance sheet for increased borrowing.

Increased leverage could lead to a discernible increased percentage return on equity (given the same return on assets) at not necessarily

higher risk. The benefit depends on the size of the balance sheet relief as a percentage of balance sheet and the subsequent possible increase in degree of leverage. By way of example a resource entity with 30 per cent gearing and a requirement for a 10 per cent bank guarantee could improve its pre-tax return on equity by approximately 0.6 per cent by switching from the guarantee facility to borrowings.

## **9.5 Resource and funding requirements**

For the successful and timely delivery of the proposed program, appropriate resourcing will be required. The program will require new complex policy development, significant stakeholder engagement, multi-agency coordination, revised systems and processes (for data and information systems), implementation program management and delivery, and expanded skills for agencies.

Some of the skills required to service this model include finance, accounting, risk analysis, rehabilitation specialist, project management, stakeholder/communications, legal and administrative decision making. The agencies impacted will also need revenue certainty to implement and administer the entire FA system, not just the fund.

To ensure a coordinated approach and certainty for delivery, QT could provide funding as a loan that would be progressively repaid from the revenue streams developed by the scheme.

## 10 Evaluation and recommendation

The three options to be evaluated are:

- Status Quo (SQ)
- Enhanced Status Quo (ESQ), and
- Tailored Solution (TS).

The evaluation has been made against the evaluation criteria in Section 2.4 and using the rating scale set out in Section 2.5, a zero to five rating where:

- zero is 'totally fails to satisfy the requirement' and
- five is 'very high standard, exceptional outcome, definite strengths'.

### 10.1 Evaluation of FA options

#### 10.1.1 Environmental performance

FA is a tool to address the financial risk to the State and, based on the analysis for this Review, no evidence was found of it having a positive, material impact on the environmental performance of an operator.

The evaluation approach therefore considers whether the FA option supports the Initiatives (refer to Section 6) to raise the level of environmental performance.

The Initiatives do not exist in SQ and therefore the SQ option has been rated as not contributing to environmental performance and rated a 0.

For both ESQ and TS the Initiatives are assumed to be implemented and, on the basis there is no misalignment between the Initiatives and either FA option, each is rated 'adequate' (a score of 3).

Under the TS however, a funding stream will be created that Government can use for activities that actively support the Initiatives and can be applied to remediate abandoned mines, agency resources to improve monitoring of the Industry and innovation support. The TS option has therefore has been rated more highly, and given a 4.

ToR objective	Status quo	Enhanced status quo	Tailored Solution
High level environmental performance	0	3	4

#### 10.1.2 Protects State's financial interest

The criteria for this desired outcome assess how well is the State protected against the Expected Loss and the one in 200 year event, or the Unexpected Loss by the FA systems. The financial outcomes are summarised in Table 18.

**TABLE 18: NET FINANCIAL OUTCOME AFTER 5 YEARS (\$'MILLIONS)**

<b>FA Option</b>	<b>Expected outcome<sup>55</sup></b>	<b>One in 200 outcome</b>
Status Quo	(73)	(307)
Enhanced Status Quo	(11)	(61)
Tailored Solution	223	(212)

A positive outcome for the State is only possible under the TS option and, based on the contribution rates proposed, after five years it is estimated to produce a net surplus for Government in the Expected Loss scenario. This options has therefore been rated a 5.

Over five years, ESQ's EL is negligible (on a per annum basis equates to approximately \$2 million) and so it has been rated a 3 (adequate). The EL for SQ is significant at an average of \$15 million per annum and so it has been assigned a rating of 1 (clearly inadequate).

Looking at the one in 200 outcome, all options are forecast to provide a negative outcome. In rating these extreme outcomes, it is recognised that systems are designed to cope with such events, not completely avoid the outcome. As occurs under the current FA scheme, the State is not obliged to undertake the rehabilitation for disclaimed or returned sites: the cost represents an environmental cost, not necessarily a financial cost.

<sup>55</sup> Positive figures represent positive Fund balance and those in brackets represent a cost to Government.

The ESQ loss equates to a cost of \$12 million per annum, an exceptional outcome for a one in 200 event and reflected in its rating of 4 (does not meet minimum standards). The losses for the SQ and TS solutions in the hundreds of millions are inadequate and initially both rated as such (a score of 1). However, the fund arrangements under the TS would enable the State to revised contribution rates and over time potentially recoup some of the losses, so it has been moved up one notch.

