

# Circum Minerals' World-Class Tier One, Low Cost, Scalable Ethiopian Potash Project



March 2016

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# Introduction



## Developing Circum's World-Class Tier One, Low Cost Ethiopian Potash Project into a Major Scalable Long Term Producer and Key Supplier to the Asian Markets

- Circum is developing its **100% owned** Danakil Potash Project in Northern Ethiopia
- Mineral resource of **4.9 billion tonnes** at 18.1% KCl with reserves of 107.8 Mt of KCl equivalent
- Seismic data suggests **potential total resource of 12 to 14 billion tonnes**
- Targeting annual production of **2 Mt of MOP and 0.75 Mt of SOP** for Phase 1
- Amenable to **low cost** solution mining and solar evaporation - both low risk, proven technologies
- **Scalable production** - resources sufficient to support at least two, possibly three expansions
- Mine gate cash costs projected to be the **lowest in the world**
- One of the **lowest capital intensity** per annual tonne of any major potash project in the world
- Substantial **transportation advantages** to India, Southeast Asia and South China
- Management team has experience building mines and a **track record of creating value**

# Danakil Project Overview



## Summary

- DFS completed in July 2015, optimized in February 2016
- Production target of 2 Mtpa MOP, 0.75 Mtpa SOP
- Low cost, low risk solution mining
- Initial development capital of US\$2.3 billion
- Peak funding around US\$1.8 billion due to an early revenue stream from initial production
- Lowest quartile mine gate cash costs
  - US\$38/t MOP and US\$112/t SOP
- Total operating costs (FOB Djibouti)
  - US\$81/t MOP and US\$156/t SOP
- After-tax NPV (10% real WACC<sup>(1)</sup>) of US\$2.1 billion<sup>(2)</sup>
- After-tax IRR of 26% in nominal terms<sup>(1)</sup>

## Project Location



## Next Steps

- Final stage of negotiation regarding the Mining License Agreement with the government of Ethiopia

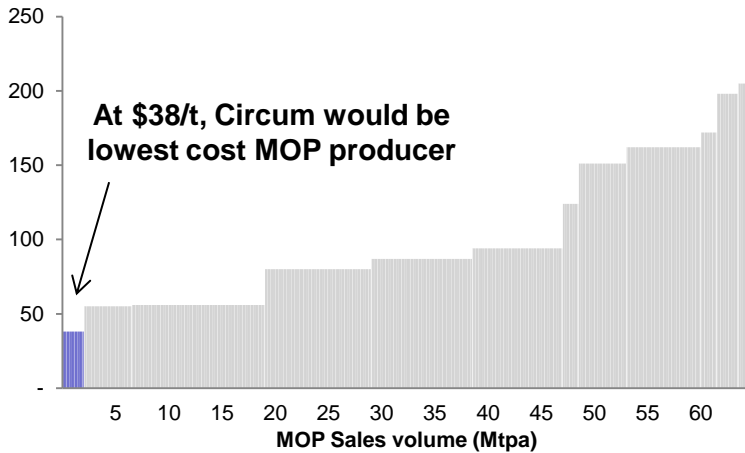
1. Weighted Average Cost of Capital

2. Based on a flat, real MOP price of US\$350/t and a flat, real SOP price of US\$580/t (based on December 2015 revised DFS), assuming 2% inflating factor. Note: Including marketing benefits

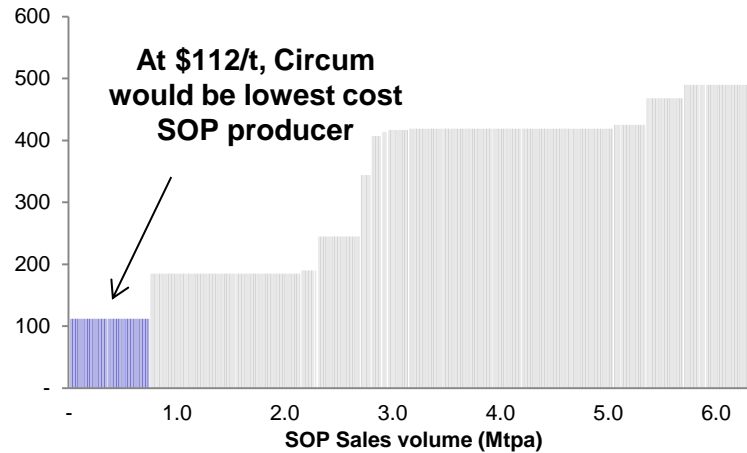
# Low Cost, High Margin, Capital Efficient Project



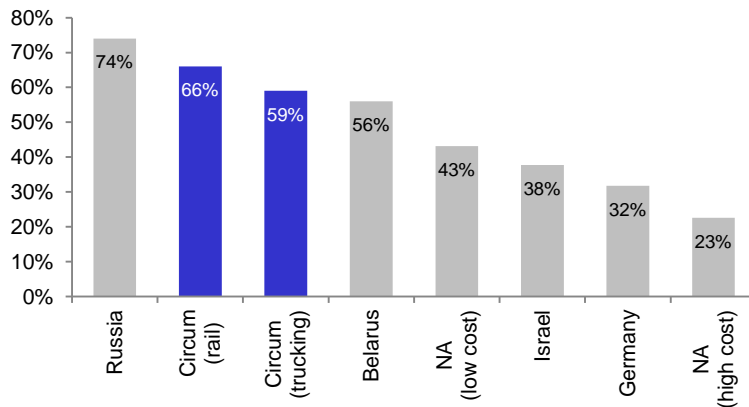
2014 MOP Cash Cost Curve (US\$/t EXW)



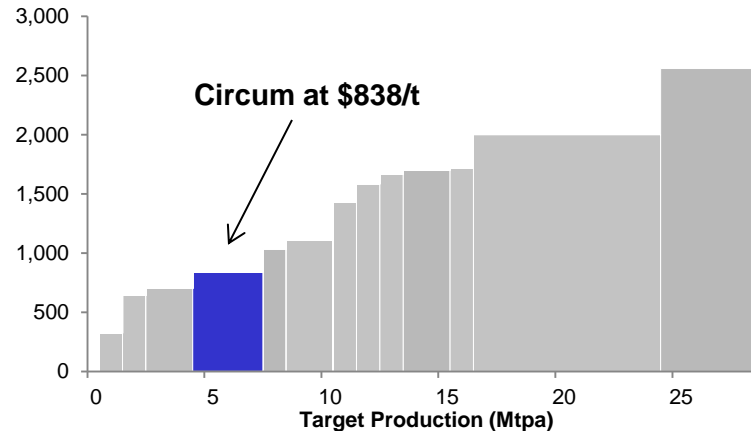
2014 SOP Cash Cost Curve (US\$/t EXW)



Margin over CIF Production Costs\*



Capital Intensity per Tonne (US\$/t)

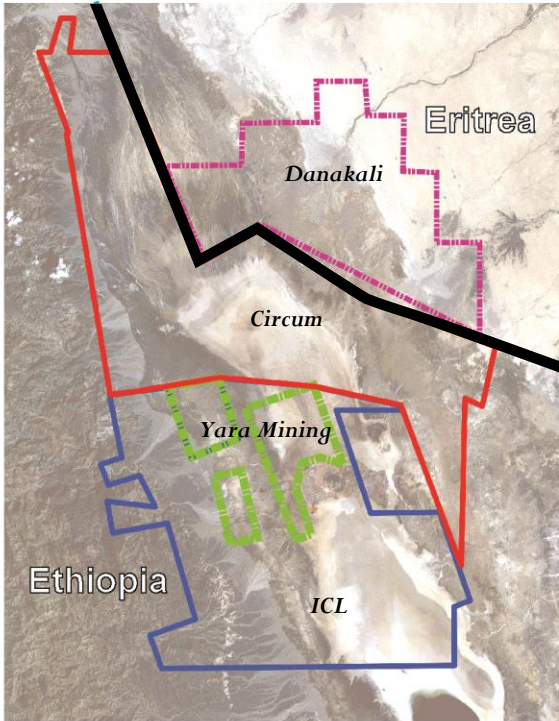


Sources: Cash cost data from Integer; CIF production costs from Goldman Sachs (except Circum); and capex information from companies' presentations and announcements. \* Margins based on MOP price of US\$350/tonne less CIF production cost (including sustaining capital). Product price of US\$413/tonne assumed for Circum based on 2 Mt MOP at US\$350/tonne and 0.75 Mt SOP at US\$580/tonne.

