



**Clean TeQ Holdings Limited**  
**(ASX: CLQ)**

**Corporate Overview**

**November 2015**



Creating sustainable solutions for oil and gas, municipal, mining, agriculture and industry.



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The Syerston Scandium Project is at the Scoping Study phase and although reasonable care has been taken to ensure that the facts in this presentation are accurate and/or that the opinions expressed are fair and reasonable, no reliance can be placed for any purpose whatsoever on the information contained in this document or on its completeness.

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All amounts including "\$" or "A\$" are in reference to Australian Dollars unless stated otherwise.

The information in this document that relates to Exploration Results, Mineral Resources or Ore Reserves is based on information compiled by Sharron Sylvester, who is a Registered Professional Geoscientist (10125) and Member (2512) of the Australian Institute of Geoscientists, and a full time employee of OreWin Pty Ltd. Sharron Sylvester has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking 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'. Sharron Sylvester, who is a consultant to the Company, consents to the inclusion in the report of the matters based on her information in the form and context in which it appears.

All persons should consider seeking appropriate professional advice in reviewing the presentation and the Company.

# Clean TeQ | Highlights

## **INNOVATIVE PLATFORM TECHNOLOGY**

- Continuous Ion Exchange Platform Technology – intellectual property 100% owned by CLQ

## **SYERSTON SCANDIUM PROJECT (100% owned by CLQ)**

- Potential to develop the world's first primary supply of Scandium
- Positive scoping study results for long mine life development
- High grade, large scandium resource with potential for further resource upside
- Using our proprietary technology, CLQ is targeting Scandium Oxide supply at a significantly lower cost than current supply
- Favourably located in a low political risk jurisdiction
- Key development milestones in place (MLA's and development consent)
- Critical water allocation rights already obtained

## **METALS RECOVERY**

- Clean-iX® - innovative process for the extraction and purification of a range of valuable metals from slurries and solutions that are not amenable to conventional separation
- Piloting work has confirmed CLQ's ion-exchange extraction processes' ability to recover low concentrations of scandium from intermediate process streams

## **WATER TREATMENT**

- Continuous Ionic Filtration & Exchange (CIF®) and Macroporous Polymer Adsorption (MPA®) resin technology provides cost effective solutions to the mining, oil and gas and municipal industries for the treatment of waste waters
- Partnership to deploy platform technology in large Chinese market through Heads of Agreement for formation of a joint venture with Shanghai Investigation, Design and Research Institute Co. Ltd (**SIDRI**), majority-owned by China Three Gorges Corporation

## **BOARD AND MANAGEMENT**

The Clean TeQ team consists of experienced managers and specialised engineers and chemists with extensive experience in the provision of industrial technology solutions and mining operations, project development and financing

# Clean TeQ | Corporate Overview

## Issued Capital

ASX code	CLQ
Shares	418.0 M
Options	21.0 M
Performance Rights	1.7 M
Fully Diluted Capital	440.7 M
Share Price	22.0c@
2015 Share Price Trading Range	6.2-29.5c
Market Capitalisation (undiluted)	92.0 M@

## Shareholders

Total shareholders	2,601@
Robert Friedland	16.7%
Board & Management	9.2%

## Cash and Debt

Cash*	\$8.9 M
Short Term Debt	Nil
Long Term Debt (zero coupon Mar-18 notes)	\$3.0 M

## Share Price Chart (A\$/share)



\* As at 30 September 2015

@ As at 26 October 2015

Creating sustainable solutions for oil and gas, municipal, mining, agriculture and industry.



# Clean TeQ | Board and Management



## **CHAIRMAN & CEO - Sam Riggall**

Sam is a graduate in law and commerce and an MBA from Melbourne University. He was previously Executive Vice President of Business Development and Strategic Planning at Ivanhoe Mines Ltd. Prior to that Sam worked in a variety of roles in Rio Tinto for over a decade covering project generation and evaluation, business development and capital market transactions.



## **NON-EXECUTIVE DIRECTOR – Ian Knight**

Ian is a Director of nem Corporate and his experience includes working with boards of public and private firms and State and Federal Governments . He provides extensive experience in strategy and implementing mergers, acquisitions, divestments and capital raising initiatives. Ian was also formerly a partner of KPMG and National head of Mergers and Acquisitions.



## **NON-EXECUTIVE DIRECTOR – Eric Finlayson**

Eric is a geologist with over thirty years' experience in Australia and overseas . Eric worked for 24 years with Rio Tinto including as regional exploration manager for Canada, Director of Exploration for Australasia and Global Head of Exploration for Rio Tinto based in London. Eric is currently Senior Adviser-Business Development for High Power Exploration Australia.



## **GENERAL MANAGER METALS – John Carr**

John is a graduate in chemical engineering from Melbourne University and an MBA from Deakin University. John has previously worked as a process engineer for Rio Tinto. John has spent 8 years with Clean TeQ developing its technologies for metal extraction and water treatment.



## **EXECUTIVE DIRECTOR AND CIO - Peter Voigt**

Peter is a graduate in chemistry and has a MAppSc from Royal Melbourne Institute of Technology. Peter established Clean TeQ in 1990 and became a director in September 2007 and CEO in 2010. In November 2013 Peter moved to become the Chief of Innovation and Executive Director.



## **NON-EXECUTIVE DIRECTOR – Roger Harley**

Roger is founder and principal of investment bank Fawkner Capital. He has over 25 years' experience as a corporate adviser, manager and investor including 11years as Director Corporate Finance and Director of Equity Capital Markets with Deutsche Bank in New York and Australia. Other Non-Executive Director positions have included Medibank Private, Industry Research and Development Board and Innovation Australia.



## **GENERAL MANAGER WATER – Ealden Tucker**

Ealden has over 20 years' senior global operations experience within a number of multi-national companies, including 8 years based in China. Prior to joining Clean TeQ, he worked for Armocon Technologies, Flowserve Valve & Controls, Tyco Flow Control, Pentair, Tyco, BHP and Tubemakers. Ealden has formal engineering qualifications from the Royal Melbourne Institute of Technology.



