



# ASX Announcement

28 October 2019

ASX: PWN  
FSE: 4IP

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## UPDATED INVESTOR INFORMATION RESOURCES INCLUDING NEW PRESENTATION

### Overview

**Parkway Minerals provides update on new resources now available including:**

- Updated Investor Presentation
  - Provides details on the new technology leveraged business model and the aMES™ roll-out strategy.
- New Website
  - Additional information on the aMES™ technology and new projects acquired through the recently completed Consolidated Potash Corporation (CPC) transaction.
- Proactive Investors Australia Interview
  - Interview with Executive Director of Parkway Minerals, Bahay Ozcakmak provides corporate overview and outlines how the Karinga Lakes project is an effective case-study of how integration of the aMES™ technology can potentially transform a project.

Parkway Minerals NL (ASX: **PWN**) (“**Parkway Minerals**” or the “**Company**”) is pleased to advise that the Company has recently released a number of new investor information related resources to coincide with the recent completion of the Company’s 100% acquisition of CPC.

Details and corresponding links to the respective investor resources can be found in the investors section of the new Parkway Minerals site at:

<https://www.parkwayminerals.com.au/investors>

The updated Parkway Minerals investor presentation has also been appended to this announcement.



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Or visit the Parkway Minerals website at:

[www.parkwayminerals.com.au](http://www.parkwayminerals.com.au)



## About Parkway Minerals

Parkway Minerals (ASX: PWN) has assembled a portfolio of high-quality resource projects focused on the sustainable production of fertiliser minerals as well as lithium salts, which can be found in certain naturally occurring brines.

Through our strategic investment in Davenport Resources (ASX: DAV), we own a material interest in a globally significant potash resource in Germany, and also own a direct 100% interest in the Dandaragan Trough Project (DTP), where we have invested in excess of \$10 million over 8 years, to delineate one of the world's largest potassium and phosphate containing glauconite/greensands deposits.

In addition to the K-Max® technology developed specifically for processing glauconite feedstock from the DTP, we recently acquired the innovative aMES™ technology, which has been developed to process a range of challenging brine streams from the mining industry, in order to recover valuable minerals and produce fresh water.

Whilst the aMES™ technology is applicable to the processing of a broad range of brines, Parkway Minerals is currently focused on leveraging this state-of-the-art technology to improve the efficiency, sustainability and ultimately the profitability of global potash production, by enabling the development of more innovative project development concepts. A recent scoping study highlighted the advantages of incorporating the aMES™

technology into the development concept for the Karinga Lakes Potash Project (KLPP). In addition to the KLPP, our ongoing piloting and evaluation studies of several third-party potash projects continue to provide further encouragement of the transformative potential of the aMES™ technology.

As we move forward with our plans to improve global potash production, at Parkway Minerals, our vision is even more ambitious. We plan to, "transform global brine processing methods, through innovative technology, to improve sustainability, and create value."

### Capital Structure

At 25 October 2019

1,220,515,079 fully paid shares

246,600,643 Partly paid ordinary shares  
(paid to \$0.001, unpaid \$0.019)

55,126,000 \$0.02 unlisted options, expiring  
17 August 2020

### Board of Directors

Adrian Griffin (Non-Executive Chairman)

Patrick McManus (Managing Director)

Bahay Ozcakmak (Executive Director)

Patrick Power (Non-executive Director)



# Investor Presentation

28 October 2019

ASX: **PWN**

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[parkwayminerals.com.au](http://parkwayminerals.com.au)

# Disclaimer



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All securities transactions involve risks which include, among others, the risk of adverse or unanticipated market, financial or political developments.

Certain statements contained in this presentation, including information as to the future financial or operating performance of Parkway Minerals NL ('Parkway Minerals' or 'the Company') and its projects and technologies, are forward-looking statements. Such forward-looking statements are necessarily based upon a number of estimates and assumptions that, while considered reasonable by Parkway Minerals, are inherently subject to significant technical, business, economic, competitive, political and social uncertainties and contingencies, involve known and unknown risks and uncertainties that could cause actual events or results to differ materially from estimated or anticipated events or results reflected in such forward-looking statements, and may include, among other things, statements regarding targets, estimates and assumptions in respect of potash and phosphate production and prices, operating costs and results, capital expenditures, ore reserves and mineral resources and anticipated grades and recovery rates, and are or may be based on assumptions and estimates related to future technical, economic, market, political, social and other conditions including the satisfactory performance of certain technologies developed and/or acquired by Parkway Minerals. Parkway Minerals disclaims any intent or obligation to update publicly any forward-looking statements, whether as a result of new information, future events or results or otherwise. The words 'believe', 'expect', 'anticipate', 'indicate', 'contemplate', 'target', 'plan', 'intends', 'continue', 'budget', 'estimate', 'may', 'will', 'schedule' and other, similar expressions identify forward-looking statements. All forward-looking statements made in this presentation are qualified by the foregoing cautionary statements. Investors are cautioned that forward-looking statements are not guarantees of future performance and, accordingly, investors are cautioned not to place undue reliance on forward-looking statements due to the inherent uncertainty therein. Many known and unknown factors could cause actual events or results to differ materially from estimated or anticipated events or results reflected in such forward-looking statements. Such factors include but are not limited to: competition; mineral prices; ability to meet additional funding requirements; exploration, development and operating risks; new technology related risks; uninsurable risks; uncertainties inherent in ore reserve and resource estimates; dependence on third-party smelting facilities; factors associated with foreign operations and related regulatory risks; environmental regulation and liability; currency risks; effects of inflation on results of operations; factors relating to title to properties; native title and Aboriginal heritage issues; dependence on key personnel, and share price volatility. They also include unanticipated and unusual events, many of which it is beyond the Company's ability to control or predict.

## DINNER HILL RESOURCE STATEMENT

*Information in the presentation that relates to the Mineral Resource estimate for Dinner Hill is fully described in the ASX release of 26 September 2017. The Company is not aware of any new information or data that materially affects the information included in this presentation. All material assumptions and technical parameters underpinning the Mineral Resource estimates and Exploration Target in this presentation continue to apply and have not materially changed. The K-Max Scoping Study referred to in this presentation was fully described in the ASX release of 10 January 2013, while the Phosphate Scoping Study was released on 19 September 2013 and updated on 30 September 2015. Both are based on low-level technical and economic assessments and are insufficient to support an estimation of Ore Reserves, provide assurance of an economic development case at this stage or provide certainty that the conclusions of the Scoping Study will be realised. All material assumptions and technical parameters used in the Scoping Study and included in this presentation continue to apply and have not materially changed. Parkway Minerals has concluded that it has a reasonable basis for including the forward-looking statements provided in this presentation.*

### Competent persons' statements

*The information in this report that relates to the estimation of Exploration Targets and Mineral Resources is based on and fairly represents information and supporting documentation prepared by J.J.G. Doepel, a member of the Australasian Institute of Mining and Metallurgy. Mr Doepel, principal geologist of the independent consultancy Continental Resource Management Pty Ltd, has sufficient experience relevant to the style of mineralisation and type of deposit under consideration. He is qualified as a Competent Person, as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. This report is issued with Mr Doepel's consent as to the form and context in which the Mineral Resource appears. The information in this report that relates to reporting of Exploration Results is based on and fairly represents information and supporting documentation prepared by James Guy, a member of the Australian Institute of Mining and Metallurgy. Mr Guy is a consultant to the mineral industry and has sufficient experience relevant to the style of mineralisation and type of deposit under consideration. He is qualified as a Competent Person as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Guy consents to the inclusion in this report of the matters based on information in the form and context in which it appears. The metallurgical information in this report is based on and fairly represents information and supporting documentation compiled by Gary Johnson, a Member of the Australasian Institute of Mining and Metallurgy. Mr Johnson has sufficient experience relevant to the activity being undertaken to qualify as a Competent Person as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Johnson is managing director of Strategic Metallurgy Pty Ltd. This report is issued with Mr Johnson's consent as to the form and context in which the results appear.*

## KARINGA LAKES POTASH PROJECT (KLPP) – RESOURCE DESCRIPTION

### RESOURCE STATUS

On 20 February 2014, Verdant Minerals reported an in-situ SOP resource (in accordance with the 2012 JORC Code) for the Karinga Lakes Potash Project (KLPP). The 2014 resource is calculated using total porosity (total brine content) of the host rock. Subsequent to this resource estimate, in April 2019, the reporting requirements for brine resources under JORC have been updated, with a new set of requirements, which have been outlined in an AMEC (Association of Mining and Exploration Companies) publication titled, *Guidelines for Resource and Reserve Estimation of Brines*.

The updated brine reporting guidelines can be downloaded from the AMEC website:

[https://www.amec.org.au/Public/Media/AMEC\\_Publications/AMEC\\_Brine\\_Guidelines.aspx](https://www.amec.org.au/Public/Media/AMEC_Publications/AMEC_Brine_Guidelines.aspx)

The guidelines recommend the use of drainable porosity of the host rock (brine content that can be drained by gravity). The 2014 resource is not consistent with the new guidelines in this regard. Revision of the resource estimate to be consistent with the guidelines will result in a reduction of the total reported resource. The 2014 resource estimate is comparable to other brine potash resources reported in accordance with the JORC Code 2012, that are calculated based on total porosity. During the transition to the new guidelines it has been common for companies to report both estimates calculated on total porosity and calculated on Drainable Porosity.