# Danakil Depression – Emerging Potash Basin

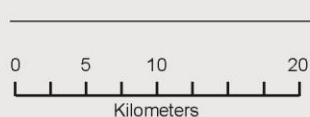


Danakil Depression  
Potash Mining Companies  
**Location Map**



**Legend**

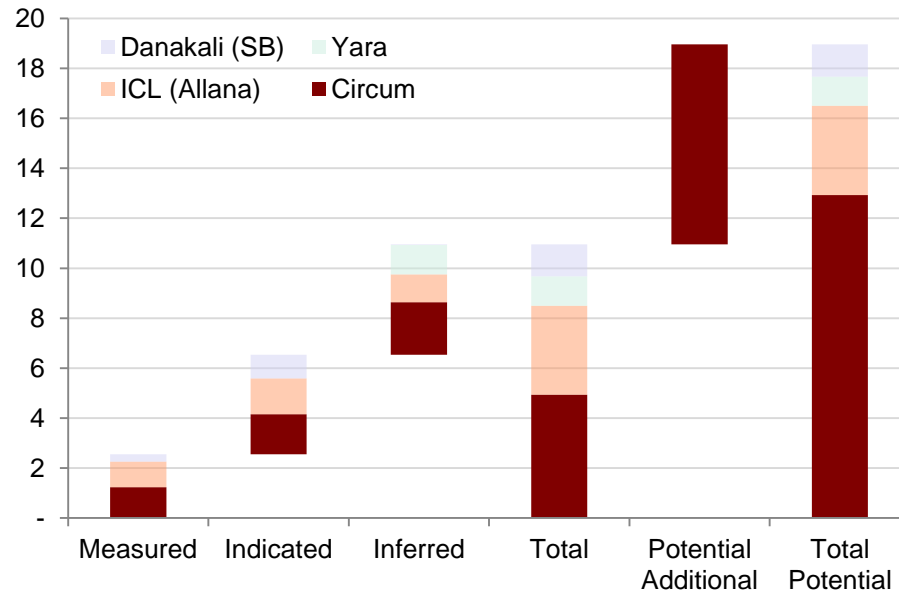
- ▭ Danakali Approximate License Area
- ▭ Circum Exploration Area
- ▭ Yara Mining
- ▭ ICL (Allana)
- ▬ Border



- One of the hottest places on Earth (+50°C) with very little rain
- Climatic conditions conducive for low-cost solar evaporation
- Few settlements or flora and fauna in the region so minimal environmental or social issues anticipated
- Circum accounts for almost half of the reported potassium bearing salts in the Danakil Basin

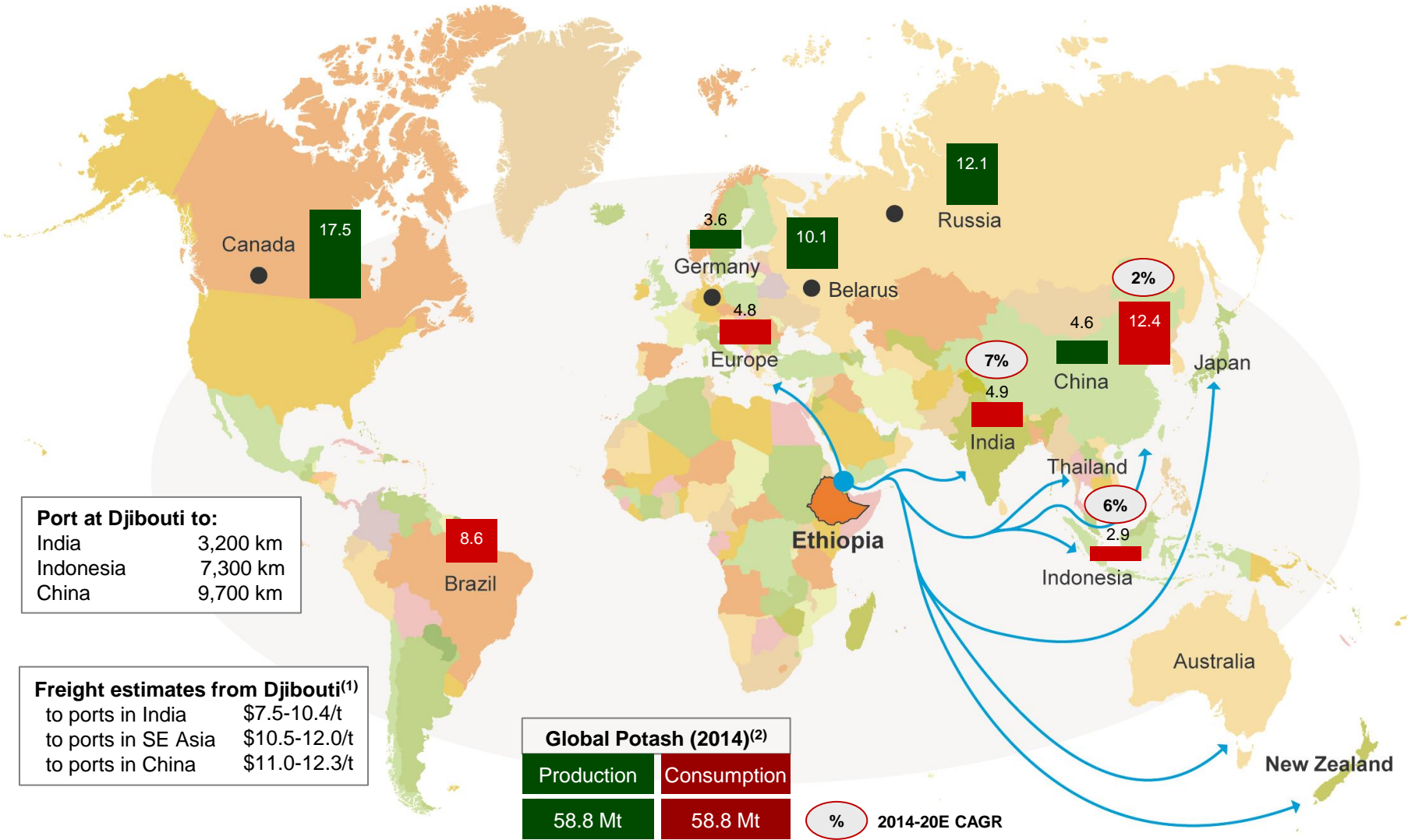
**Danakil Basin Reported Potassium Salts\***

*Billion tonnes*



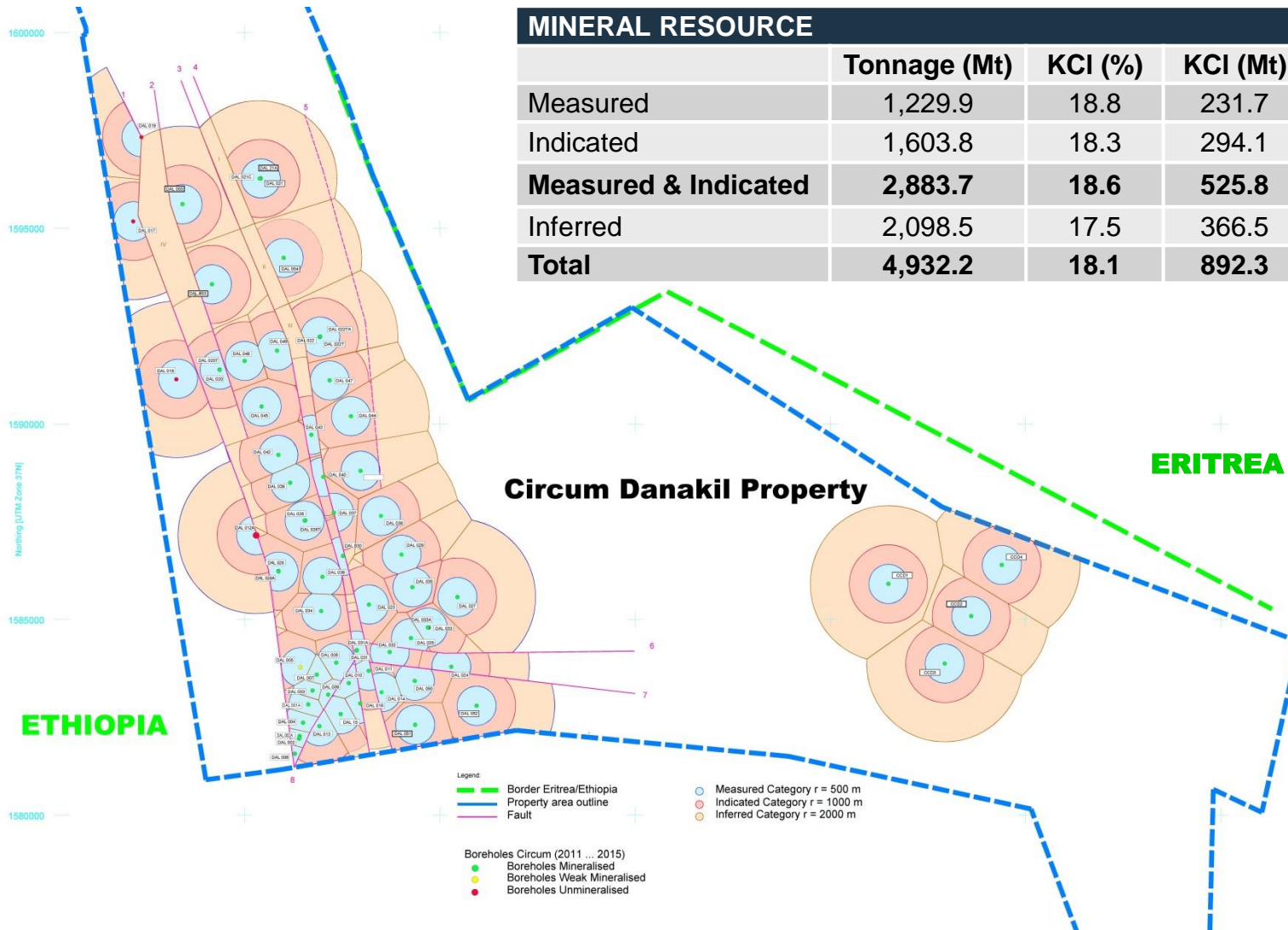
\* Reported potassium bearing salts of Circum, Israel Chemicals (ICL) and Danakali Ltd. Available Yara resources included in Inferred category.