## **CFO - Ben Stockdale**

Ben is a commerce graduate from Melbourne University and has extensive financial and commercial experience including corporate and project financing, mergers and acquisitions and metals marketing and logistics. Over the past 16 years Ben has held a number of executive roles at companies including MPI Mines, Oxiana Limited, Citadel Resource Group and Unity Mining.

# Clean TeQ | Business Unit Overview

## Metals

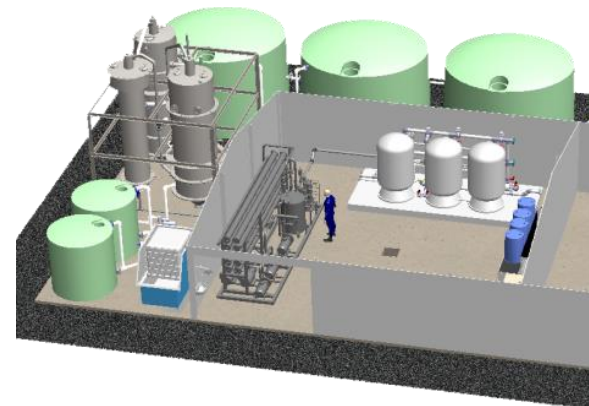
The Company's Clean-iX® Continuous Ion Exchange technology is an innovative process for the extraction and purification of a range of valuable metals from slurries and solutions that are not amenable to conventional separation.

Utilising its proprietary technology, CLQ is also progressing the development of its 100% owned Syerston Scandium Project in NSW.



## Water

The Company's Continuous Ionic Filtration & Exchange (CIF®) and Macroporous Polymer Adsorption (MPA®) resin technology provides cost effective solutions to the mining, oil and gas and municipal industries for the treatment of waste waters.



# Clean TeQ | Continuous Ion Exchange Milestones

Year	Milestone
1989	CLQ founded with a focus on biological air pollution control
1989-2000	Company grows to become largest odour control company in Australia
2000	Company acquires worldwide exclusive license for continuous ion exchange technology from Russia's ARRICT
2000-2007	Development of Clean-iX continuous ion exchange technology for metal recovery and water treatment
2007	Company IPO's on ASX
2007	Clean TeQ successfully demonstrates the use of continuous ion exchange for treated effluent desalination
2008	Successful development of nickel and cobalt recovery with BHP Billiton
2009	Clean TeQ develops and patents Continuous Ionic Filtration (CIF®) a new and innovative water technology
2009-2012	Further development work in recovery of uranium, gold and REE's
2012	Clean TeQ successfully demonstrates CIF® for desalination of produced water from CSG in Queensland gas fields
2012	Letter of Intent signed with ISK for scandium recovery from TiO <sub>2</sub>
2013	Clean TeQ successfully demonstrates the use of CIF® for reduction of sulphate in mining waters
2013	Mining entrepreneur Robert Friedland invests in Clean TeQ
2014	Heads of Agreement signed with SIDRI for China water joint venture
2014	Acquisition of Syerston Scandium Project
2015	Air business divested to focus on Platform Technology – Continuous Ion Exchange

# Clean-iX® | Continuous Ion Exchange

Ion exchange has been used for many decades to separate and recover soluble elements including heavy metals.

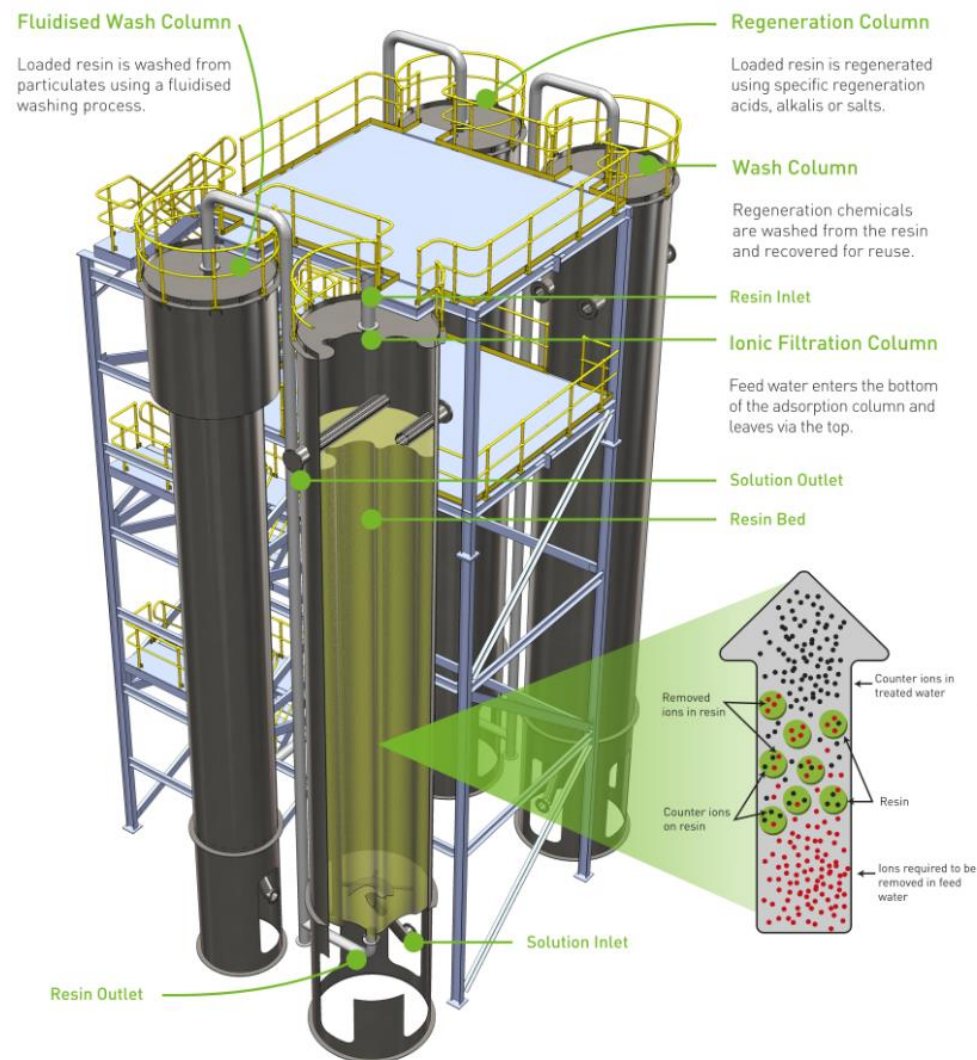
The process utilises resin (plastic) beads which are chemically engineered with a customised ionic charge.