### ADDITIONAL INFORMATION

Detailed hydrogeological studies at the KLPP have been based on significant datasets including drill hole, trench, production tests and monitoring data over several years provide confidence in the project. In collaboration with CPC's joint venture partner Verdant Minerals, the KLPP joint venture will determine an appropriate work program, (as part of a feasibility study) to revise the resource estimate for the KLPP. As a result, investors are cautioned not to make investment decisions based on the presently reported and publicly available mineral resource for the KLPP.

# Overview



## Overview

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# Corporate Snapshot

Capital Structure	Current
Ordinary Shares (PWN) on issue	1,220,515,079
12-month Trading Range	\$0.003 - \$0.010
<b>Market Capitalisation (at \$0.007)</b>	<b>\$8.5 million</b>
Partly Paid Securities (PWPCA)	246,600,643
Unlisted Options (\$0.02, 17 Aug 2020)	55,126,000
Major Shareholders	Percentage
Lions Bay Capital (CPC vendor)	18.4%
Activated Logic (CPC vendor, ED)	16.8%
Citicorp Nominees (HNW)	4.3%
Horn Resources (CFO)	3.1%
Rhodes Mining (CPC vendor)	2.8%
Patrick McManus (MD)	2.6%
Other Top 20	19.5%
<b>Top 20</b>	<b>67.5%</b>
Marketable Securities	Value (\$A)
34,300,000 units ASX:DAV @ \$0.05	\$1.65 million
7,142,850 units ASX: DAVO \$0.005	\$0.04 million
3,900,000 units ASX: LIT \$0.046	\$0.18 million
<b>Total</b>	<b>~\$1.9 million</b>

## Parkway Minerals (PWN) – 3 Year Share Price Chart



## Directors & Management

**Adrian Griffin** – *Non-Executive Chairman*

**Patrick McManus** – *Managing Director*

**Bahay Ozcakmak** – *Executive Director*

**Patrick Power** – *Non-Executive Director*

**Robert van der Laan** – *Chief Financial Officer*

**Amanda Wilton-Heald** – *Company Secretary*

## Stock Symbols



ASX:  
**PWN**



Frankfurt:  
**4IP**

# Our Focus

## Process Range of Brines and Salts

- More than 250,000,000m<sup>3</sup> of concentrated brine is produced daily, almost half of the brine is produced by desalination plants.
- Large amounts of primary and waste brines are also produced from mining (potassium, lithium), industrial, power generation and other major industries.
- Processing and disposal of these brines are often complex, problematic and expensive. Processing costs can exceed \$5-10/m<sup>3</sup>, providing an attractive opportunity.



### Economic Brine Processing

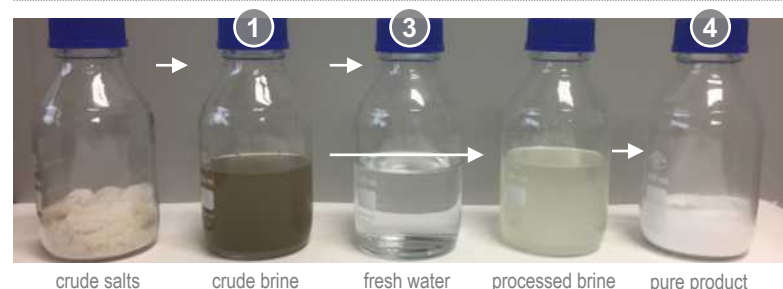
As a mining technology company, Parkway Minerals is focused on recovering valuable minerals from these brines, whilst reducing waste volumes.

#### In simple terms, we:

1. Take waste brine streams.
2. Process the brine with our aMES™ technology.
3. Recover very pure fresh water, and
4. Produce range of high-purity minerals including potash (MOP, KMS, SOP), and fresh water.

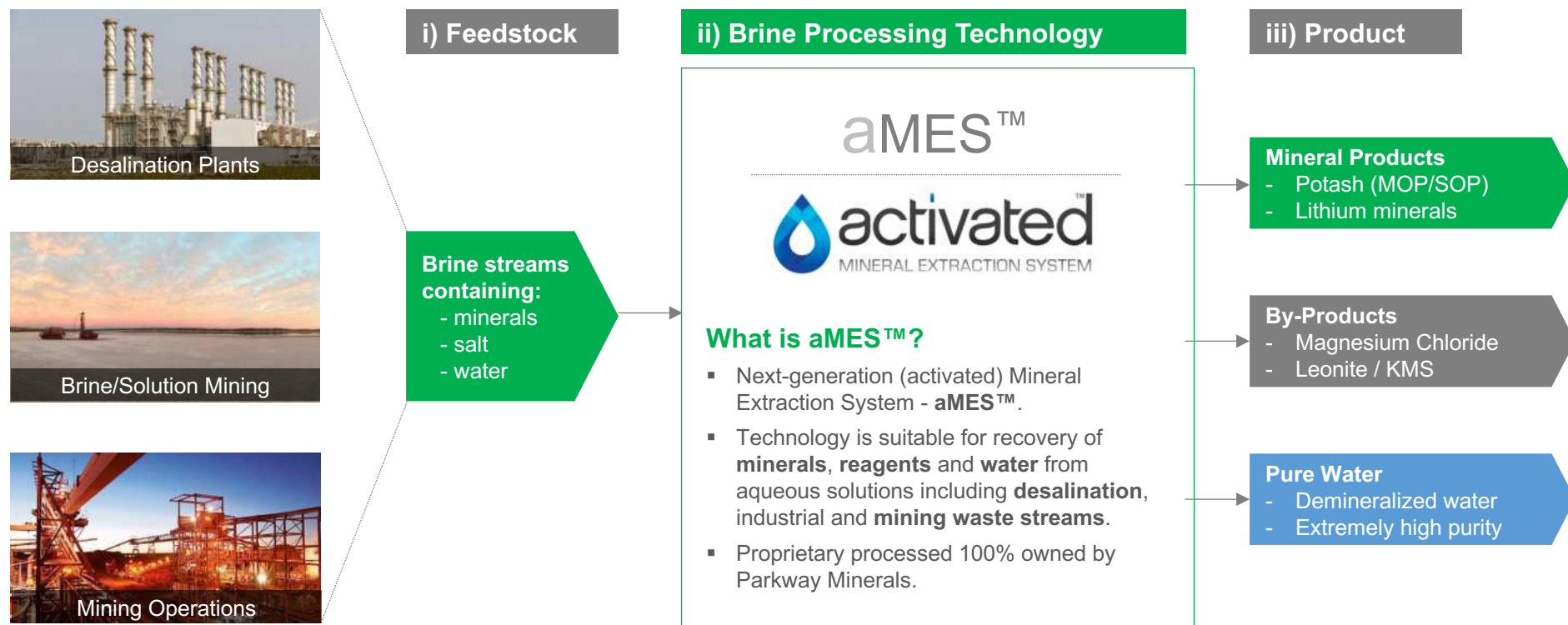


## Processing Range of Brines and Salts





# Major Global Brine Processing Opportunities



Major global opportunities

Market need

Technology-based solution

Creating value

# Key Advantages of aMES™ Technology

## Next-Generation Brine Processing

- Existing conventional technologies are mature, but increasingly no longer fit-for-purpose, particularly in terms of environmental credentials.
- Flotation – widely used in mineral processing including in potash production, but low-yields and disposal of waste streams is a major challenge.
- Reverse Osmosis (RO) – disposal of waste brine streams is emerging as a significant issue, particularly given the presence of antiscalants and antifoulants.

Key Performance Parameter	aMES™ Technology	Flotation Process	Reverse Osmosis
Potash Recovery	90%+ ✓	75%+ ✗	-
Reliance on reagents	no ✓	yes ✗	-
Recovery of byproducts	yes ✓	no ✗	no ✗
Recovery of fresh water	yes ✓	no ✗	yes ✓
Water quality	high (<10mg/L) ✓	-	low (>300mg/L) ✗
Raw water recovery	75%+ ✓	none ✗	30-40% ✗
Environmental impact	low ✓	moderate ✗	moderate ✗
Operating pressure	low ✓	ambient ✓	very high ✗
Electrical energy demand	low ✓	low ✓	low-moderate ✗

## Conventional Flowsheets

- Many conventional project flowsheets, adopt Flotation for mineral processing related applications and Reverse Osmosis for desalination.
- Many mineral processing flowsheets also adopt RO to provide process water and/or “dewater” waste streams to reduce disposal volumes.

## aMES™ Based Flowsheets

- The application of aMES™ technology provides the opportunity to:
  - improve product quality and yields
  - produce fresh water (instead of consume)
  - reduce project waste footprint

### “Game-changer”

- Efficient
- High-purity
- Sustainable

### “Conventional”

- Low-yielding
- Moderate-purity
- Sub-optimal

### “Cheap water”

- Low water yield
- Waste brine stream
- Process chemicals



... the natural choice.