# Favorable Location to Key Markets



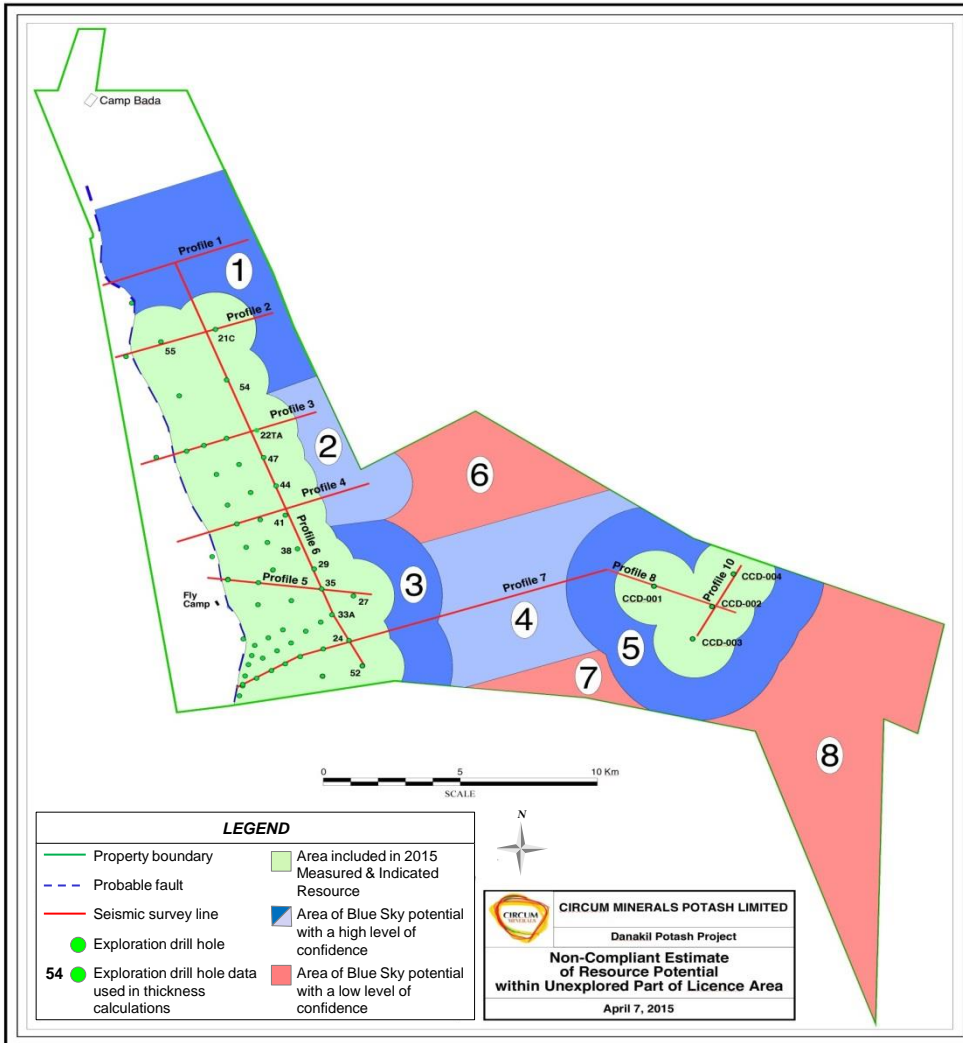
1. Ashmead Maritime, February 2016  
 2. Goldman Sachs Investment Research, January 2015 and Integer Potash Market Research, June 2015

# High Quality Extensive Resource . . .



Source: NI 43-101 Mineral Resource calculated by K-Utec, July 2015.

# ... with Significant Upside Potential



Seismic interpretation of undrilled area indicates exploration potential of an additional 7-9 billion tonnes for a total potential resource of 12-14 billion tonnes.

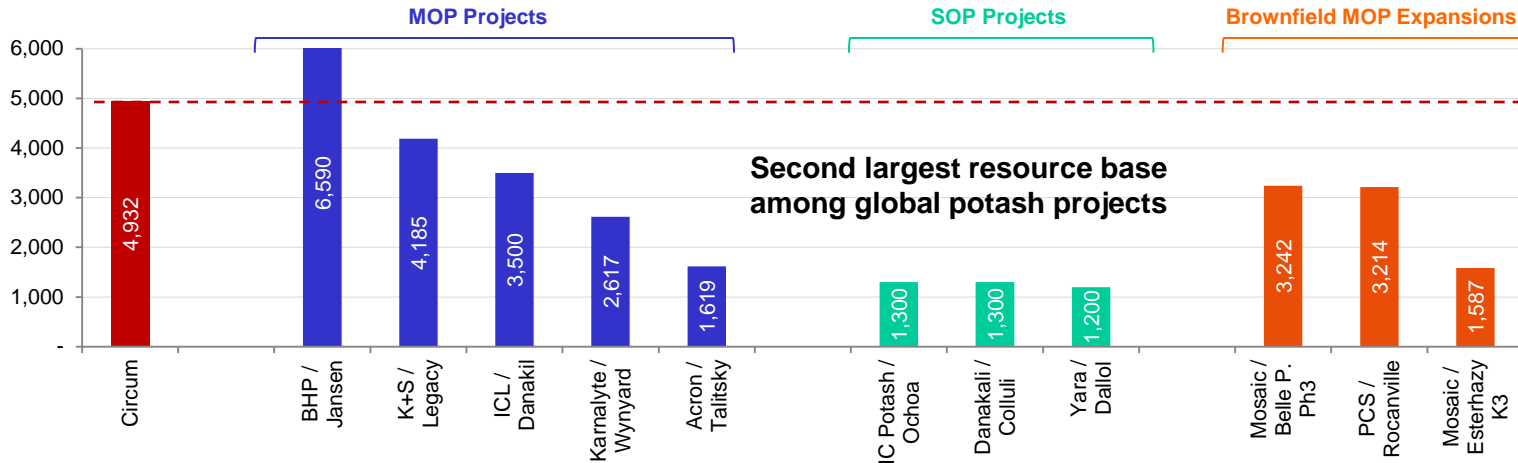
NON COMPLIANT ESTIMATED POTENTIAL RESOURCE*	
Potash Member	Tonnage (Mt)
Sylvinite	1,299.7
Upper Carnallite	740.8
Lower Carnallite	2,367.4
Kainitite	4,380.4
<b>TOTAL</b>	<b>8,788.3</b>

\* Note: The potential quantity of the exploration target is conceptual in nature and there has been insufficient exploration to define a Mineral Resource and it is uncertain if further exploration will result in the determination of a Mineral Resource Estimate.

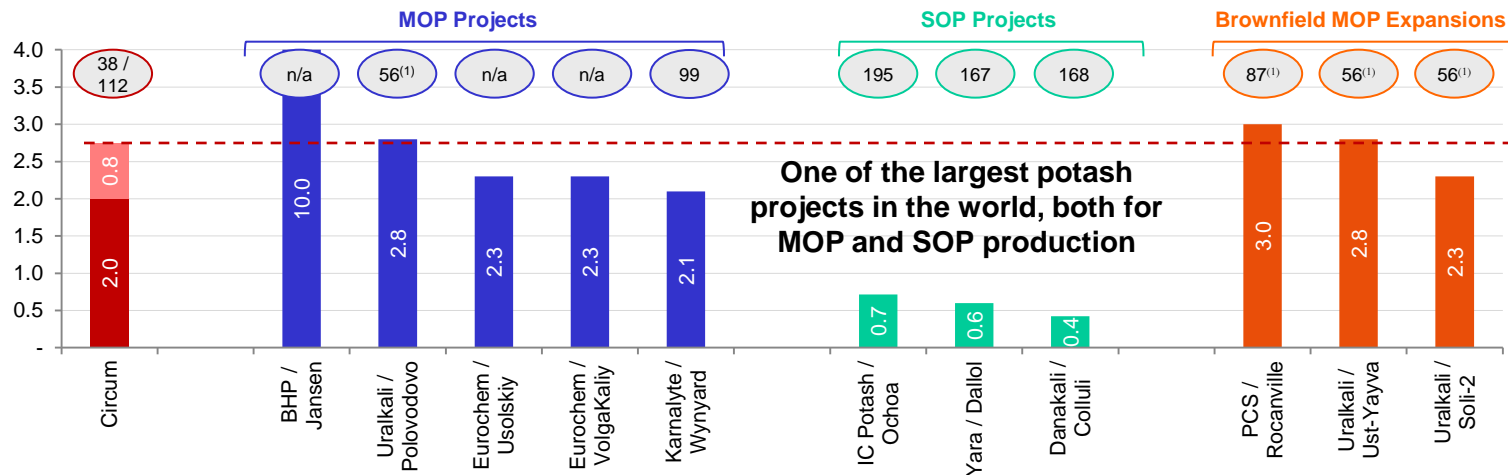
# Favorable Competitive Positioning



## Total Reserves and Resources (Mt)



## Target Production Capacity (Mtpa)



Source: Broker research, company filings. Note: only includes DFS-stage projects

1. Based on current (2014) operating costs per tonne for respective companies
2. Ex-works – pre transport and freight costs i.e. costs at mine gate