The ionic charge of the resin, when introduced into the solution, results in adsorption of the targeted elements onto the beads.

The resin beads are then removed from solution and the targeted elements are washed off the beads (desorbed) and either recovered or disposed of.

Typically, ion exchange has been undertaken as a batch process in vats, which makes treating large volumes of solution expensive.

**Clean-iX® Continuous Ion Exchange** has been developed as a means to employ ion exchange in a cost effective manner for recovery of metals from solution and for the treatment of industrial waste water.





# Clean-iX® | Continuous Ion Exchange

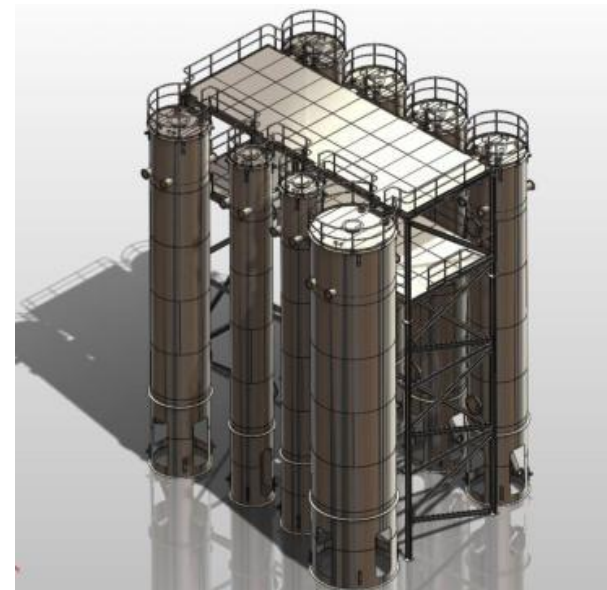
Continuous Ion Exchange involves the continuous counter-current flow of chemically charged resin beads through solutions and slurries in specially designed columns.

Targeted elements are adsorbed onto the beads, which are then pumped into separate columns for metal recovery by desorption. The resin beads are then recycled back to the beginning of the process.

Originally developed by the All Russian Research Institute of Chemical Technology (**ARRICT**) over 40 years ago, Clean TeQ has further developed the Continuous Ion Exchange technology to provide the most cost effective, and environmentally friendly, metal recovery and waste water treatment processes available.

**Metals:** Clean TeQ's **Clean-iX®** Continuous Ion Exchange technology is an innovative process for the extraction and purification of a range of valuable metals from slurries and solutions.

**Water:** Our Continuous Ionic Filtration & Exchange (**CIF®**) and Macroporous Polymer Adsorption (**MPA®**) resin technologies provide cost effective solutions to the mining, oil and gas and municipal industries for the treatment of waste waters. CIF® and MPA® have been specifically designed to cope with the most demanding industrial waste water streams.



Resin-in-Column (cLX)



Resin-in-Pulp (cRIP) or Resin-in-Leach (cRIL)

Clean TeQ Metals | Clean iX<sup>®</sup>

## Clean-iX® combines the processes of:

- Leaching
- Extraction
- Elution/Desorption

### Key Advantages:

- Higher metal recovery
- High selectivity for target metals, reducing system size and reagents
- Multiple metal products produced from one process

### Benefits compared to conventional:

- Simplification of process flow sheet reducing capital costs
- High efficiency extraction and reagent utilisation, reducing operating costs

## Metals Recovered with Clean-iX®:

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### Target Metals:

## Base Metals

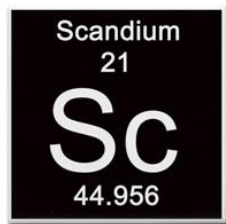
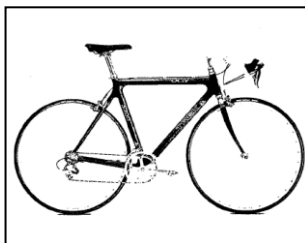
## Rare Earth Elements

## Platinum Group Metals

## Radioactive Elements

## Precious Metals

# Scandium | The Next Strategic Metal

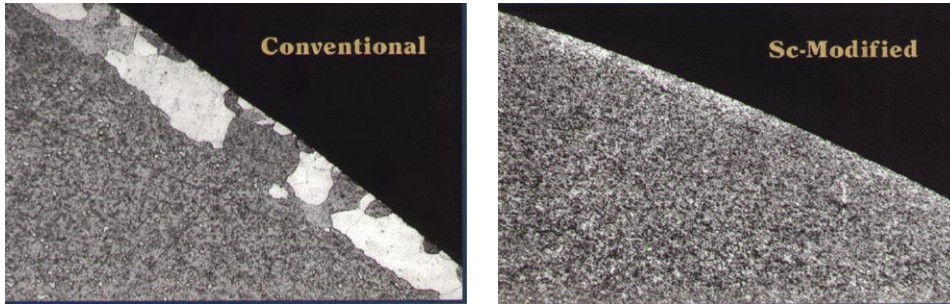
A standard periodic table of elements. The element Scandium (Sc) is highlighted in red. It is located in the first column of the d-block, between the lanthanide and actinide series.