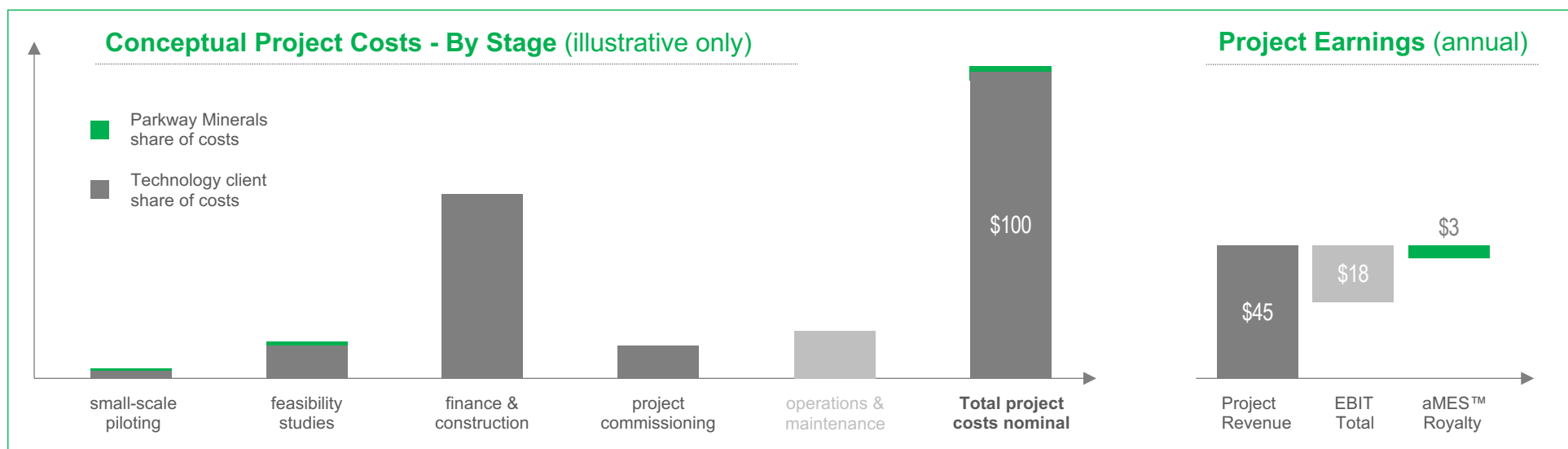
# Technology Leveraged Business Model

## Leveraging the aMES™ technology to generate royalties

- Ongoing focus on projects where the aMES™ technology has the potential to deliver substantial near-term advantages, including higher revenues, lower costs, and sustainability credentials.
- Business development pipeline focused on opportunities that enable “paid-piloting” for third-party projects.
- Parkway Minerals seeks to share in the incremental value created through the aMES™ technology, via royalties.

## Illustrative Returns

- <20% ROE for project owner without use of aMES™ (target projects)
- >30% ROE target for aMES™ projects
- >100% ROE for Parkway Minerals



## aMES™ Project Evaluations

- Given the broad appeal of the aMES™ technology, a large proportion of piloting studies for third-party projects are funded by prospective clients.

## aMES™ Project Development

- Opportunity to recover costs through up-front licensing fee.
- Parkway Minerals does not require to become an equity owner in a project to derive significant value.
- Parkway Minerals will seek to share in the incremental value created through the adoption of the aMES™ technology.

## aMES™ Royalty Interest

- A modest royalty (5-10%) that is proportionate to aMES™ based value creation, improves project economics.
- The value of the royalty may be the equivalent to a 15-20% equity interest.

# Introduction to aMES™ Roll-Out Strategy

## The Karinga Lakes Potash Project (KLPP) Showcase

- The KLPP-PFS represents an excellent opportunity to further demonstrate the advantages of the aMES™ technology. The PFS will assist in aMES™ roll-out.
- Parkway Minerals licensed the aMES™ technology to the KLPP-JV in August 2017. As the technology matures, materially higher royalties rates are anticipated.



### Pre-Feasibility Study (PFS, 6-9mo plan)

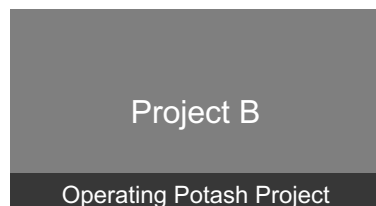
- Build and test larger-scale aMES™ pilot plant
- Design skid-mounted integrated aMES™ module
- Update resource study (desktop analysis)
- Update technoeconomic model

### Definitive Feasibility Study (DFS, 12mo plan)

- Initiate project permitting process
- Further scale-up of aMES™ pilot plant
- Detailed stakeholder engagement to underpin FID
- Finalise project development plan

## Roll-Out

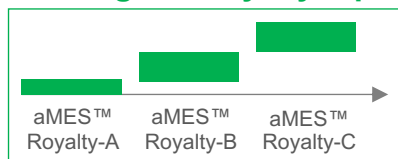
- Leverage aMES™ plant design into more advanced projects asap.
- Focus on operating projects, but also advanced stage projects.



## Preliminary Evaluations & Piloting

- Evaluating suitability of aMES™ to process brine streams.
- Initial indications confirm a high-value potash product can be produced from a number of problematic waste brine stream.
- Ongoing pilot studies and collaborative discussions.

## Building the Royalty Pipeline



## Business Development

- In active discussions with several potash project proponents with well defined potash resources, to explore the suitability of evaluating aMES™ technology application.
- Discussions based on “paid-piloting” with royalty pathway.

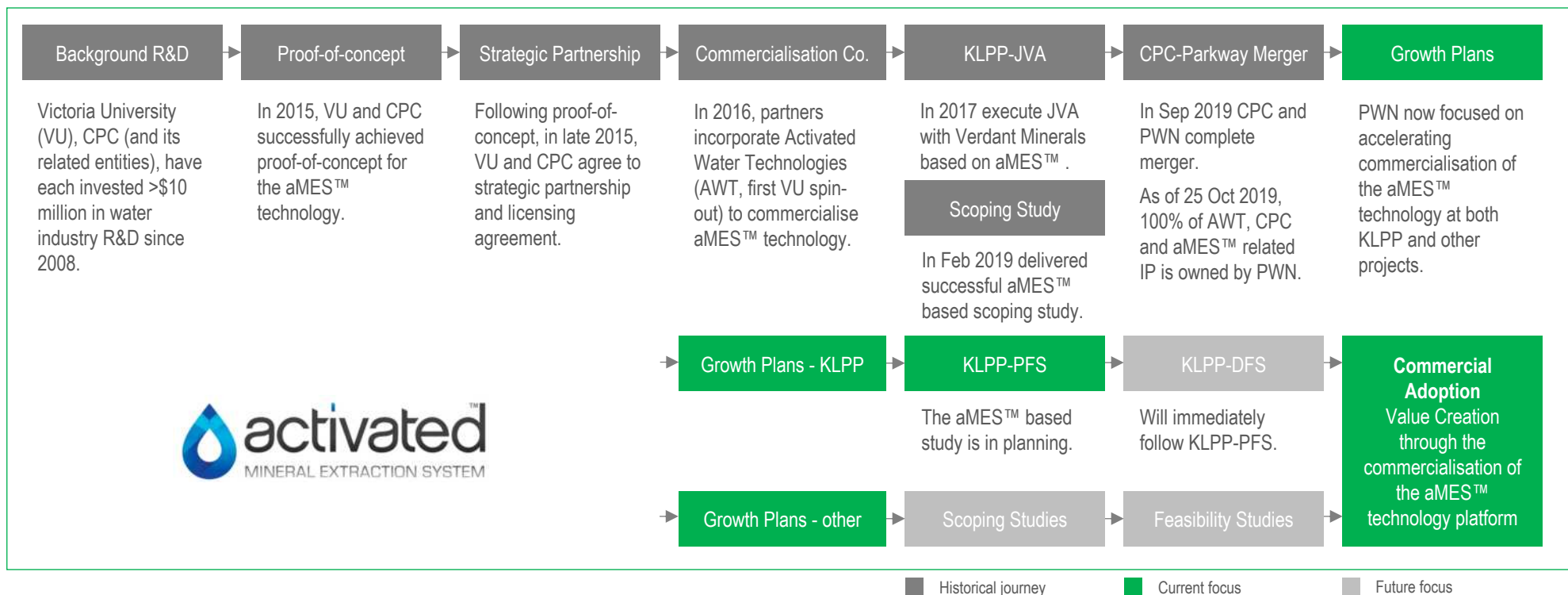
## Extensive Active Business Development

# aMES™ Technology Commercialisation



## Overview

- The aMES™ technology builds on more than a decade of R&D, with focused innovation during the last 5 years and substantial investment.
- AWT (now a Parkway Minerals subsidiary) has been successfully awarded several Australian Research Council grants supporting commercialisation efforts.
- Following completion of the KLPP Scoping Study in February 2019, the transformative potential of the aMES™ technology has been validated.
- CPC (now a Parkway Minerals subsidiary) has established relationships with tier-1 equipment, engineering & construction and other important partners.
- Through the KLPP-PFS process, Parkway Minerals will formalise certain strategic partnerships, and will use this as a platform to leverage into other projects.



# Parkway Minerals – Our Vision

“ To transform global brine processing methods, through **innovative technology** to improve sustainability, and **create value.** ”

## Economic Value

- Improved mineral recovery
- Recycling of water & reagents
- Monetisation of byproducts

## Environmental Value

- Reduced environmental footprint
- More sustainable operations

## Social Value

- Meeting community expectations
- Securing Licence to Operate

aMES™

## KEY APPLICATIONS

Desalination

Mining Brines

Potash – SOP

# Corporate Information



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# Acquisition of CPC – Transformational Transaction

## 1(a) CPC Transaction Timeline

Consolidated Potash Corp (**CPC**) is an unlisted Australian company.

- 05 Aug 2019 – Parkway agreed to acquire CPC.
- 27 Aug 2019 – Parkway raised \$450,000 (condition precedent).
- 13 Sep 2019 – Parkway shareholders approved acquisition of CPC.
- 17 Sep 2019 – Parkway completes acquisition (98.83% of CPC shares).
- 25 Oct 2019 – Parkway completes acquisition (100% of CPC shares).