<b>ToR objective</b>	<b>Status quo</b>	<b>Enhanced status quo</b>	<b>Tailored Solution</b>
Protects State's financial interest			
▪ Expected loss	1	3	5
▪ Unexpected loss	1	4	2

### 10.1.3 Not a disincentive to Industry

Based on stakeholder engagement, the Industry does not support the current system, believing it to be expensive and restrictive (in terms of narrow market of banks, difficulties in accessing discounts). It is therefore rated a 2 for large operators and, because of the higher cost for mid-tier operators, a score of 1 is applied for them. The treatment of Small Operators with FA below \$50,000 is addressed as one of the Initiatives – refer to Section 6.6).

The ESQ option removes discounts and is based on a higher rehabilitation cost estimate and so is rated as totally failing to satisfy the requirement not to be a disincentive to mid-tier players (rating of 0). For larger operators, the expansion of surety to overseas banks and insurance companies may reduce the impact of the loss of discounts, and so a rating of 1 is applied.

Among the mid-tier operators and the Association of Mining and Exploration Companies (AMEC), a pooled fund like the RF has very strong support. The rating is reduced because the revised FA Calculator is expected to result in a higher rehabilitation cost and the potential requirement for more frequent PoOs increasing costs. The rating is therefore a 4.

The segmentation of the TS option makes the assessment for larger operators more complex. Rating each segment separately, a weighted average rating of the TS option for large operators is 2.2.

ToR objective	Status quo	Enhanced status quo	Tailored Solution
Not a disincentive to Industry			
▪ Large operators	2	1	2.2
▪ Mid-tier operators	1	0	4

#### 10.1.4 Satisfies community expectations

The final evaluation criteria relates to communities expectations. For funding to ensure full rehabilitation of the site:

- the TS option with its socialised pool can achieve that, but it is noted there are some operators with third party surety, so the overall rating is a 4 (high standard).
- the other two options will result in a shortfall in funding for rehabilitation in some instances, but the removal of discounting under the ESQ option should reduce the frequency. The ratings applied reflect those outcomes (SQ a 1, ESQ a 3).

The ability to avoid significant losses has been partially assessed under the criteria to protect the State's financial interests. From a community perspective, the issue of losses is considered on the basis of frequency.

The SQ will continue to regularly produce losses because of the discount system and so it is rated a 2 (obvious weakness). The ESQ and TS options should limit the losses significantly. For TS, the Government should have surplus funds 97.5 per cent of the time and potentially provided whole-of-State benefits. Both options have therefore been rated a 4.

ToR objective	Status quo	Enhanced status quo	Tailored Solution
Satisfy community expectations			
▪ Fully fund rehabilitation work	1	3	4
▪ Avoid significant losses	2	4	4



### 10.1.5 Overall evaluation

Applying the weightings to each evaluation criteria and the score assigned above, the overall rating for each FA option is set out in Table 19.

**TABLE 19: EVALUATION OF OPTIONS**

ToR objective	Weighting	Status quo	Enhanced status quo	Tailored Solution
High level environmental performance	10%	0	3	4
Protects State's financial interest				
▪ Expected loss	25%	1	3	5
▪ Unexpected loss	25%	1	4	2
Not a disincentive to Industry				
▪ Large operators	15%	2	1	2.2
▪ Mid-tier operators	15%	1	0	4
Satisfy community expectations				
▪ Fully fund rehabilitation work	5%	1	3	4
▪ Avoid significant losses	5%	2	4	4
<b>Overall weighted score</b>	<b>100%</b>	<b>1.1</b>	<b>2.6</b>	<b>3.5</b>

Based on these scores, the options ordered by ranking (highest to lowest) are rated as follows:

Option	Rating
Tailored Solution	Between <b>high standard</b> , some definite strengths, and <b>adequate</b> , satisfies minimum standards, meets criteria however a few weaknesses
Enhanced status quo	Between <b>low</b> , does not meet minimum standards, some obvious weaknesses and <b>adequate</b> , satisfies minimum standards, meets criteria however a few weaknesses
Status quo	<b>Very low</b> standard, clearly inadequate, several definite weaknesses or a major weakness

## 10.2 Recommendation

The previous section took an analytical approach to evaluate each option and computed a score that rated the Tailored Solution the best option.