- Scandium (**Sc**) commonly marketed as Scandium Oxide (**Sc<sub>2</sub>O<sub>3</sub>**).
- Sc is abundant in Earth's crust but rare to find concentrated occurrences for economic extraction.
- Scandium's value as an alloy of aluminium has been well understood for decades.
- Scandium can play a key role in the development of high performance materials in the aerospace, transport, energy and consumer sectors.
- Scandium also plays a key role in the distributed power generation market through solid oxide fuel cells.



# Al-Sc Alloys | Next Generation Materials

## Grain Refinement:



(Source: scandium.org)

## Applications of aluminum and alloys to airplanes:



(Source: Kaiser Aluminum)

Aluminium-Scandium (Al-Sc) alloy physical characteristics:

- **Grain refinement:** smaller evenly shaped grains for increased strength
- **Superplasticity:** Al-Sc alloys can be subjected to higher stresses to form more complex shapes
- **Precipitation hardening:** Al-Sc alloys are significantly harder
- Higher **corrosion resistance** and thermal **conductivity**
- Increased **weldability** with no loss in strength

Potential functional benefits of Al-Sc alloys to transport:

- Reduction in overall weight through lighter materials and removal of rivets
- Additional weight reduction through Al-Sc components made with Additive Layer Manufacturing (ALM)
- Reduction/elimination of chromium and other harmful corrosion inhibiting chemicals (aerospace)
- Reduction in overall manufacturing cost
- Reduction in fuel and maintenance costs



# Scandium Alloys | Aerospace and Automotive

## Commercial Aerospace

New Airplanes to be delivered by 2032:



(Source: Boeing)

**Total: 35,280**

### Average Aluminium content per aircraft:

- Boeing: 51 tonnes
- Airbus: 43 tonnes
- Average: 47 tonnes**

(Source: USGS)

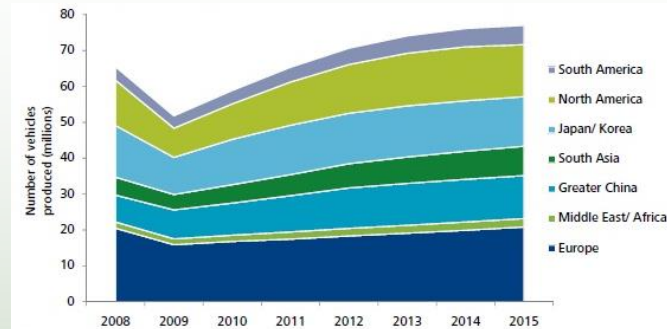
**Total Al Consumption: 1,658,160 tonnes by 2032**

Assuming 0.4% Sc in all aircraft aluminium and 25% uptake in the market:

Sc market potential: 1,660 tonnes by 2032  
or **98 tonnes per annum of scandium**  
or **150 tonnes per annum of scandium oxide**

## Commercial Automotive

New Light Vehicles 2010-2015 (millions of units):



**2015 Total: 75M**

(Source: CSM Worldwide)

### Average Aluminium content per light vehicle:

World Average: 0.159 tonnes

(Source: Ducker Worldwide & The Aluminium Association)

**Total Al Consumption: ~12,000,000 tonnes p.a.**

Assuming 0.2% Sc in all light vehicle aluminium and 10% uptake in the market:

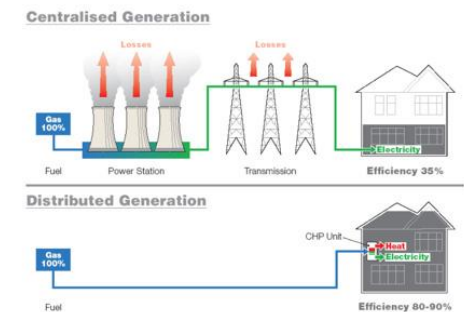
Sc market potential:  
**2,400 tonnes per annum of scandium**  
or **3,650 tonnes per annum of scandium oxide**

# Solid Oxide Fuel Cells | Energy Production

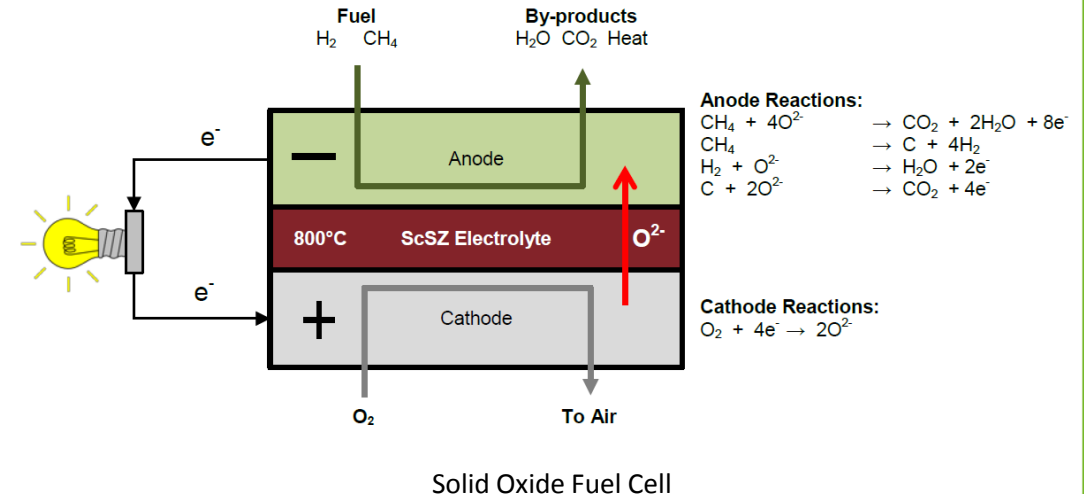
- Solid Oxide Fuel Cells (**SOFC's**) convert gas into electricity, heat and water.
- SOFC's use hard ceramic materials as the electrolyte – normally yttrium-stabilised zirconium.
- Sc-stabilised zirconium electrolyte allows for operation at much lower temperatures and extends operating life:
  - Lower production and operating cost
  - Higher efficiencies
  - Reduced downtime from cell replacement and servicing
- Large potential as a source for low cost “green” energy of the future.
- Decentralised energy production combined with off-grid power storage solutions.
- Bloom Energy (leading Sc-based SOFC provider) has 140MW of installed capacity and growing.