## 1(b) Assets Acquired Through CPC

### Attractive Projects

- The acquisition of CPC, provides Parkway with direct ownership interests in two highly prospective brine projects:
  - Karinga Lakes Potash Project (**KLPP**)
    - Initial 15% interest, increasing to 40%
  - New Mexico Lithium Project (**NMLP**, Central Lordsburg Playa)
    - 70% interest, increasing to 100%

### Disruptive Technology Platform

- The acquisition of CPC, also provides Parkway with direct ownership of the **aMES™ technology platform**, suitable for a range of brine processing applications, including the production of potash and lithium.

## 1(c) Corporate Synergies

- Complementary projects and technology, provide Parkway with substantial strategic and operational synergies.
- Enlarged project and technology portfolio together with an expanded board provide Parkway with critical-mass to execute & unlock value.

## 2(a) Growth Platform

- The acquisition of CPC provides Parkway with a pathway to create substantial value by focusing on the:
  - KLPP and NMLP projects
  - aMES™ technology platform
  - A deep organic business development pipeline - based on aMES™

## 2(b) Execute Business Plan

- Parkway is focused on advancing near-term, high-impact opportunities.

### Leverage Technology Platform

- Commercialisation of aMES™ – advance potential opportunities to apply the technology, particularly to operating assets in the potash sector.

### Key Project Priorities

- KLPP – scale-up aMES™ testwork and advance towards PFS.
- NMLP – farm-out for free carry, and/or shallow drill to define resource.

### Davenport Resources (Parkway owns 20.8% of ASX: DAV)

- Establish partnership to explore collaborative opportunities and support Davenport Resources strategic activities in Germany.

## 2(c) Legacy Parkway Project Platform

- Dandaragan Trough – historical expenditure in the order of \$12 million.
  - Soliciting interest from prospective JV partners.
- Lake Seabrook – initially encouraging SOP exploration results.
  - Parkway intends to divest the project to focus on key priorities.



# Board of Directors



## **Adrian Griffin – Non-Executive Chairman**

- Adrian is an Australian-trained mining professional, has had exposure to metal mining and processing worldwide during a career spanning more than three decades. A pioneer of the lateritic nickel processing industry, he has helped develop extraction technologies for a range of minerals over the years.
- Adrian is a former chief executive officer of Dwyka Diamonds Limited, an AIM and ASX-listed diamond producer, was a founding director and executive of Washington Resources Limited and also a founding director of Empire Resources Limited, Ferrum Crescent Limited and Reedy Lagoon Corporation Limited. Moreover, Adrian was a founding director of ASX-listed Northern Minerals Limited, where he is currently a non-executive director. He is also managing director of ASX-listed Lithium Australia NL, a company focused on lithium extraction, battery technology and lithium recycling.



## **Patrick McManus – Managing Director**

- Patrick has a degree in mineral processing from Leeds University and an MBA from Curtin University. A mining professional for more than 30 years, his work has taken him to many sites within Australia and overseas, including Eneabba and the Murray Basin in Australia, and Madagascar, Indonesia and the United States.
- During that time, Patrick has worked in operational, technical and corporate roles for RioTinto, RGC Limited and Bemax Resources Limited. He was a founding director and, from January 2007 to March 2010, managing director of ASX-listed Corvette Resources Limited.



## **Robert Van der Laan – Chief Financial Officer**

- Bob is a qualified accountant with more than 25 years' experience in the management of financial and risk management systems of public and private companies, in the resources and engineering sectors.



## **Bahay Ozcakmak – Executive Director**

- Bahay is the founder of Activated Water Technologies and the CEO of AWT's parent company, Consolidated Potash Corp. (CPC). In addition to two decades of successful technology commercialisation experience, Bahay has extensive corporate development expertise, including M&A, particularly in the energy and mining sectors, where he has led the successful acquisition of several flagship projects and major corporate transactions, particularly with listed companies.
- Bahay has broad corporate experience ranging from business and corporate strategy development through to CEO and director level roles in the energy and mining sectors. Recent experience with resources companies have been focused on gold, copper, nickel, cobalt, lithium, potash and uranium projects. Bahay is currently a director of several private and public companies and is currently the executive chairman of TSX-Venture listed Fidelity Minerals Corp.



## **Patrick Power – Non-Executive Director**

- Patrick is the founder of Western Potash, and was instrumental in securing substantial investment for the company and advancing the Milestone (under construction) project in Saskatchewan, Canada.
- Patrick brings over 25 years experience in mining finance, management and venture capital. Patrick is currently a director of Western Potash and President and CEO of Arctic Star Exploration, a diamond exploration company. He has served as a director of other mineral exploration companies including Amarillo Gold Corp., First Narrows Resources Corp., and Goldtex Resources Ltd.



## **Amanda Wilton-Heald – Company Secretary**

- Amanda is a Chartered Accountant with over 19 years of accounting, auditing (of both listed and non-listed companies) and company secretarial experience within Australia and the UK.

# aMES™ Information



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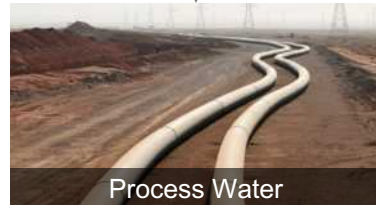
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# Mining Industry – Brine Processing Opportunities



**Waste Brine**  
- chemicals  
- salt  
- water

1



i – Adapted from: "UN Warns of Rising Levels of Toxic Brine as Desalination Plants Meet Growing Water Needs", UNU-INWEH Study (14 Jan 2019).

## 1) Desalination Waste Brine<sup>i</sup>

- For every litre of freshwater output, desalination plants produce on average 1.5 litres of brine.
- World's ~16,000 **desalination plants discharge 142 million m<sup>3</sup>/day of brine daily.**
- Brine management can represent **up to 33% of a desalination plant's cost** and ranks among the biggest constraints to more widespread development.
- Almost 22 million m<sup>3</sup>/day of brine is produced at a distance of greater than 50km from the nearest coastline. Despite the large volume of brine produced in these areas, very few economically viable and environmentally sound brine management options exist.



**Brine Feedstock**  
- minerals  
- salt  
- water

2

## 2) Mineral Brine Feedstock

- Primary brine projects include **playa hosted brines** for the production predominantly **potash and lithium** Key opportunity
- Solution mining** (ISL/ISR) techniques are also utilised to **produce potash** and other valuable mineral products.



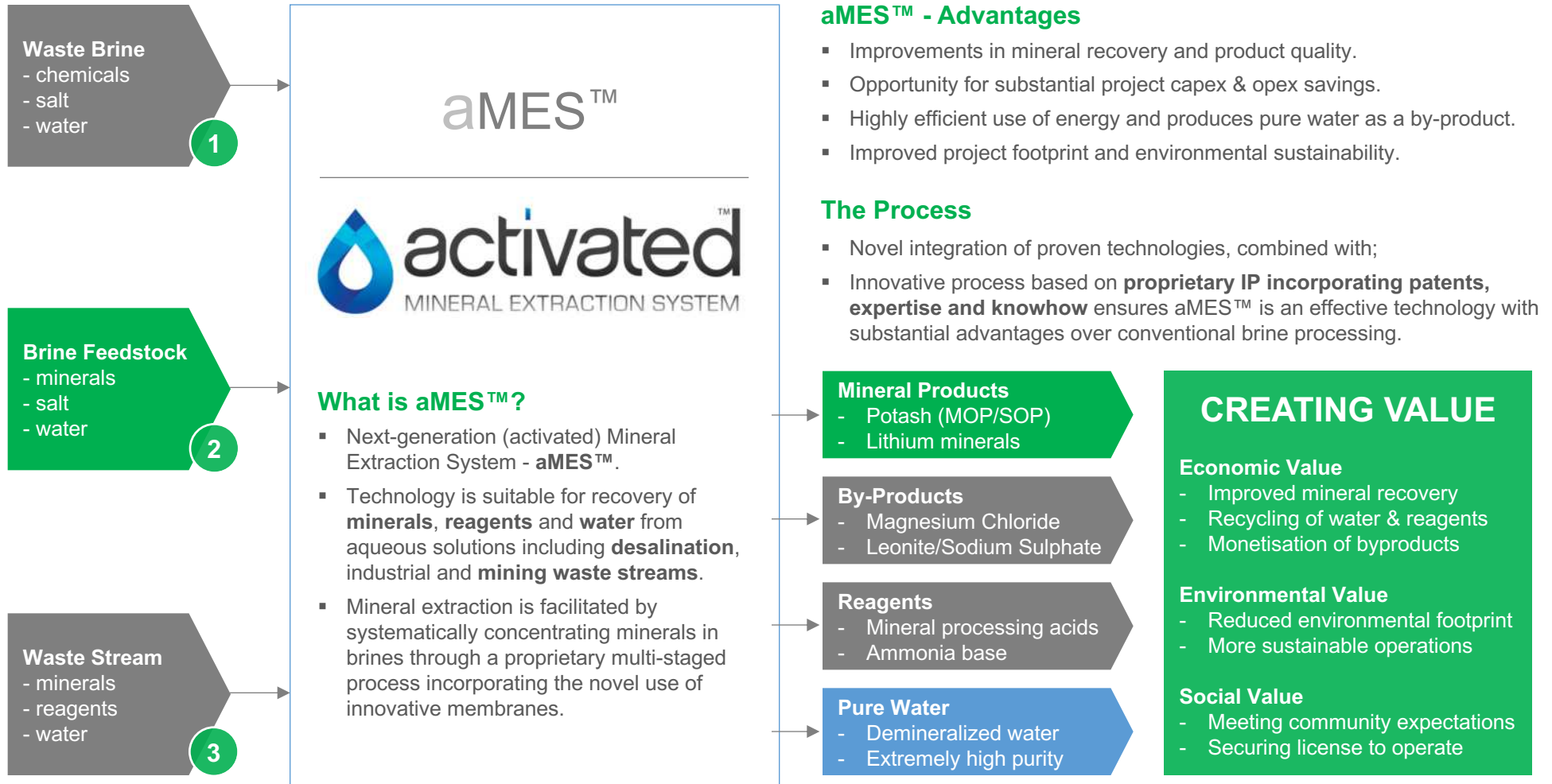
**Waste Stream**  
- minerals  
- reagents  
- water

3

## 3) Tailings Waste Streams

- Typically have a large footprint and represent substantial environmental risks including community concerns.
- Tailings storage facility (TSF) construction, operation and maintenance represent **significant costs and risks.**
- Treatment of tailings solutions is a high growth sector.