To determine a *recommended* option, an assessment is required to ensure the proposed solution actually delivers the Government's objectives and does not have any material weaknesses. For instance, a fundamental issue with the ESQ option is the material negative impact on the cost to Industry, making it difficult to implement without significant resistance from Industry.

The TS option offers the Government some significant benefits:

- A pool of funds that can be applied to fund other initiatives, such as abandoned mines or innovative solutions.

- A socialised fund so that, other than in extreme events, there is a sufficient funds to complete rehabilitation to the required standard.
- A benefit to the majority of industry (but not for a significant minority) through a reduction in the cost of business.
- A significant contribution to the cost of the FA system, through the administration fees charged on the SPA and RF.

The TS option does expose the Government to incurring a potential loss in extreme scenarios. The risk is however less than the risk borne under the current scheme and should reduce over time as the fund balance is forecast to grow.

The recommended option is predicated on the basis the Initiatives are implemented concurrently. Without that, the moral hazard and financial risk under the TS is too great.

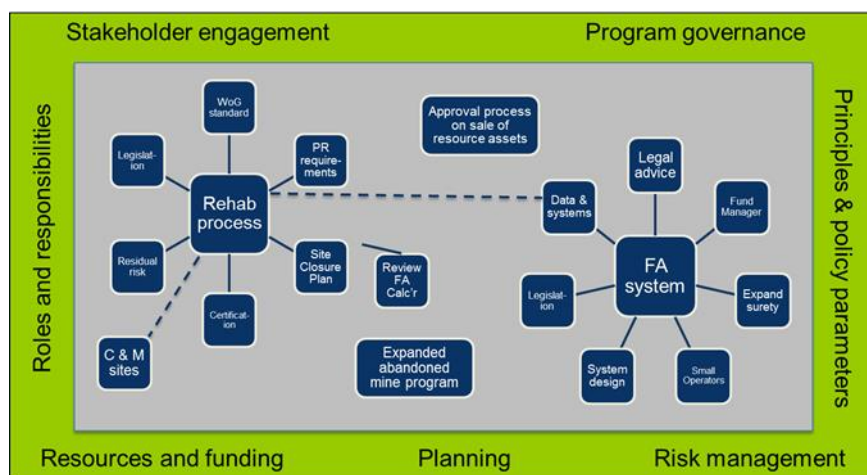
Taking all these factors into account, the Review recommends the Tailored Solution for consideration by Government.

# 11 Implementation program

If agreed to by Government, the recommendations in this Review will require substantial changes to legislation, administrative responsibilities and funding arrangements. The number of stakeholders involved in the Review (both internal to government and external) provides an insight into the scale of the implementation task. Transitional arrangements are likely to be complex.

While outside the scope of the Review, Figure 8 summarises the key implementation tasks, and the framework required to underpin it.

**FIGURE 8: IMPLEMENTATION PROGRAM**



Source QTC

## 11.1 Framework for implementation program

There are seven principles identified for the implementation framework:

- Principles and policy parameters
- Roles and responsibilities
- Program governance
- Planning
- Risk management
- Stakeholder engagement, and
- Resources and funding.

The first two principles are key to the success of the implementation program: getting clarity on what the acceptable outcomes are to Government and who is responsible and accountable for the different functions.

Principles and policy issues that will need to be addressed include:

- Defining broad parameters that will be the basis of the minimum rehabilitation standards for:
  - new sites
  - existing sites, where the work undertaken to date may restrict future options, and
  - abandoned mines.
- The acceptability of mandating for certain requirements.

- Identification of the negotiable and non-negotiable elements.
- Willingness for the State to bear residual risk.
- Approach to stakeholder engagement.
- Commitment to the provision of resources and funding.

The roles and responsibilities framework is broader than assigning specific tasks in the implementation plan. As noted in the jurisdictional review, all states share the management of their resources industry among a number of agencies. And with the recommended FA system, additional skills and capabilities will be required (eg, management of the funds, detailed assessment of credit risk), introducing other agencies into the process.

It is recommended that a thorough, independent review of the current allocation of responsibilities be undertaken and recommendations made on where specific functions most appropriately reside, from the perspective of both internal government processes and seamless engagement with external stakeholders.

Resources and funding is discussed in more detail in Section 11.3, but the other elements of the framework should not pose any issues if the first two have been appropriately established.