Bloom Energy Fuel Cells



(Source: SOFC Power)



# Scandium Alloys | Additive Layer Manufacturing

**3D printed part (EADS-Airbus):**



**3D printed heat exchange plate:**



- Al-Sc alloys are already used for Additive Layer Manufacturing (3D printing) of component parts utilising computer aided design.
- Complex geometries and unique shapes formed to minimise waste and reduce cost of production.
- Al-Sc alloys highly applicable to this emerging industry due to its:
  - High mechanical strength
  - Fast cooling rate
  - High level of geometric freedom

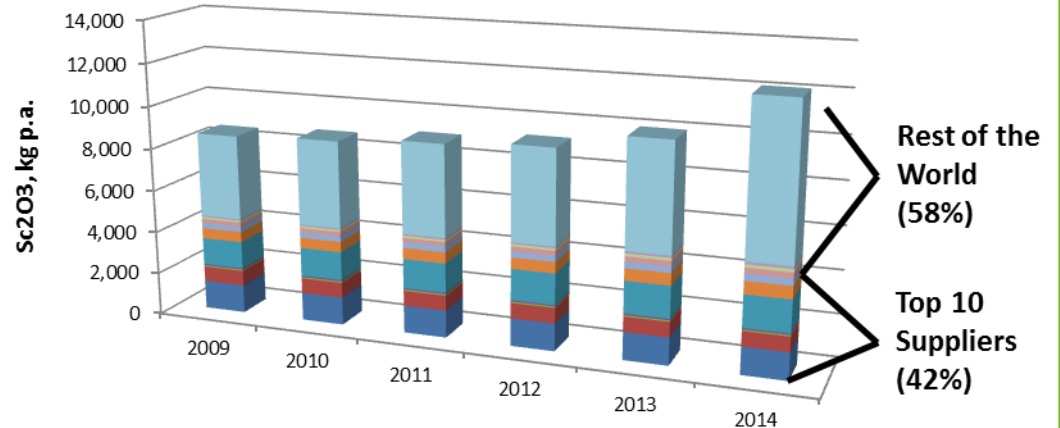
Other emerging industries include:

- High voltage tension wire - due to Sc-Al alloys having high strength and high electrical conductivity.
- Sporting equipment - Baseball bats, golf clubs, lacrosse sticks, bicycle frames due to high strength to weight properties.
- High intensity lamps - Scandium-based lamps provide light which most resembles sunlight.

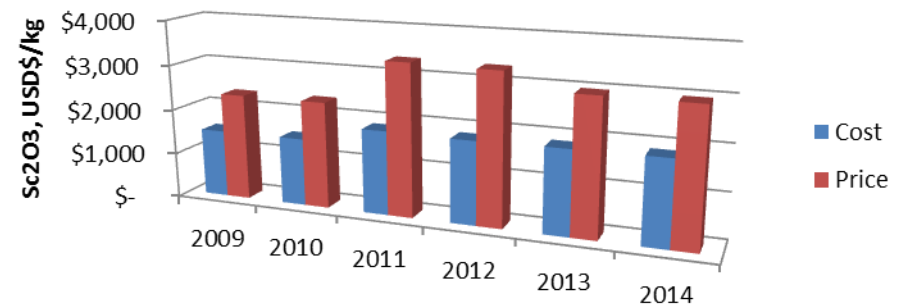
# Scandium | Supply Chain Challenges

- Sourced as a by-product or from stockpiles - no current sources of primary mine supply.
- Due to limited supply and high production costs, total global consumption ranges from 10-12tpa.
- Supply is heavily fragmented, as by-product streams generally only contain low concentrations of scandium (~10-30ppm Sc).
- 2014 estimated averages per kg  $\text{Sc}_2\text{O}_3$ :
  - Price: USD\$2,000-3,000/kg
  - Production cost: USD\$1,600-1,800/kg
- The majority of the world's  $\text{Sc}_2\text{O}_3$  is produced in China, Russia or the FSU, which presents inherent sourcing risks.
- Availability of reliable supply has been a major inhibitor to the increased usage of Scandium.

Historical Global Scandium Oxide Production



Historical Global Scandium Oxide Price & Cost



(Source: QY Research Scandium Oxide Research Centre)



# Syerston | Scandium Project

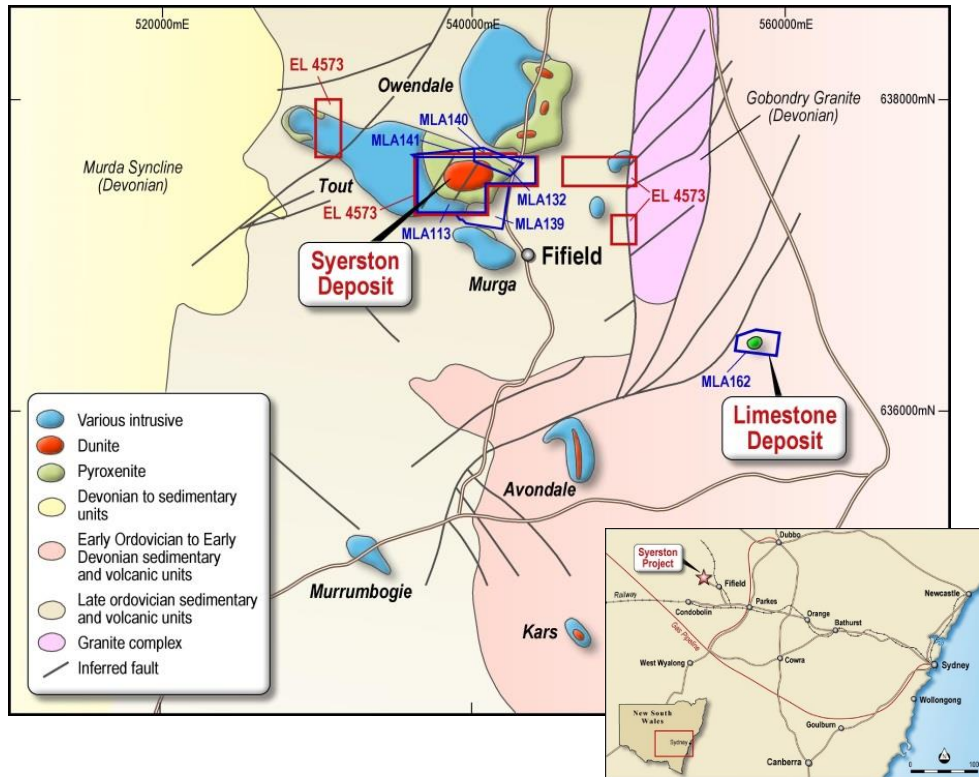
There are a number of things which need to occur for the Scandium market to grow significantly:

- 1) **Reliable supply over decades** – current sources of supply are highly fragmented and large volumes are not available.
- 2) **Lower  $\text{Sc}_2\text{O}_3$  pricing** - low grades/concentrations of existing sources of supply combined with conventional technologies (HPAL & SX) result in higher costs of production.
- 3) **Customer commitment to offtake** - Customers and suppliers must work in partnership to develop new resources and markets for scandium.

## Clean TeQ aims to facilitate this growth through the development of the Syerston Scandium Project:

- Potential to develop the world's first primary supply of Scandium
- Positive scoping study results for long mine life development
- High grade, large scandium resource with potential for further resource upside
- Using our proprietary technology, CLQ is targeting Scandium Oxide supply at a significantly lower cost than current supply
- Favourably located in a low political risk jurisdiction
- Key development milestones in place (MLA's and development consent)
- Critical water allocation rights already obtained
- Experienced development team

# Syerston | Project Location & History



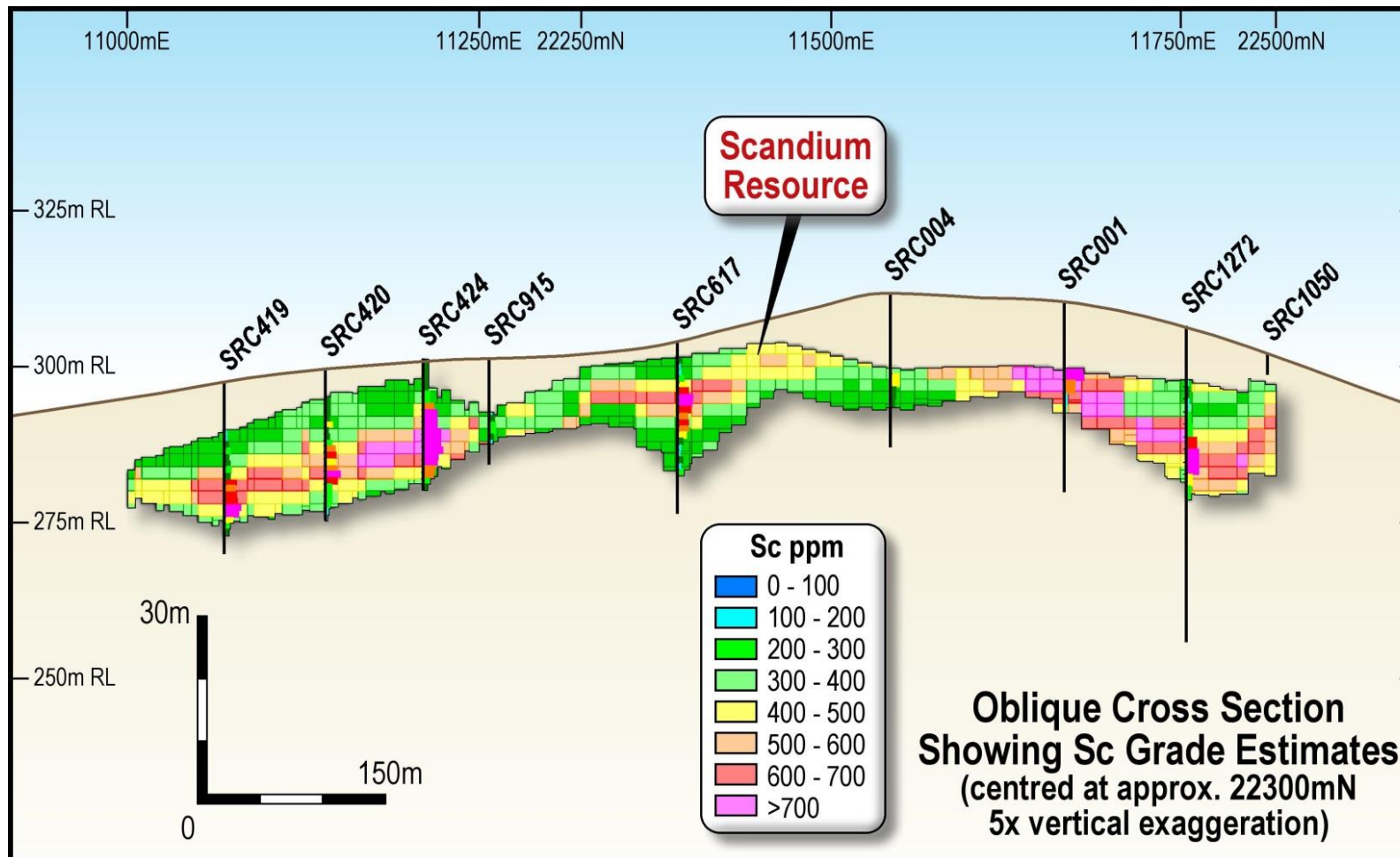
The Syerston Project consists of:

- An Exploration License (EL 4573);
- Mining Lease Applications (MLA 113, 132, 139, 140, 141 & 162 [limestone deposit]);
- Freehold land over portion of project area;
- Established bore field south of Project; and
- Project development consent in place.