# Target Cash Cost (US\$/t EXW<sup>(2)</sup>)

# Solution Mining – Simple and Inexpensive



## Favorable Economics

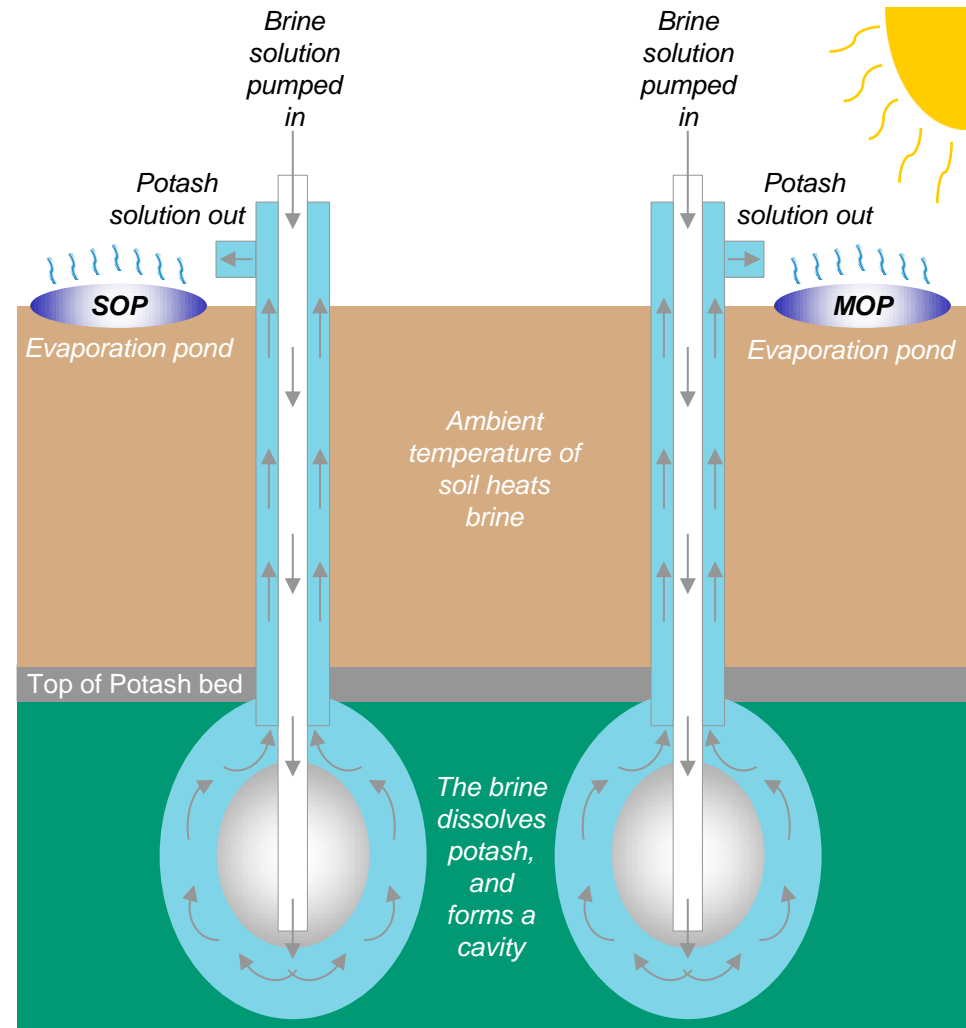
- Capex and opex lower than conventional mining
- Solar evaporation ideal for regional climate
- Faster time to production
- Higher IRR, faster payback period
- Project will benefit from big horizons
  - Less wells to be drilled, large caverns

## Less Complex

- Ability to selectively mine potash layers
- No underground access is required
- No development shafts are needed
- Production volume is easily scalable

## Low Risk

- Proven technology (used in Canada & USA)
- Minimal impact on the environment
- No risk of mine flooding and losing entire project
- Low personnel risks during operation



\* Figure for illustrative purposes only. Source: Circum Minerals

# Solution Mining – Enhancement Potential

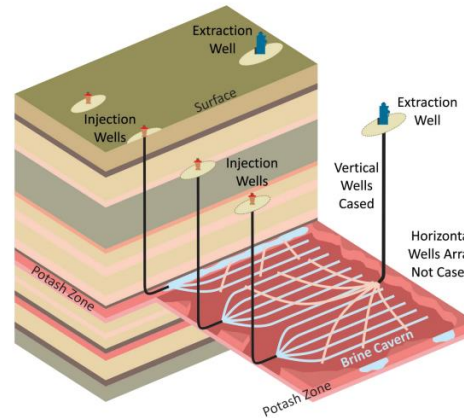


More Advanced Techniques such as Dual Caverns and Horizontal Drilling can be Potentially Explored

## Solution Mining

Project/ Location	Owner	Project/ Location	Owner
Kazakhstan	Satimola	Canada	Karnalyte Resources
Northern Africa	Vale	Canada	Western Potash
Colorado	NaTec Mines	Congo	Mag Industries
Legacy (Canada)	K+S	Turkey	EtiSoda

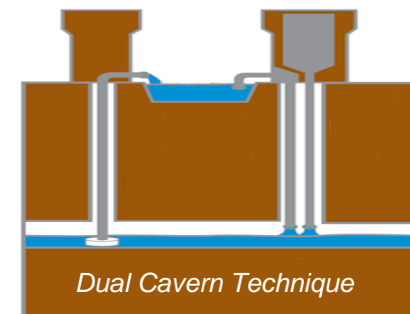
## Horizontal Drilling



- Intrepid Potash uses horizontal drilling at its Moab mine in the USA
- Stabilized production volumes substantially above the pre-acquisition levels from PCS

## Dual Caverns

Project/ Mine	Owner	Comments
Milestone Project	Western Potash	• Completed scoping study in July 2015
Esterhazy / Belle Plaine	Mosaic	• Allows for more efficient management of brine inflow
Legacy Project	K+S	• Employs dual cavern drilling approach
Deusa Int.	Deusa Int.	• Employs dual cavern drilling approach



# Infrastructure – Regional Overview



## Significant infrastructure support from the Ethiopian Government

- The Government recently completed a paved road from Mekele (where Circum’s logistics base is located) to the Danakil Basin.
- EEPCo<sup>(1)</sup> intends to expand the national power grid from Mekele to the Danakil region.
- Significant work done with Umvoto on water; studies indicate access to sufficient water from three alluvial fan complexes in license area.
- Potash transport will be initially by truck to new port being built in Tadjoura, Djibouti.
- Circum is preparing a PFS on potential routing and costs of a rail link from Danakil Basin to Djibouti which will connect with the proposed Weldiya-Tadjoura Port rail line.
- New bulk terminal at Tadjoura to be completed in Q3 2016; discussions underway with Djibouti Port Authority.
  - Distance from Project area to port is approximately 600km.
  - Product shipping by Handymax vessels.

Ship Loaders at Port



Potash Haulage Truck



1. Ethiopian Electric Power Company

# Infrastructure – Power & Water



## Power



- Maximum electrical power demand for proposed operations of 77MW.
- EEPCo intends to expand the national power grid from Mekele to the Danakil region.
  - Feasibility study outlines transmitting 180MW to new Dallol sub-station, to be in place by 2017.
- Total cost of US\$45-50M, of which 20% will be provided by the Government and the balance borrowed. An application for financing has been submitted to the African Development Bank
  - Danakil basin potash companies could share costs if no external financing is forthcoming, given substantial cost savings expected from grid power vs. own power stations onsite (US\$0.02 vs. US\$0.30/kWh).
- Circum DFS includes design and cost of 10km, 100MVA line from Dallol sub-station to mine site.

## Water



- Water requirement of c.30 gigalitres per annum (c.80 million litres per day) given the solution mining techniques to be utilized.
- Umvoto hydrogeological model indicates Circum has access to sufficient water for its operations from the nearest three alluvial fan complexes, all within the Circum license area.
  - Umvoto is the world leader in water resource development.
  - Work will continue on the water exploration program in 2016 to increase confidence in water resources.
- The Government has stated that in case of any shortfall in water availability, water will be allocated from two large aquifers adjacent to the license area.
  - Nearby Lelegheddi river other potential source of water.