# aMES™ - Solving Problems & Creating Value



## aMES™ - Advantages

- Improvements in mineral recovery and product quality.
- Opportunity for substantial project capex & opex savings.
- Highly efficient use of energy and produces pure water as a by-product.
- Improved project footprint and environmental sustainability.

## The Process

- Novel integration of proven technologies, combined with;
- Innovative process based on **proprietary IP incorporating patents, expertise and knowhow** ensures aMES™ is an effective technology with substantial advantages over conventional brine processing.

# Opportunities for SOP Production through aMES™

## Overview

- Whilst there is growing demand for SOP, maintaining existing and bringing new production online through conventional means, faces significant challenges.

### 1) Process Water

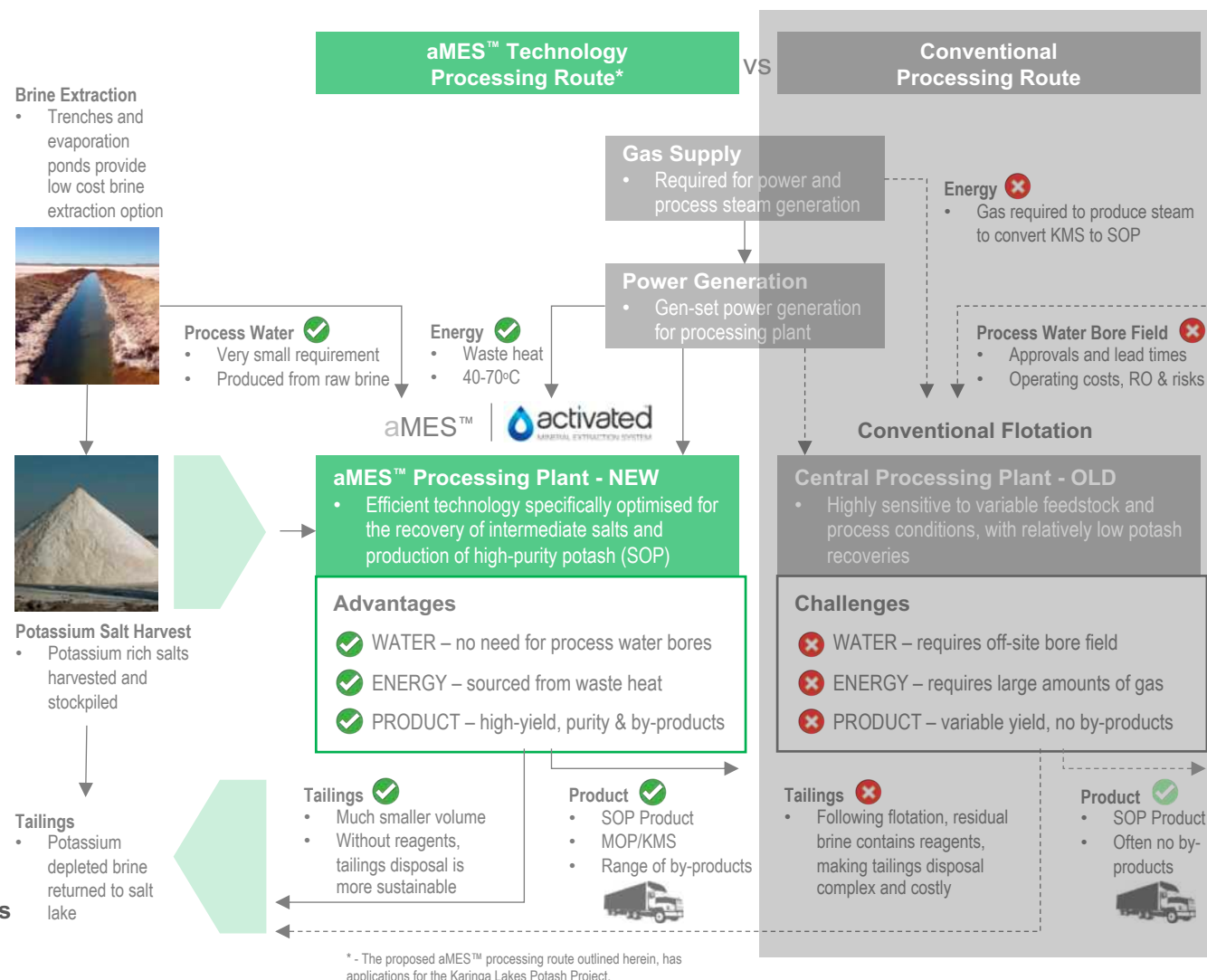
- Depending on the specific flowsheet, the production of 1 tonne of SOP can require in excess of 10m<sup>3</sup> of fresh process water.
- The aMES™ technology recovers and recycles high-quality process water.**

### 2) Mineral Processing

- Mineral recoveries associated with flotation and other conventional processes are sensitive to feedstock composition.
- The aMES™ technology achieves high recoveries including of by-products.**

### 3) Waste Brine Disposal

- Various mineral processing stages associated with flotation, leaching and purge solutions, generate substantial waste brine streams.
- Disposal of these waste brine streams is often both complicated and costly.
- The aMES™ technology is able to process & recover products from these streams.**



# Proprietary aMES™ Technology Platform

## High-Value Technology Platform

Through the acquisition of CPC, Parkway has acquired Activated Water Technologies (AWT), the owner of the aMES™ technology platform.

### Through aMES™, AWT has developed:

- An efficient system to process concentrated brines to recover valuable minerals.
- Flexibility to optimise flowsheet to extract maximum value from a given feedstock.
- **A novel brine processing platform, with substantial barriers to entry.**

## World-Leading R&D

- Subsidiaries recently acquired by Parkway, primarily AWT, are at the forefront of innovative brine processing related R&D.



AWT has a strategic collaboration and technology licensing agreement in place with VU. The partnership has been successful in securing prestigious Australian Research Council (ARC) grants to deliver R&D programs with budget exceeding \$1 million.

AWT is a founding member of ARC-EESep, a world-class team of scientists from 8 Australian universities, CSIRO, 3 Intl. universities, and includes 20 industry partners, with total funding of >\$10 million.



### Novel Concept Design

- The aMES™ technology:
  - Is based on innovative system designs, including (patented) designs which provide significant advantages
  - Incorporates a range of proprietary modifications and integrations to established process designs & equipment



### R&D Technical Partner

- Strategic partnership and technology licensing agreement with Victoria University (VU).
- Based on more than a decade of water sector research (>\$10M), has developed significant R&D expertise knowhow relating to:
  - Novel system designs
  - Robust operation of pilot plant facilities
  - State-of-the-art R&D



### Pilot Plant Facilities

- A broad range of aMES™ pilot plant equipment and facilities suitable for:
  - Performing cutting-edge in-situ studies including crystallization kinetics
  - Investigating key process parameters and providing proof-of-concept for each feedstock
  - Validating performance and performing range of optimization studies



### High Performance

- The design of each aMES™ project application is intended to achieve a material step-change in project performance as a results of:
  - Proprietary system design & operation
  - Integrated heat-exchanger (patented) to improve energy intensity
  - Utilising CHP principles to increase system efficiency



### Leading Partnerships

- Established relationships with key partners essential for successful project delivery including:
  - Technical process development expertise
  - OEM suppliers, particularly plant and BOP system related
  - EPC contractors
  - Specialised consultants
  - Project proponents



#### aMES™ Pilot Plant

Innovative aMES™ pilot plant built and operated, with specialised equipment; options to significantly scale-up brine processing capacity as required.



#### aMES™ Operations

Proprietary brine extraction, preparation and processing capabilities based on the innovative aMES™ technology platform, support testing operations.



#### aMES™ Products

Extensive testwork based on proprietary aMES™ flowsheets has produced high-grade potash related products, including sylvite (MOP), leonite (KMS), sulphate of potash (SOP).

# aMES™ - Key Technological Innovations

## Selective & Precise

- Multilayered aMES™ process design provides several degrees of control.
- Range of aMES™ system designs are optimally suited for a given application.
- Different physicochemical parameters relating to:
  - Solubility (temp), reactivity, pH, kinetics and other conditions,
  - are utilised to develop an optimal flowsheet for a given application.

### Impact

- Higher quality products.
- Flexibility in the recovery of products. If the compounds are soluble, then they can be extracted through aMES™ processing.
- Typical cations include; K, Mg, Li, B, Br, I and byproducts (Ca, Na, Si, NH<sub>4</sub>)
- Typical anions include; Cl, CO<sub>3</sub>, SO<sub>4</sub>

## Full Utilisation of Feedstock

- Unlike selective processes like IX or flotation, aMES™ provides the opportunity of selective/sequential harvesting of all major components.