Extensive drilling and development to date:

- 2000: Black Range Minerals completed a feasibility study for Ni/Co, including 725 RC drill holes and 9 bulk met samples.
- 2004: Ivanhoe Mines completed another feasibility study for Ni/Co after acquiring the project from Black Range, including an additional 117 RC drill holes.
- 2014: Additional 14 drill holes drilled in prospective scandium zone.

# Syerston | Project Geology



Shallow resource amenable to low cost open cut mining.

High grade zones for selective mining in early years of operation.

# Syerston | Scandium Mineral Resource

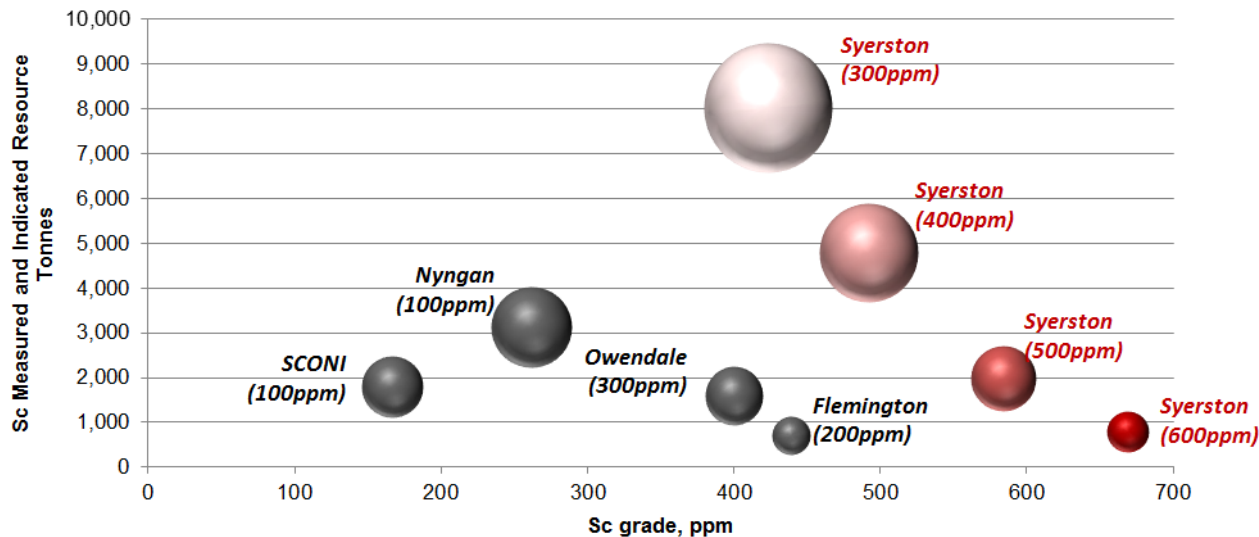
*Syerston Scandium Mineral Resource Estimate (2012 JORC)*

Cut-off	Classification Category	Tonnage, Mt	Sc Grade, ppm	Sc Tonnes	Sc <sub>2</sub> O <sub>3</sub> Equiv Tonnes*
Sc >300ppm	Measured	1.1	411	465	712
	Indicated	17.9	424	7,570	11,583
	Inferred	6.4	386	2,480	3,795
	<b>Total</b>	<b>25.4</b>	<b>414</b>	<b>10,516</b>	<b>16,089</b>
Sc >600ppm	Measured	0.1	686	62	95
	Indicated	1.1	667	701	1,073
	Inferred	0.1	630	55	84
	<b>Total</b>	<b>1.2</b>	<b>666</b>	<b>818</b>	<b>1,252</b>

\* Sc tonnage multiplied by 1.53 to convert to Sc<sub>2</sub>O<sub>3</sub>.

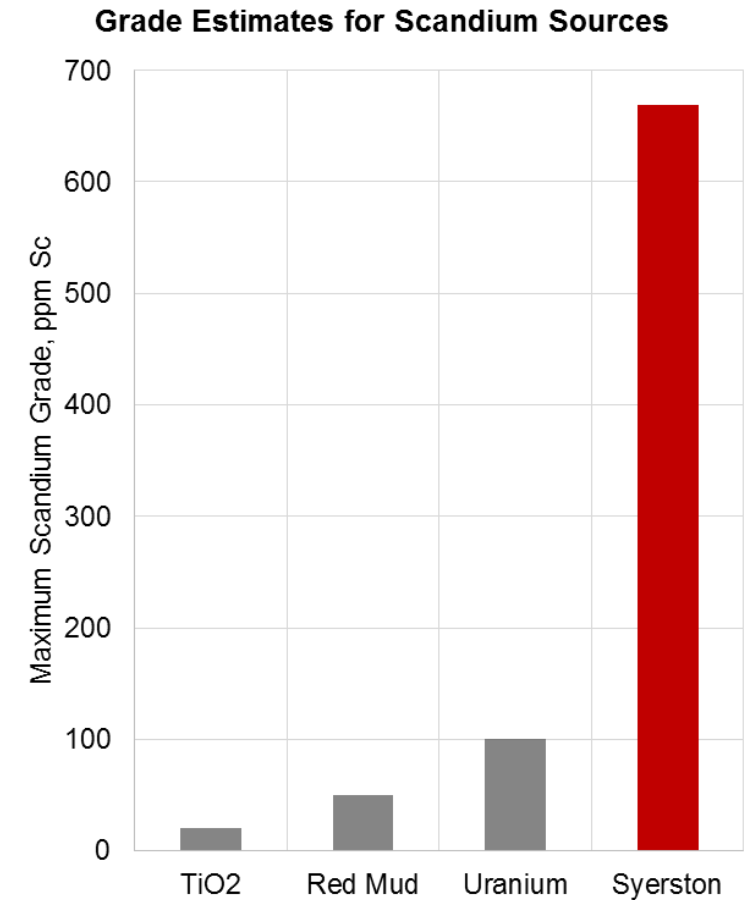


# Syerston | Scandium Mineral Resource



*Australian Scandium Mine Measured & Indicated Resource (Scandium cut-off grade)*