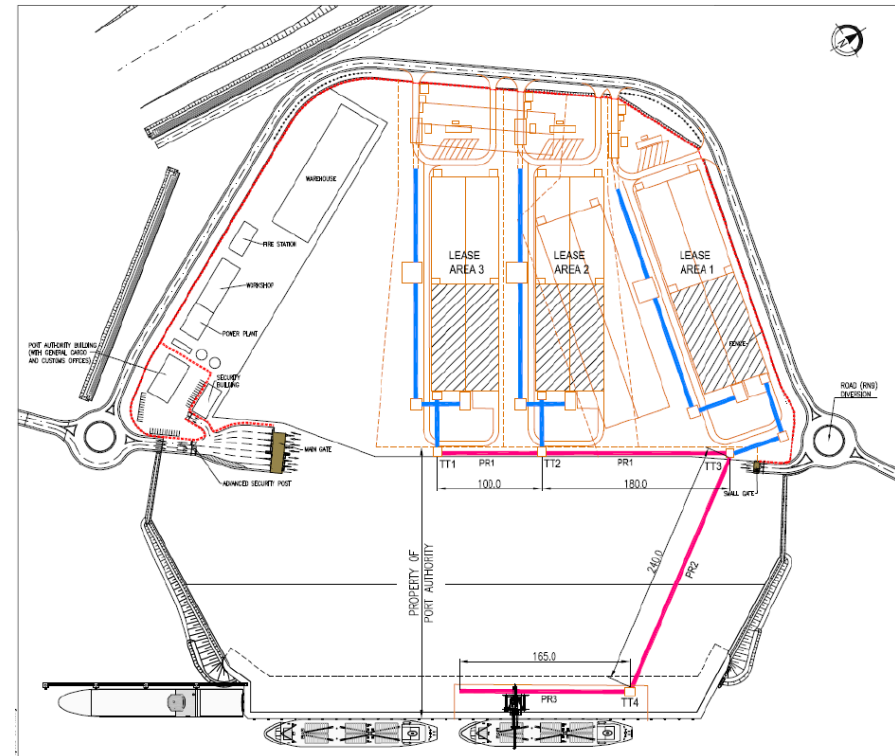
# Infrastructure – Port of Tadjoura in Djibouti



## The new port is projected to be completed in Q3 2016

- The port of Tadjoura will accommodate bulk carriers up to 65,000 DWT.
  - Quay's length (488m) allows the simultaneous berthing of two design ships with a length overall of 200m each.
  - A ship loader will be assembled in port yard in order to feed ships at 2,000 t/hr.
  - The Port capacity of up to 7.5 million tonnes p.a. is scalable
- Port critical for economic development in both Djibouti and Ethiopia.
- Circum has had detailed discussions with the Port Authority and has issued a letter of intent for the future export of potash.
- Circum's contractor, Senet, has been engaged in the design of facilities for the export of potash.
- Circum is satisfied the proposed port design meets its criteria while the timetable to port completion is well within its project schedule.

## Layout divided into 3 areas for potash companies<sup>(1)</sup>

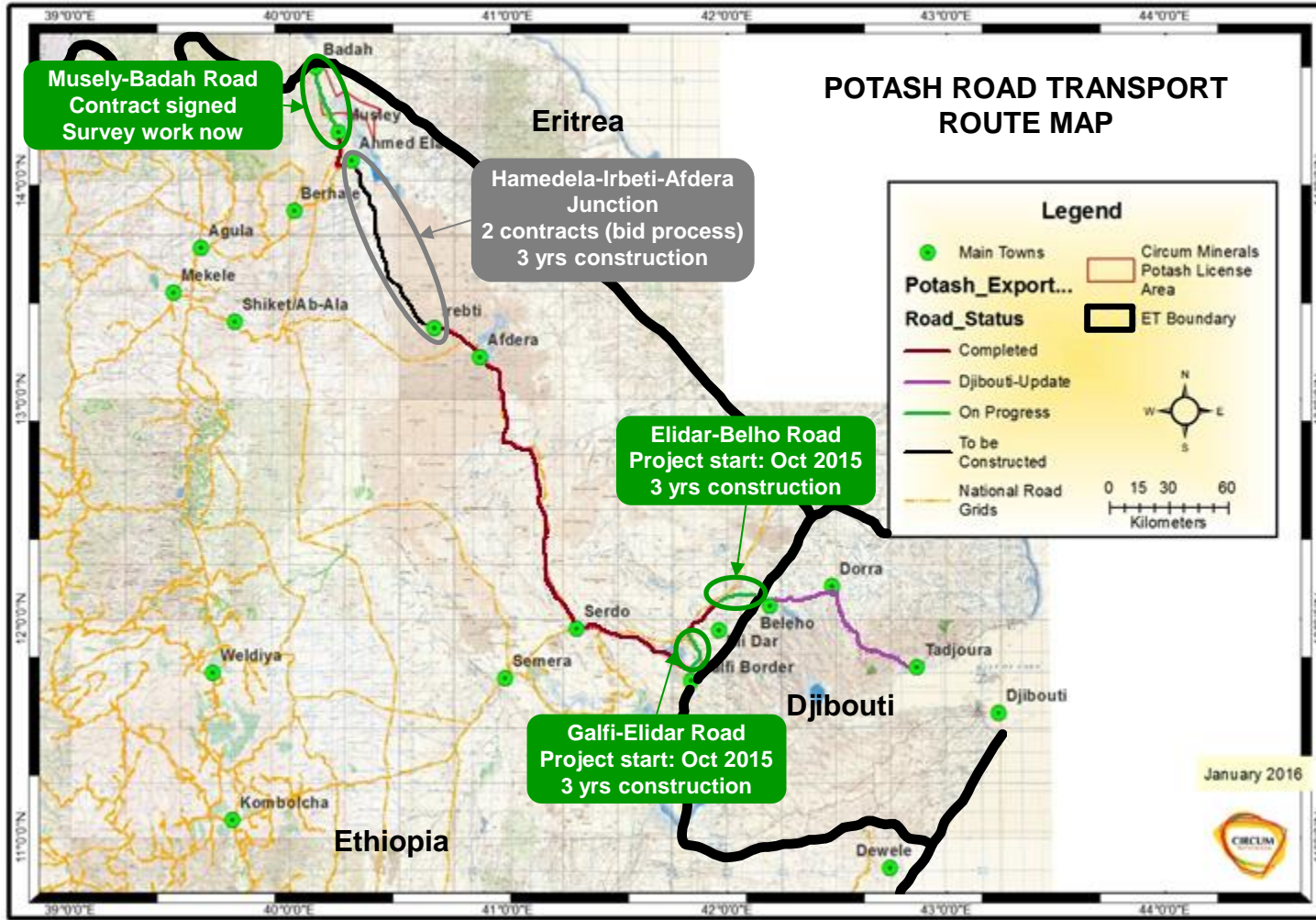


1. General plan of the potash terminal in Phase 1 (concept design) as provided by the Djibouti Port Authority.

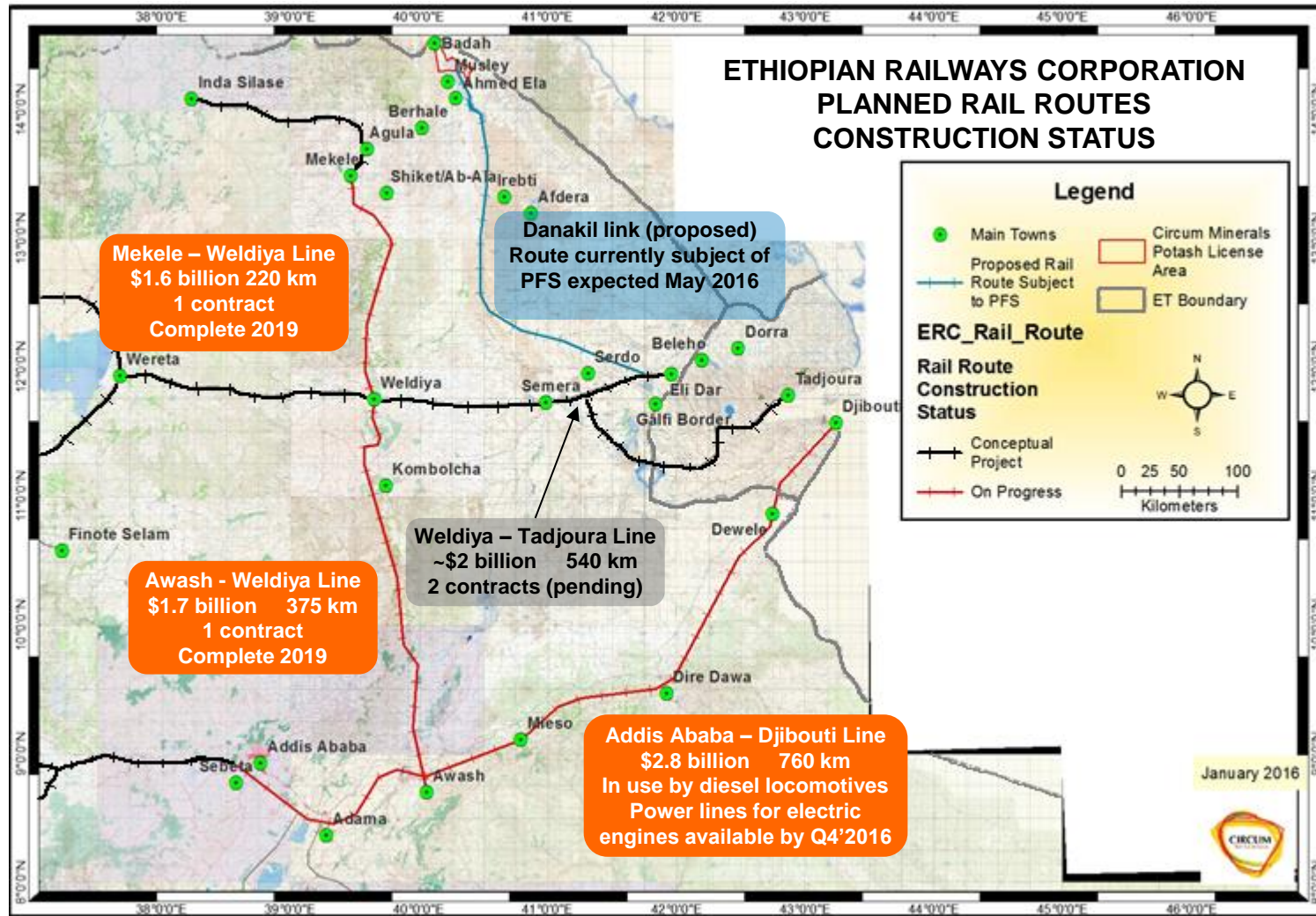
# Infrastructure – Potash Export Road Route