### Impact

- More products, less waste.
- The aMES™ technology allows the fractionated harvesting of constituents.

## Robust Performance

- Significant piloting has demonstrated that stable operations can be achieved, under typically challenging circumstances (saturated solutions).
- Fouling tendency is minimised through innovative process design and operation philosophy, developed through extensive testing and optimisation.

### Impact

- Process technology innovations ensure efficient and reliable performance.
- The aMES™ technology is typically less susceptible to changes in feedstock composition, as there is sufficient operational flexibility to adjust operating parameters to accommodate the changed feedstock.

## No Reagents

- Unlike conventional processes, the processing of feedstocks with the aMES™ technology typically do not require any reagents or additives.

### Impact

- More cost-effective and sustainable.
- The aMES™ technology performs a separating function™ by exploiting the physicochemical properties of a given feedstock, through process design.

## Energy Efficiency

- The processing of concentrated solutions are typically energy sensitive.
- As aMES™ is a thermally driven process, project feasibility is often sensitive to the availability (cost) of thermal energy, although aMES™ is energy efficient.

### Impact

- More efficient than conventional processes.
- Utilises low-grade waste heat, with significant advances have been made to further reduce the energy intensity of the aMES™ process.

# aMES™ - Value Creation Strategy



## Overview

- The aMES™ technology has attracted the interest of several major OEM and potential EPC partners, as well as prospective end users that recognise the potential of the technology.
- Parkway plans to create substantial value by developing a portfolio of strategic revenue opportunities.
- **Product Sales**
  - Specialised aMES™ related equipment sales (containerised unit).
- **Technology Licensing**
  - Larger projects that have undergone pilot-scale testing, will require a license to use the aMES™ technology. **Preferred business model.**
- **Project Equity Participation**
  - Parkway may seek to support early stage aMES™ test work in return for a minority equity interest a project.
- **Corporate Activity**
  - Enabling and/or process technologies similar to aMES™ are highly sought after by industry incumbents and often drive M&A activity.

## aMES™ Application Evaluation – Business Model

For each type of application, Parkway will typically develop an aMES™ technology integration pathway.

- Typically an initial aMES™ test program generating substantial analytical, process and design data.
- Test Program key deliverables include:
  - Preliminary aMES™ process flow diagram.
  - Basic engineering design, equipment specifications.
  - Technoeconomic Study
- Test Program delivered on a “paid-piloting” basis.
- Significant synergies across projects with similar application.

## Technology Delivery – Business Model

Develop optimal aMES™ delivery proposal.

- Parkway to provide a license to aMES™ technology as part of an overall EPC proposal with either the client’s preferred engineering contractor or CPC’s strategic partners.
- **License fees & royalties** to reflect extent of value creation.
- Upfront fees to Parkway will allow client to share more of benefits derived through the use of the aMES™ technology.





# Potash Market



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# Fertilisers are of Global Strategic Importance

## Mission Critical

- Modern agricultural food production **requires fertilisers**.

## The Importance of NPK

- N-P-K are the Major Nutrients in agricultural fertilisers.
- Each of these nutrients, are essential for plant growth.
- Each of these nutrients, are **non-substitutable**.

## Major Nutrients

- Nitrogen (N)
- Phosphorus (P)
- Potassium (K)

## Minor Nutrients

- Calcium (Ca)
- Magnesium (Mg)
- Sulphur (S)

## Micro Nutrients

- Mg, Zn, Fe,
- B, Cu, Mo, Cl
- and several others

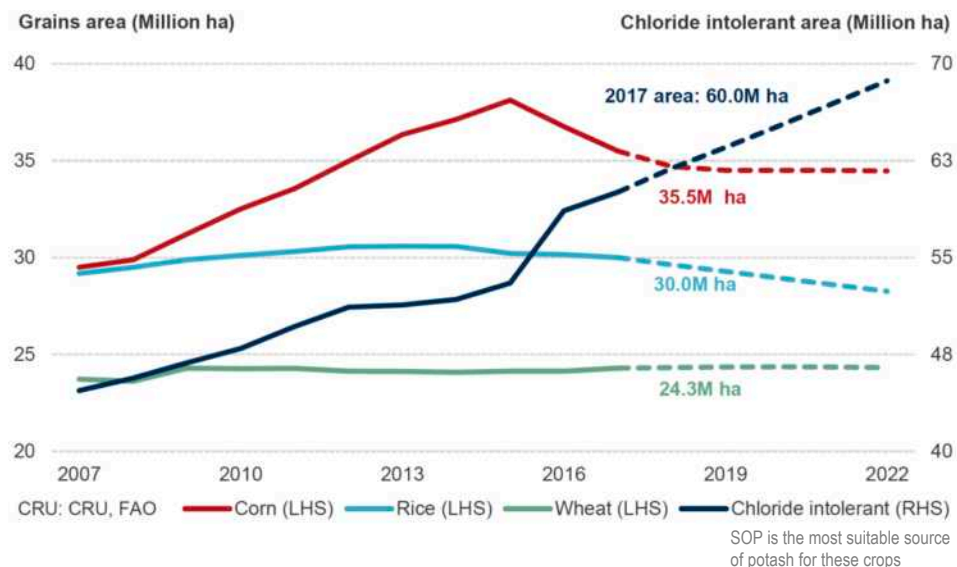
## Potassium & Potash

- Potassium (K) stimulates plant growth, provides disease resistance and drought tolerance, and improves flavour, colour and shelf-life of fruits and vegetables.**
- Potash is a general term to describe compounds containing water soluble potassium suitable for plant growth.
- Muriate of Potash (**MOP**) – KCl, is suitable for many crops.
- Sulphate of Potash (**SOP**) –  $K_2SO_4$  is superior for Cl sensitive crops and generally trades at a US\$200+ premium to MOP.

## Potash – Concentrated Production Profile

- Global **potash production is dominated (92%) by a small number of countries**, including: Canada (35%), Belarus (19%), Russia (17%), China (12%), Israel (6%) and Germany (4%).

## Major Crops in China (by area, Million ha)



## Long-Term Growth in Demand

- Population growth is driving demand for food, water and natural resources.
- To satisfy the increased demand for food requires intensification of agriculture, which in turn **requires fertilisers** to improve productivity.
- Production of higher value protein (meat) requires significantly more feedstock (grain), often 4 - 10x more grain to produce the equivalent meat.
- Improving diets in developing countries is increasing demand for tree nuts, fruits and vegetables, which are typically chloride intolerant (see chart), therefore MOP is unsuitable as a source of potash, and **SOP is required**.

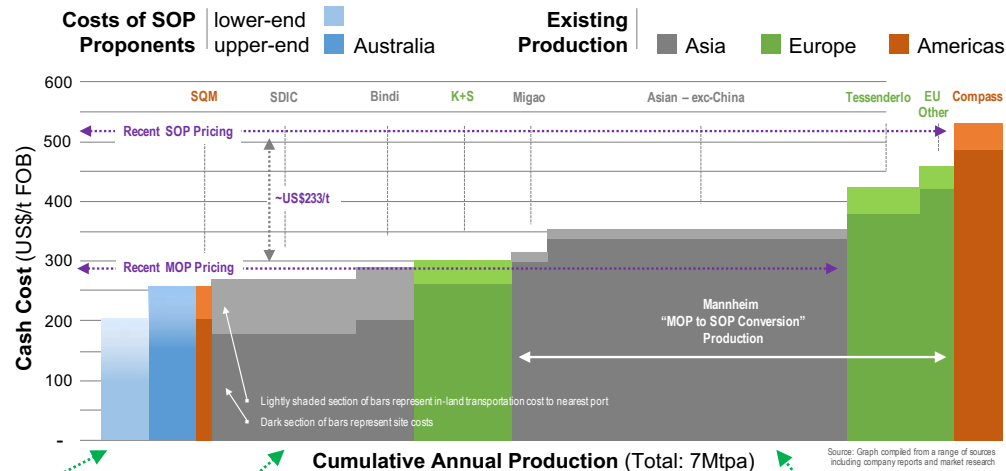
# SOP – Challenges & Opportunities by Segment

## Overview

- Each region/segment of the SOP industry cost curve faces unique **challenges in maintaining existing**, and increasing **additional SOP production capacity**.

## Opportunities for aMES™

- For a given project or the corresponding segment of the SOP industry cost curve, there is an optimal aMES™ based application to address the specific challenges.
- In general, the aMES™ technology improves the water balance, reduces wastes, and yields a premium product mix.



## aMES™ Value Creation

- The **scale of opportunities is substantial**, with the potential value creation attributable to a given aMES™ application comparable to a significant stand-alone project.
- Potential applications involve utilising existing site infrastructure, thereby **maximising ROI** and providing pathway to earnings.

## Challenges – by Segment

### Australian Production – Planned

- Projects generally located in remote and arid environments to maximise brine evaporation rates.
- Scarcity of process water is a major obstacle to many projects.
- Cost overruns likely.

### Brine Production – China

- China is a substantial net-importer of potash, and has effectively subsidized the domestic potash industry.
- Unlikely China will become an exporter of material volumes due to increasing domestic demand.

### K+S Production – Germany

- Waste brine disposal from, i) primary potash production, and ii) waste heap brine, are major challenges undermining sustainability and viability of future operations.
- Large-scale high-impact challenge.

### Mannheim Production – Asia & EU

- Must be sold at a premium to the MOP price as this is a major input.
- Generally high-cost, low-margin, geared for domestic consumption.
- Disposal of HCl acid (waste product) is a major issue.