## 11.2 Implementation tasks

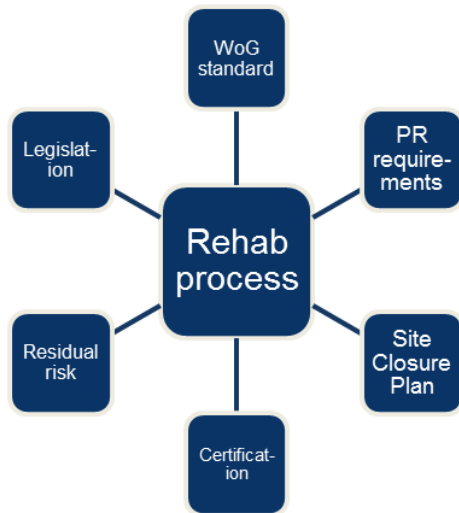
The implementation tasks relate to the Initiatives (Sections 5.4 and 6) and the Tailored Solution and have been logically grouped as follows:

- Rehabilitation process
  - Rehabilitation policy development (Section 6.1)
  - Management of C&M sites (Section 6.2)
  - Review of the FA Calculator (Section 5.4)
- FA system
  - Implementation of Tailored Solution (Section 8.3)
  - FA for Small Operators (Section 6.6)
  - Improved information systems (Section 6.3)
  - Expanded forms of surety (Section 7.3.1)
- Approval process on sale of resource assets (Section 6.5)
- Expansion of abandoned mine program (Section 6.7)

The initiative on the governance framework (Section 6.4) is covered under Roles and Responsibilities in the implementation framework discussed in Section 11.1.

The issues to consider in implementing the rehabilitation process are summarised in Figure 9.

**FIGURE 9: REHABILITATION PROCESS – IMPLEMENTATION TASKS**



*Source QTC*

Key issues to note from the above are:

- The need for a whole of Government view on rehabilitation standards will underpin the whole process. As part of the implementation framework, the Government will establish the high level parameters, but these will need to be developed and may be different depending on the resource type, the site location etc.
- On the basis that an accurate calculation of the rehabilitation liability requires a detailed understanding of the plan for the site, the Review of the FA Calculator is shown in Figure 8 as dependant on the development of requirements for site closure plans.

- For Industry to have certainty that its efforts in progressive rehabilitation will be recognised, the process of certifying the work will need to be defined.
- It is anticipated that the nature of the changes proposed will require legislative change, and so that process will need to be factored in and ideally aligned with the legislative program for the FA system.

**FIGURE 10: FA SYSTEM – IMPLEMENTATION TASKS**



*Source QTC*

Figure 10 sets out the key areas required for implementation of the Tailored Solution. It is recommended that the data and system requirements for all Initiatives be addressed in the development of the FA system. The data and systems are critical for the effective management of the State's FA risk.

Other tasks that will be required include:

- Selection of a fund manager.
- Transition arrangements for entities no longer required to provide third party surety.
- Legal advice to ensure the structure of the FA system (mainly the contributions to the funds) is not under the Commonwealth's jurisdiction.
- Development of business rules on how joint ventures participate in the Tailored Solution.
- Advice to ensure the structure of the FA system does not trigger any accounting implications for the liabilities that are currently noted as contingent.
- Development of business rules for making a claim on the RF.
- Plans on how the SPA contributions and interest on the RF will be applied.
- Legislative change to enable the estimation of rehabilitation liability to include a contingency.
- Potential development of a code of practice for estimating the cost of rehabilitation, similar to the JORC<sup>56</sup> Code, which provides a mandatory system for the classification of exploration results, mineral resources and ore reserves according to the levels of confidence in geological knowledge and technical and economic considerations.

## 11.3 Development of implementation plan

For a program of this scale, complexity and required stakeholder engagement to be successful, the requisite governance, resourcing, funding and project management skills will need to be confirmed in a timely manner.

High level program administration costs have been estimated and provide a basic assessment for administration of the Tailored Solution and may well contribute to the delivery of associated projects, including policy development.

The first stage of any implementation program would be the development of a more thorough scope of work and budget, which considers individual project timetables to meet the program milestones. Each component will require appropriate scheduling and resourcing to meet the program aims and, combined, form the overall plan and budget.

It is recommended that, prior to consideration by Government, the FA Working Group coordinate and develop an initial program plan that considers all tasks, a draft schedule and budget.

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<sup>56</sup> Joint Ore Reserves Committee.

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