Transport initially by truck; rail the preferred long term option



# Infrastructure – Rail Construction Status



# Definitive Feasibility Study



## Financial Highlights

### ECONOMICS

Pre-tax NPV @ 10%	US\$2.8 billion
Pre-tax Nominal IRR	29%
After-tax NPV @ 10%	US\$2.1 billion
After-tax Nominal IRR	26%

### KEY ASSUMPTIONS

Annual Production	2 Mt MOP, 0.75 Mt SOP
MOP Price	US\$350/t
SOP Price	US\$580/t
Mine Life	26 years
Accuracy of Study	+ / - 15%
Cost Basis	Q2 2015

## Project Costs

### OPERATING COSTS (US\$/tonne)

	<u>MOP</u>	<u>SOP</u>
Production Opex	38	112
Transportation & Port Opex	44	44
Opex (FOB Djibouti)	81	156
Opex (incl sustaining capex)	121	196

### DEVELOPMENT CAPEX (US\$M)

Direct & Indirect Costs	2,093
EPCM and Insurance	181
Owners Costs	30
Total Capex	2,304

# Significant Upside / Blue Sky Potential



## Significant upside from numerous identified areas

<b>Resource to Reserve Conversion</b>	<ul style="list-style-type: none"><li>• Potential to increase mining recovery factor from 24% to c.30%<ul style="list-style-type: none"><li>- Requires geotechnical study to be undertaken</li><li>- Could reduce annual sustaining capex by US\$20-30M, with possibly lower operating and maintenance costs, while extending mine life by 5-6 years</li></ul></li><li>• Recovery factors of 40-50% achieved through use of dual caverns (Belle Plaine / Mosaic, Legacy / K+S and Deusa Int.) or horizontal drilling (Intrepid)</li></ul>	Near Term
<b>Rail Transport and By-Products</b>	<ul style="list-style-type: none"><li>• Option to transport product by rail instead of road to Port of Tadjoura</li><li>• High level study completed and pre feasibility study due May 2016</li><li>• Cheaper transport solution (less than US\$10/t vs. US\$30/t) for upfront capex of c.US\$0.9B</li><li>• Reduced transport cost will support the economic feasibility of by-products such as industrial grade salt, magnesium chloride, magnesium sulfate, etc.</li><li>• Important for expansion of production beyond 2.75Mtpa</li></ul>	
<b>Bromine Revenue Stream</b>	<ul style="list-style-type: none"><li>• High, possibly economic levels of bromine found in cores</li><li>• Bromine could be extracted from waste brine before disposal – would add additional revenue stream at low cost</li><li>• Further core analysis currently being conducted; potential future bromine study</li></ul>	
<b>Geothermal Power</b>	<ul style="list-style-type: none"><li>• Deposit close to area of volcanic activity with significant potential for geothermal power generation</li></ul>	Longer Term

# Corporate Overview



## Management Team

### Executive Directors

- **Stephen R. Dattels**, *Chairman & Co-Founder*
  - Founded UraMin (sold in 2007 for US\$2.5B to Areva)
  - Key executive at Barrick during its formative years
- **Brad Mills**, *Executive Director*
  - Managing Director at Plinian Capital Ltd.
  - CEO of Mandalay Resources Ltd. (TSX)
  - Former President of BHP Billiton's Base Metals Div.

### AMED Appointees

- Carlo Baravalle, *Non-executive Director*
- David Twist, *Non-executive Director*

### Other Non-executive Directors

- Mike Beck, *Non-executive Director*
- Ian Stalker, *Non-executive Director*

### Management

- Chris Gilchrist, *Chief Operating Officer*
- Ian Burns, *Chief Financial Officer*
- Richard Jeanne, *Senior Consulting Geologist*
- Yonas Bekele Belay, *Country Manager*

## Fully Diluted Equity

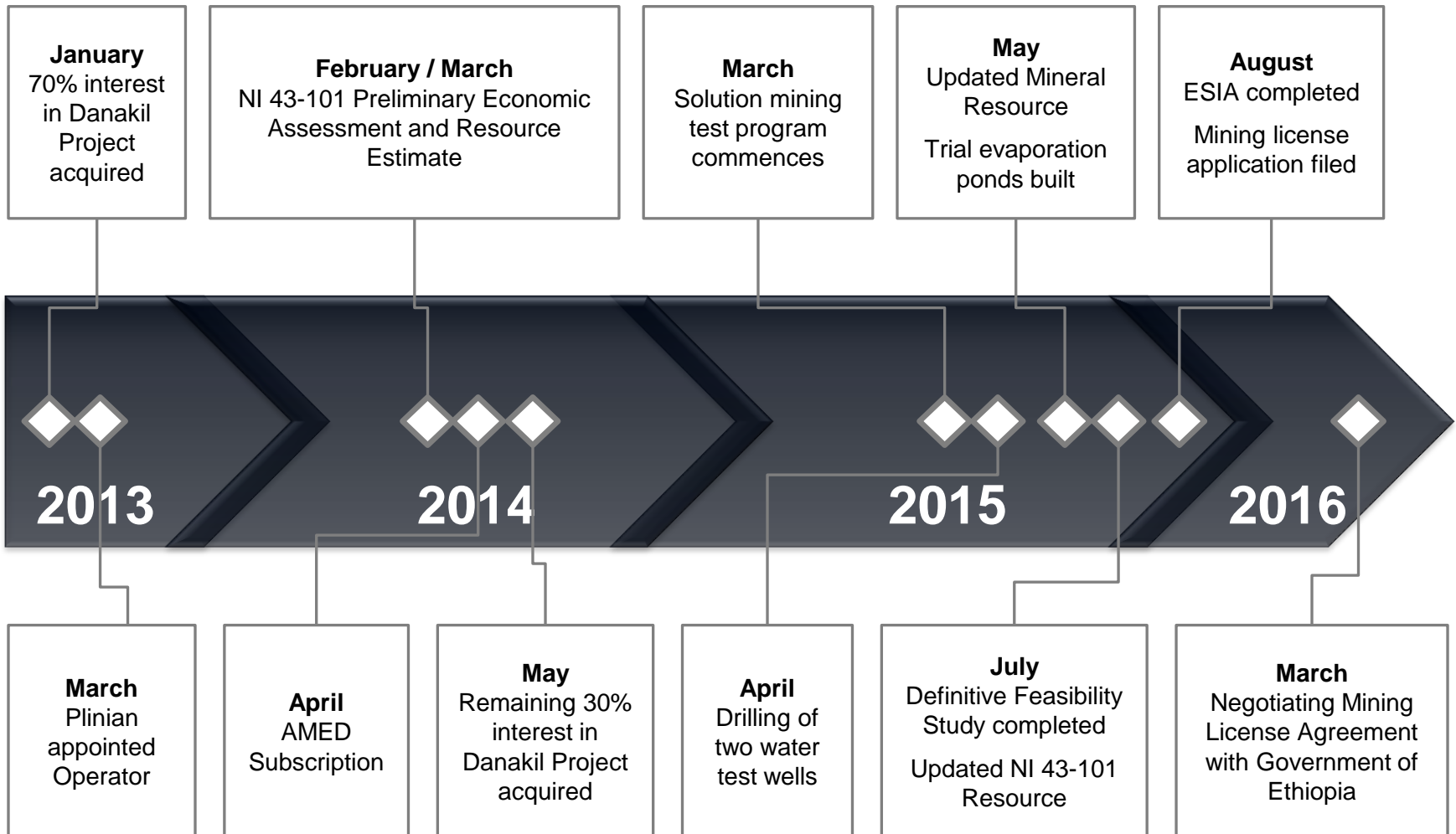
Issued shares	96.5m
Options and warrants	4.0m
Fully-diluted shares	100.6m

## Shareholders (Fully-diluted)

AMED	37%
Directors & Management*	26%
Plinian	10%
Others	27%

\* Includes connected and related parties to the directors.