### US Production

- Generally high-cost, low-margin, geared for domestic consumption.
- Often requires MOP in non-Mannheim conversion process.
- Other US operations are experiencing challenges with access to process water.

## Opportunities – by Segment

### Overview

- Recover fresh water from brine, removing/reducing need for fresh water bore field, reducing costs.
- Simplified flow sheet and potential to recover range of byproducts.

### Overview

- Range of opportunities but not the current priority due to relatively opaque and fragmented domestic markets.

### Overview

- Recover fresh water from waste brine streams to resolve residual waste disposal challenges.
- Recover additional product and byproducts from waste streams.

### Overview

- Range of opportunities but not the current priority due to relatively opaque and fragmented domestic markets.

### Overview

- Improved flow sheet and potential to recover range of byproducts.
- Other projects in the US have the opportunity to be lower cost producers with new flow sheets.

# Project Profiles



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# Karinga Lakes Potash Project (KLPP) – Overview

## Introduction

- CPC has earned an initial 15% interest in the KLPP, and has the right to acquire up to 40% through staged investment of further \$2 million.
- CPC holds a conditional option<sup>i</sup> to acquire additional 10.1%.
- In February 2019, CPC delivered a Scoping Study<sup>ii</sup> to the project operator, Verdant Minerals<sup>iii</sup>, investigating a potential **development scenario for the KLPP based on the aMES™ technology**.
- CPC has established a JV with Verdant Minerals to pursue feasibility studies regarding potential project appraisal and development.

## Infrastructure

- Brine lake system located in prime geological setting on pastoral land in Central Australia (Northern Territory).
- Ideally located, with major road and rail infrastructure located in proximity to the project, with regional gas options also available.

## Geology

- The project consists of a chain of dry salt lakes and is located within the Central Australian Groundwater Discharge Zone.

## Extensive Project Studies

- Extensive project appraisal studies have been performed by Verdant Minerals since 2010.
- On 20 February 2014, Verdant Minerals reported an in-situ sulphate of potash (SOP) resource (in accordance with the 2012 JORC Code) for the KLPP. Since announcing this resource, reporting guidelines have changed, as a result, investors are cautioned not to make investment decisions based on the presently reported and publicly available mineral resource for the KLPP. Further details, refer to the *Parkway ASX announcement on 5 August 2019*.



(A) KLPP Regional Infrastructure (Northern Territory). (B.i) Lake Mingere Trial Trench. (B.ii) Lake Mingere Brine & Salt Samples. (B.iii) SOP produced from Lake Mingere salts. (C) KLPP Exploration Licence Map. Maps and associated details are illustrative only and not to scale.



KLPP - potash brine preparation brine extraction for aMES™ processing)

## aMES™ Application Rationale

- Potential to rapidly develop a more capital efficient and sustainable potash production operation compared to conventional development pathways.
- The aMES™ pathway potentially eliminates the requirement for flotation, process steam, gas pipeline and a freshwater bore field, which collectively represent major costs in the traditional SOP production flowsheet previously evaluated.
- Potential to recover magnesium salts as a by-product.

i – refer Parkway [ASX Release 5 August 2019](#).

ii – refer Verdant Minerals [ASX Release 18 February 2019](#).

iii – formerly ASX: VRM, in June 2019 was acquired by CD Capital at a 113% premium.

# Karinga Lakes (KLPP) – Project Appraisal

## Project<sup>i</sup> Appraisal

- The KLPP has undergone comprehensive appraisal and represents a highly prospective sulphate of potash (SOP) brine project.
- Verdant Minerals have been exploring the KLPP area since May 2010 and on 20 February 2014 reported an in-situ potash resource for the project. The 2014 resource is based on the total porosity (total brine content) of the host rock. Refer to *Resource Status* sections for additional information about the resource status for the KLPP.
- Most of CPC's process development studies, including the recently completed technoeconomic study have been based on brine and salt feedstocks from Lake Miningere, where the reported brine composition was deemed to be particularly well suited for the production of SOP.

## Project<sup>i</sup> Appraisal Status

- **The potash brine investigations were based on data acquired over several years, including;**
  - 93 brine samples from hand dug pits
  - 4 small backhoe trenches which were pump tested
  - 8 vibracore drill holes, 73 sonic drill holes & 200 aircore drill holes
  - 42 installed 50mm piezometers around drill holes & 48 piezometers around trenches
  - 47 installed 100mm wells
  - 10 pumping tests from 100mm wells
  - 4 long term pump tests from 3 trenches and a well
  - 142 porosity samples.



KLPP Project Evaluation - extensive drilling, sampling & investigative studies



KLPP Brine Flow-Testing

## Resource<sup>i</sup> Status

- In collaboration with CPC's joint venture partner Verdant Minerals, the KLPP joint venture will determine an appropriate work program, (as part of a PFS) to revise the resource estimate for the KLPP to conform with updated guidelines.
- As a result, investors are cautioned not to make investment decisions based on the presently reported and publicly available mineral resource for the KLPP. Further details, refer to the *Disclaimer*.

i - On 20 February 2014, Verdant Minerals reported an in-situ SOP resource (in accordance with the 2012 JORC Code) for the KLPP (refer Verdant Minerals ASX Announcement, 20 Feb 2014). The 2014 resource is calculated using the total porosity (total brine content) of the host rock. Subsequent to this resource estimate, in April 2019, the reporting requirements for brine resources under JORC have been updated, with a new set of requirements. As a result, investors are cautioned not to make investment decisions based on the presently reported and publicly available mineral resource for the KLPP. Further details, refer to the *Disclaimer*.

# Karinga Lakes (KLPP) – Forward Plan

## Overview

- The KLPP represents an attractive opportunity for CPC, as extensive project evaluation initiatives demonstrate the brine can be readily accessed by trenching and concentrated through solar evaporation to produce a mixed salt containing precursors to SOP.
- On [18 February 2019](#), Verdant Minerals announced that CPC had satisfied all of the Key Performance Indicators (including the delivery of a **Scoping Study based on the aMES™ technology**) required in order to acquire an initial 15% of the KLPP and establish a Joint Venture with Verdant Minerals.

## Scoping Study

- The KLPP Scoping Study was performed by CPC in collaboration with Verdant Minerals, Victoria University and a leading techno-economic modelling expert. The budget for the study was ~\$1 million over 18 months.
- CPC has earned a 15% interest in the KLPP to date, by completing extensive bench scale testwork and a scoping study on the potential feasibility of producing SOP from the KLPP through the use of the aMES™ technology (refer Verdant Minerals ASX announcement, 18 February 2019 Karinga Lakes – Establishment of Joint Venture).
- The Scoping Study identified several important strategies **to simplify the development of the KLPP** by potentially eliminating the requirement for flotation, process steam, gas pipeline and freshwater bore field, which represent major costs in the traditional flowsheet.

## Forward Plan

- As part of CPC's Stage 2 earn-in to the KLPP, Parkway is currently working with Verdant Minerals to develop an appropriate Pre-Feasibility Study (PFS) scope based on:
  - Updating the KLPP Resource Statement (no field work expected to be required)
  - Using the aMES™ technology package
- As a result of entering into an aMES™ licencing agreement with Verdant Minerals regarding the KLPP, Parkway subsidiary **AWT holds a 1% NSR over the KLPP**.

## KLPP – aMES™ Mediated Project Transformation

- CPC has performed extensive studies on the KLPP since 2015, and most recently culminated in the delivery of a Scoping Study (18 Feb 2019) and the subsequent acquisition of an initial 15% equity interest in the project.
- **Key Findings of the aMES™ focused studies have identified:**
  - Important strategies to simplify the development of the KLPP by potentially eliminating the requirement for:
    - flotation,
    - process steam,
    - gas pipeline, and a
    - freshwater bore field,
    - which collectively represent major costs in the traditional potash production flowsheet.
  - The JV partners have indicated that they believe the **aMES™ technology provides the most suitable pathway to potentially developing the project**, subject to appropriate feasibility studies.
- **The optimisation opportunities identified at the KLPP have applications for many other potash projects:**
  - CPC has received interest in assisting other MOP and SOP project producers and proponents investigate the potential of the aMES™ technology.
  - Parkway is currently evaluating these opportunities.

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# New Mexico Lithium Project (NMLP) - Overview

## Introduction

- Parkway has acquired an initial 70% interest in the NMLP, and has the right to acquire up to 100% through staged investment.
- Project covers ~40km<sup>2</sup> of federal BLM claims – no royalties payable.
- Project ideally located, with major road, rail, gas and power infrastructure passing through or adjacent to the project area.

## Lordsburg Playa

- The project displays important geological components including:
  - i) “source” - lithium bearing volcanic rocks.
  - ii) “scale” - large catchment area to accumulate lithium.
  - iii) “concentration” - located in a geothermally active region.
  - iv) “trap” - closed central playa in an arid environment.
- The project area has not been previously explored for lithium.



[A] Map of the United States of America. [B] Map of New Mexico (N.M.). [C] NMLP Claim Map. Maps and associated details are illustrative only and not to scale. Map does not reflect recent claim consolidations.

## Right Geology for Lithium Brine

- Basin and Range extensional faulting - actively defines subsiding closed basin.
- Volcanic source rock include lithium bearing rhyolites.
- Region of high heat flow including hot springs to leach lithium from rhyolites into brines in the closed Lordsburg basin.
- Basin morphology provides large catchment area for groundwater and brine recharge. Long lived basin for enrichment of lithium brines.

## Forward Plan

- Seek to farm-out for free-carry, and/or shallow drill to define resource.



Lithium brines processed with aMES<sup>TM</sup> technology, as a pretreatment.