# Circum's Development Progress to DFS



# Key Milestones for 2016



- ❑ Finalize Mining License Agreement with the Ministry of Mines
- ❑ Commence process to select strategic partner and obtain financing for the Project
- ❑ Continue operation of solution mining test well
- ❑ Complete infrastructure studies and PFS level study on product transport by rail
- ❑ Complete additional hydrological studies and define additional water resource
- ❑ Examine the potential of bromine as a by-product

# Site Photos



**Solution Mining Well Head**



**Solar Evaporation Pools**



**Main Camp**



**Harvesting Kainitite Crystal Crop**

# Key Investment Highlights



- **High quality resource base in premier new potash basin with favourable location to end markets**
  - Resource of 4.9Bt (@18.1% KCl) is among the largest in the world with seismic data suggesting a total resource potential of 12-14Bt
  - Substantial transportation advantages to India, Southeast Asia and China
- **One of the largest potash projects globally with proven technology, low capital intensity and resulting economies of scale**
  - Proven mining and processing using solution mining and solar evaporation
  - At US\$838/t, Circum's Danakil is one of the most capital efficient potash projects in the world
- **World-class project with expected industry leading cost position and substantial upside potential from existing resource base**
  - Lowest mine gate costs and among lowest FOB costs in the world
  - Resources support scalable production with potential for >5Mtpa operation
- **Favourable mining jurisdiction with significant infrastructure support from Ethiopian government**
  - Full commitment to support the emerging potash industry through infrastructure development
  - Favourable fiscal regime with a mining corporate tax rate at 25% and a 5% Government free carry
- **Production of MOP and SOP products, both benefitting from highly attractive long-term market fundamentals, and flexibility in production to target the optimal product mix**
  - Increased fertilizer usage due to population / income growth and improved crop yields
  - Unique position to produce both MOP and SOP, which is a premium product
- **DFS highlights attractive returns due to strong cash flow generation potential**
  - Estimated margins in excess of 50% for both MOP and SOP products\*
  - Potential for up to 70% of debt funding to boost equity returns

\* Based on DFS financials (which assumes a flat, real MOP price of US\$350/t and a SOP price of US\$580/t)



## APPENDIX A: POTASH MARKET OVERVIEW

# Potash Overview



## Potash Overview

**“Potash” refers to a group of potassium (K) bearing minerals and chemicals. Its primary use is as a soil fertilizer (90% of current use).**

**Circum is in the unique position to be a producer of both MOP and SOP.**

## Muriate of Potash (MOP), KCl

- Most common form of potassium fertilizer
- Global market of 65Mt KCl equivalent in 2015
- Contains chloride, which can be harmful to sensitive crops
- Primarily for carbohydrates crops



## Sulfate of Potash (SOP), $K_2SO_4$

- Global market of 6Mt in 2015
- No chloride
- Ideal for fruits, vegetables, coffee, nuts, potatoes, tobacco
- Priced 30-60%+ over MOP
- Ideal for use in arid regions
- Ideal for salty or sandy soils
- Improves yield, taste, color, aroma and shelf life



# Drivers for Increased Potash Demand



The **global population** is expected to **grow by approximately 300-400 million** every five years.



**Fertilizer demand** is underpinned by **positive farm economics**, with **high crop prices**. These are expected to continue.



**Income growth** in developing countries tends to **stimulate a change** towards more **varied and meat-based, crop-intensive diets**.



**Developing countries** will need to **boost crop yield** considerably in the coming years **to ensure food security**. This will require fertilizer usage.

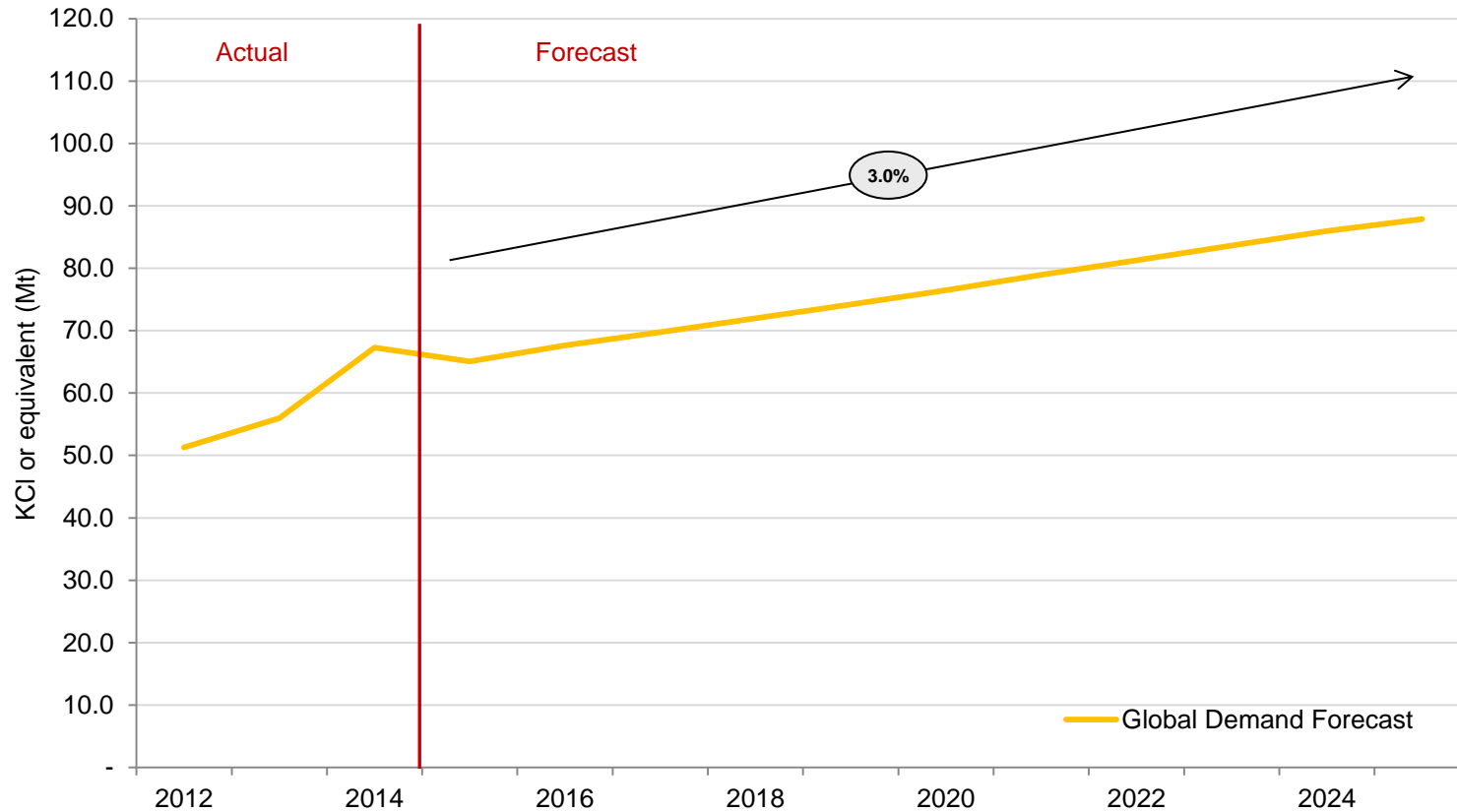


# Potash Demand Outlook



Global potash demand is expected to reach 88Mtpa by 2025

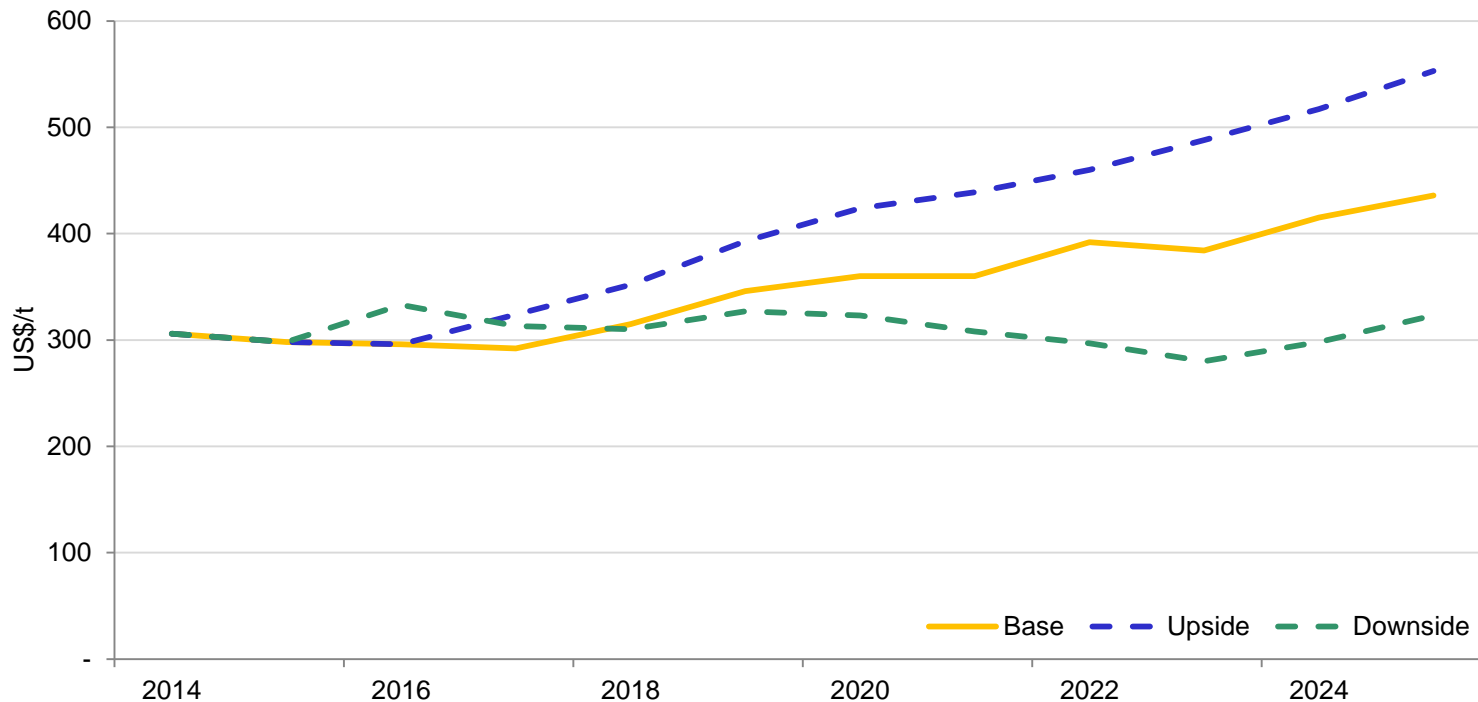
Global Potash Demand (Mt)



# MOP Price Forecast



## MOP Price Forecast (US\$/t, Nominal Terms)<sup>(1)</sup>



***“BHP forecasts potash will fall into deficit after 2020 as existing mines are depleted and higher yields are required from arable land to feed a growing global population with diets that include increasing amounts of protein.”***

- 22 September 2015

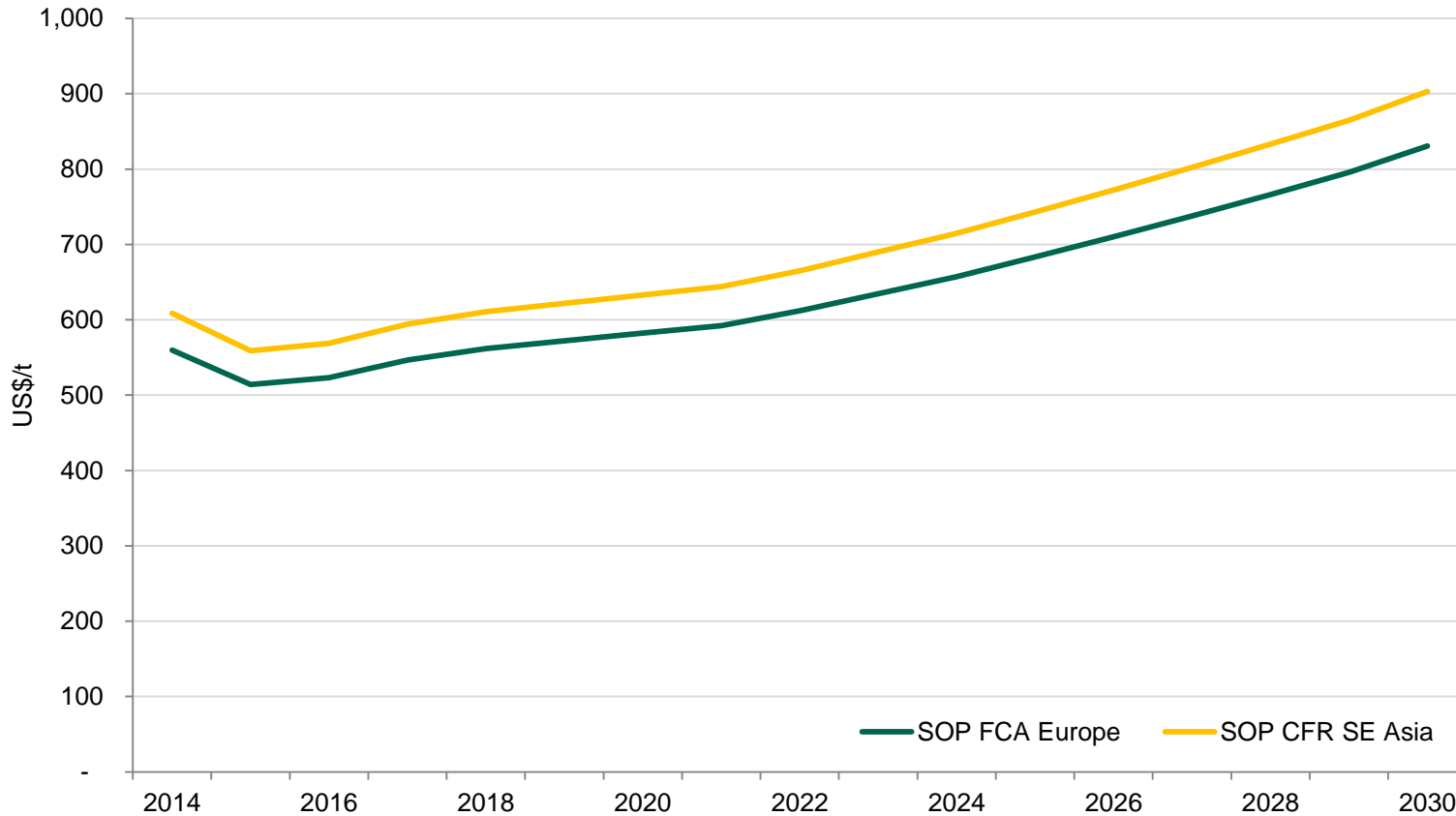
Source: Integer Research Limited, September 2015.

1. Scenarios refer to supply side; upside scenario assumes lower near/medium term prices will deter longer term investment in capacity; downside scenario assumes sustained high near/medium prices will lead to significant new capacity coming online in longer term

# SOP Price Forecast



## SOP Price Forecast (US\$/t, Nominal Terms)



Source: SOP Price Forecast by CRU Consulting, July 2015.



## APPENDIX B: ETHIOPIA OVERVIEW

# Ethiopia Overview



## Key Statistics

STATISTIC	VALUE
Location	<ul style="list-style-type: none"> <li>Landlocked country in East Africa</li> <li>Neighbored by Sudan, Eritrea, Djibouti, Somalia, Kenya and South Sudan</li> </ul>
Population	<ul style="list-style-type: none"> <li>99.4 million (2015E)</li> </ul>
GDP (Current US\$)	<ul style="list-style-type: none"> <li>US\$61.7 billion (2015E, in current US\$)</li> </ul>
Real GDP Growth	<ul style="list-style-type: none"> <li>8.1% (2015E, year-on-year)</li> <li>c.60% growth (from 2010-2015E)</li> </ul>
GDP per Capita	<ul style="list-style-type: none"> <li>US\$620 (2015E, in current US\$)</li> </ul>
Budget Balance	<ul style="list-style-type: none"> <li>(2.5)% of GDP (2015E)</li> </ul>
Current Account	<ul style="list-style-type: none"> <li>(10.5)% of GDP (2015E)</li> </ul>
Key Exports Sectors	<ul style="list-style-type: none"> <li>Food and agricultural products (e.g. coffee)</li> </ul>
Mining Sector	<ul style="list-style-type: none"> <li>Gold, potash, niobium and natural gas</li> </ul>
Religious Composition	<ul style="list-style-type: none"> <li>44% Ethiopian Orthodox, 34% Muslim, 19% Protestant, 3% Other</li> </ul>
Key Political Parties	<ul style="list-style-type: none"> <li>Ethiopian People's Revolutionary Democratic Front (controls 500 out of 546 seats in legislature)</li> <li>The Somali People's Democratic Party (24 seats)</li> </ul>
President	<ul style="list-style-type: none"> <li>Mulatu Teshome Wirtu</li> </ul>
Other Key Government Officials	<ul style="list-style-type: none"> <li>Prime Minister - Hailemariam Desalegn</li> <li>Minister of Foreign Affairs - Tewodros Adhanom</li> <li>Minister of Trade - Abdurahman Shek Mohammed</li> <li>Minister of Finance &amp; Economic Development - Sufian Ahmed</li> </ul>
5 Year Growth and Transformation Plan (GTP)	<ul style="list-style-type: none"> <li>Government envisaged 3 5-year plans to propel the country towards climate resilient middle income status                             <ul style="list-style-type: none"> <li>GTP I - framework for 2010-2015 focused on infrastructure and capacity development</li> <li>GTP II - planned successor program likely to focus more on manufacturing and agricultural exports</li> </ul> </li> </ul>