## aMES<sup>TM</sup> Application Rationale

- Potential to **direct process the brine with aMES<sup>TM</sup>** technology, therefore eliminating or reducing the need for evaporation ponds.
- Potential to rapidly develop a more capital efficient and sustainable lithium production operation compared to conventional development pathways.
- Potential to process and recover range of additional compounds including **potash as a by-product**.
- Third-party interest in the NMLP, with potential to drill in conjunction with regional exploration company.



# Dandaragan Trough Project (100% PWN)

## Overview

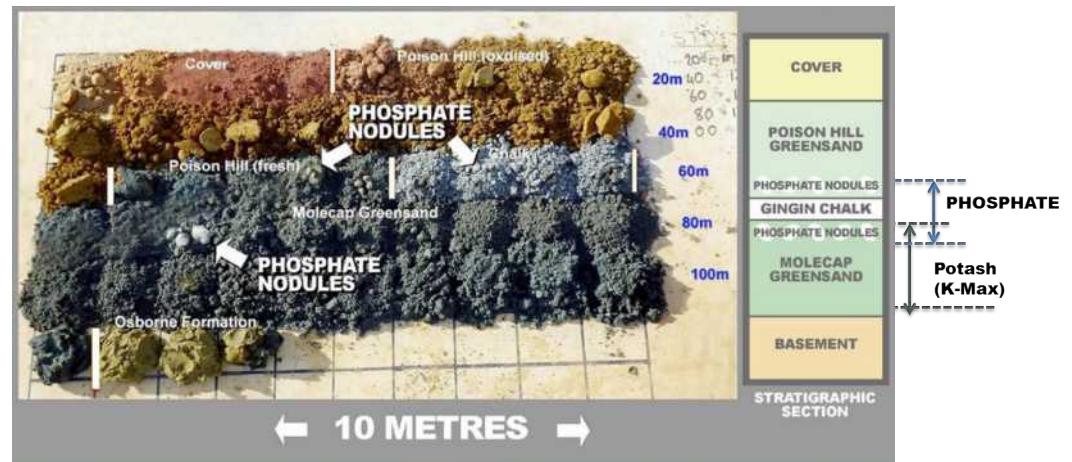
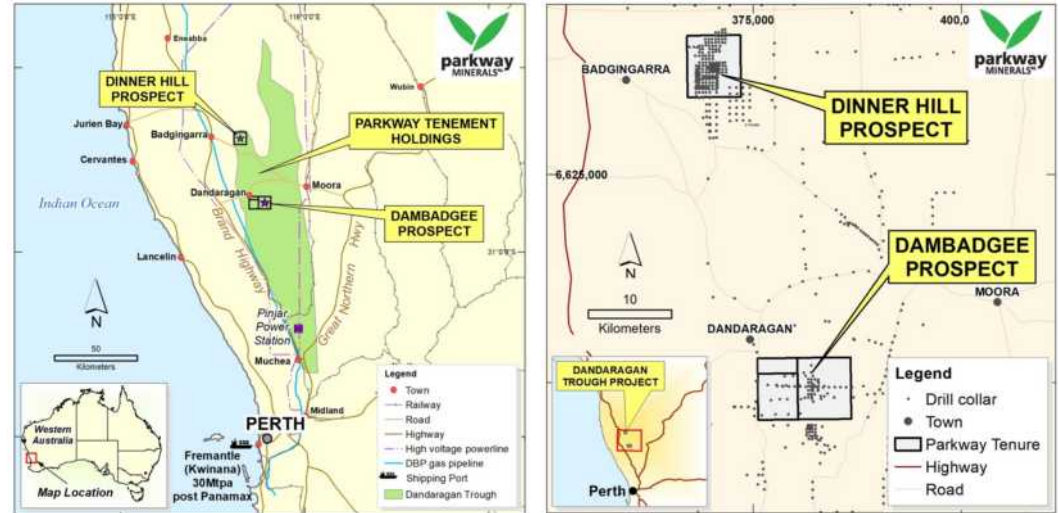
- The Dandaragan Trough hosts one of the **world's largest glauconite/greensands deposits**, containing abundant P and K.
  - Widths greater than 20km
  - Many intersections greater than 40m thick
  - Regionally extensive - extends ~150km along strike
- Great Infrastructure:
  - Rail, roads, towns, power, gas and water all nearby
  - Two major export ports and fertiliser plants at Geraldton and Kwinana, less than 200km away.
- Close to local markets WA SE and South Asia
- Similar mining activity already established in the region.

## Resource Appraisal

- Indicated + Inferred Potash Resource – 910 Mt @ 3.8%  $K_2O$ , and
- Indicated + Inferred Phosphate Resource – 630 Mt @ 1.9%  $P_2O_5$ .
- Resource covers 52 km<sup>2</sup> area (ASX release, 26 Sept 2017).
- Dambadgee – Recent drilling results suggest that the Dambadgee prospect may represent a higher quality resource than Dinner Hill. Exploration Target of 2 to 4 billion tonnes reported [28 Sept 2017](#).

## Next Steps

- Parkway is exploring various pathways to introduce a joint venture or strategic partner to fund the next stage of feasibility studies.



# Davenport Resources (ASX: DAV)

## Overview

- Davenport Resources is a pure-play potash company with a globally significant potash resource inventory (largest in Western Europe), in an established potash mining district of Central Germany.

## PWN Shareholding

PWN is the largest shareholder in Davenport Resources holding:

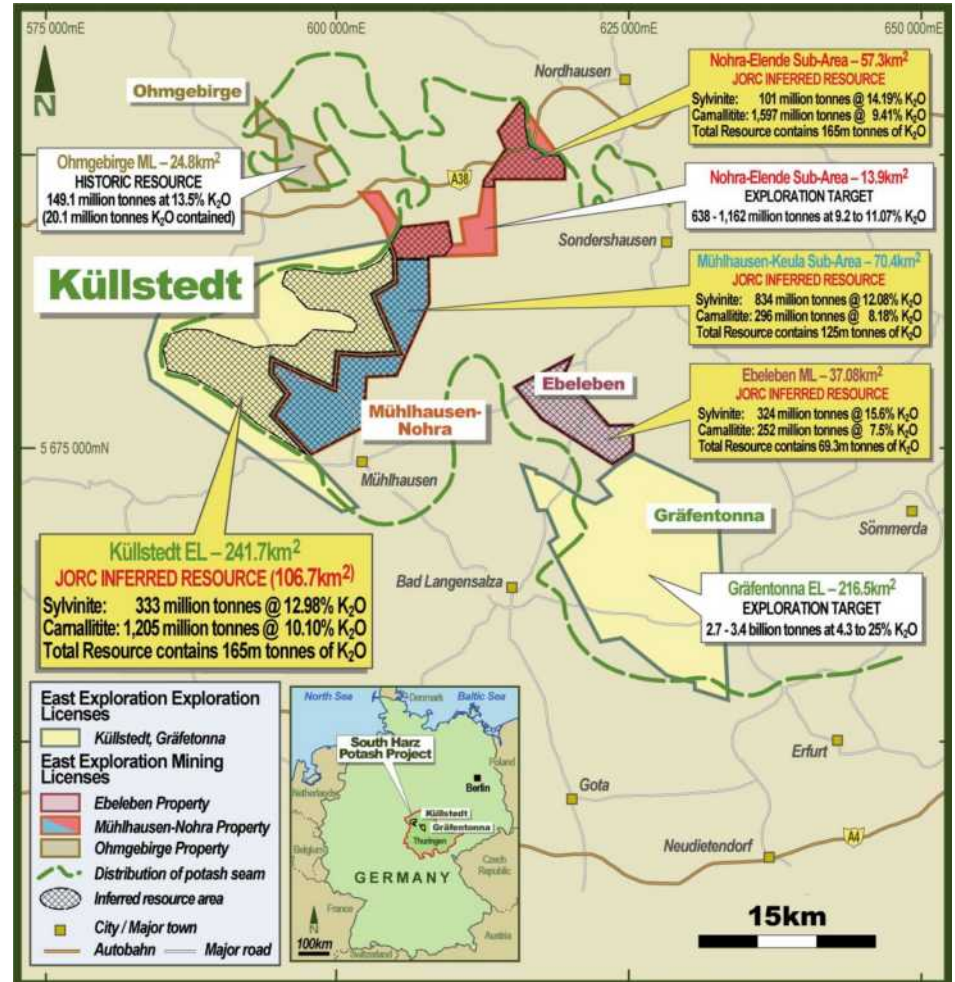
- 34,300,000 shares (~20.8% IC) and 7.1 million options (DAVO)

## Potash Resource

- Davenport controls over 4.9 Billion tonnes (grading 10.6% K<sub>2</sub>O) of JORC Inferred Resource from its Ebeleben and Mühlhausen-Nohra mining and Küllstedt exploration licences, including 1.6 billion tonnes of Sylvinitite grading 13.1% K<sub>2</sub>O.
- Davenport's portfolio of resources represents **Western Europe's largest potash inventory** and contains a number of significant projects.

## Corporate Synergies

- Approximately 75% of the potash resource (1,205 million tonnes) at the Küllstedt project consists of carnallitite grading at 10.1% K<sub>2</sub>O, which may be **amenable to primary solution mining**.
- CPC's aMES™ technology has likely applications in both the primary processing of potash solutions as well as sylvinitite waste streams.
- CPC has previously performed testwork to demonstrate the suitability of the aMES™ technology to process primary and waste brine streams from other potash projects.
- Parkway has facilitated collaborative discussions between DAV and CPC, to explore potential pathways for adding value to the DAV project portfolio.





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