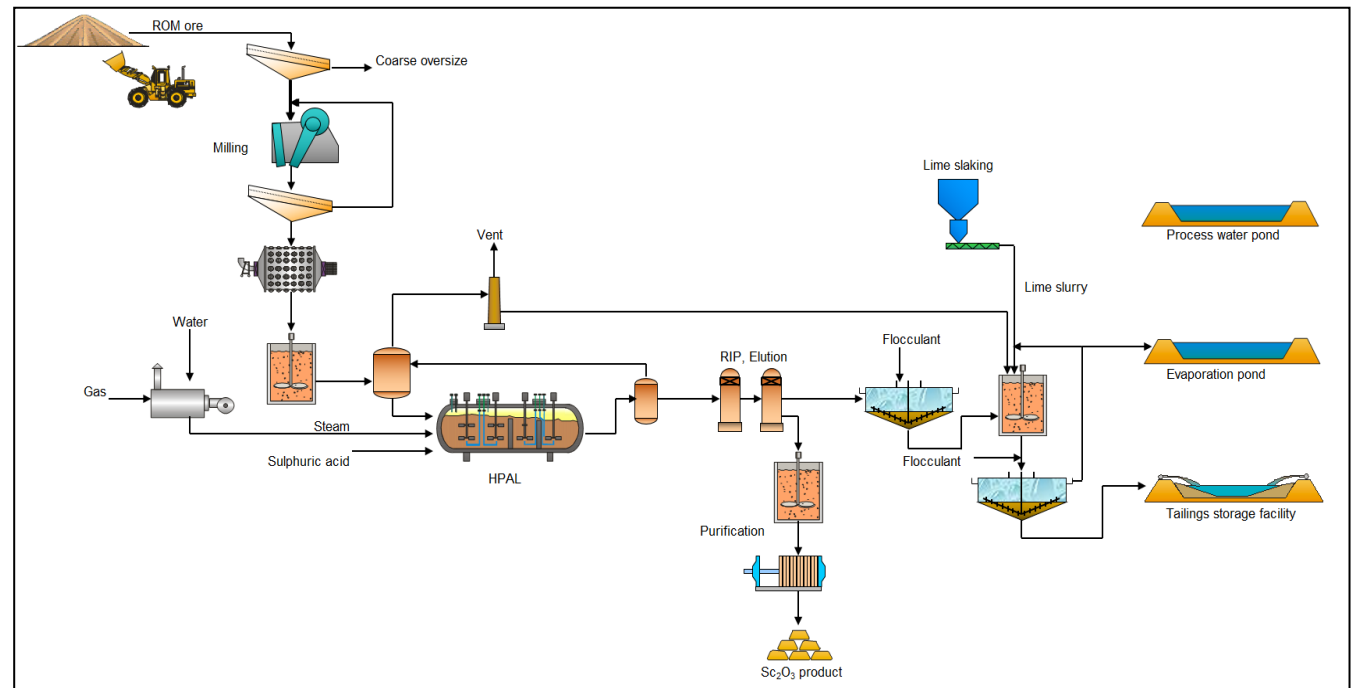
- Other scandium sources range from 10-100ppm Sc.
- Scandium production from these sources is limited by:
  - Throughput of material
  - Relative operating costs to recover low-grade material
- The Syerston project has grades 6-30 times conventional scandium sources.



# Syerston | Scoping Study Flowsheet

## Scoping Study Report May 2015:

- Mineral Resource Model and Mine Pit Model completed by OreWin Pty Ltd
- Metallurgical testwork completed internally and at ALS Metallurgy in Perth on Syerston samples
- Capital and operating cost estimate by CPC Project Design Pty Ltd
- Water source evaluation completed by Golder Associates Pty Ltd
- Financial modelling completed internally



- Based on current resource model and mine pit modelling
- Small-scale campaign mining of shallow resource for 64,000tpa plant feed
- High Pressure Acid Leach (HPAL) followed by Resin-In-Pulp (RIP)
- 42.5tpa of 99.9% purity Sc<sub>2</sub>O<sub>3</sub> (life of mine average production)
- 20 year initial life of mine assumed

# Syerston | Scoping Study

Parameter	Assumption / Output
Resource Base used for Mine	Measured & Indicated Resource
Processing Plant Throughput	64,000tpa (1.28Mt over 20 years)
Processing Plant Average Feed Grade (Year 1-20)	510g/t Sc <sup>1</sup>
Sc <sub>2</sub> O <sub>3</sub> Average Production (Years 1-20)	42.5tpa Sc <sub>2</sub> O <sub>3</sub>
Processing Plant Recovery	85%
Life of Mine	20 years
Long Term Sc <sub>2</sub> O <sub>3</sub> Price Assumption (99.9% purity)	USD\$1,500/kg Sc <sub>2</sub> O <sub>3</sub>
Exchange Rate	0.78USD:1AUD
Total Capital Cost	AUD\$78.4M <sup>2</sup>
Average Sc <sub>2</sub> O <sub>3</sub> Unit Operating Cost (Year 1-20)	AUD\$571/kg Sc <sub>2</sub> O <sub>3</sub> USD\$446/kg Sc <sub>2</sub> O <sub>3</sub>
Average Annual Revenue	AUD\$81.8M
Net Present Value (NPV) – post tax	<b>AUD\$279.1M <sup>3</sup></b>
Internal Rate of Return (IRR) – post tax	<b>53% <sup>3</sup></b>

- Robust project economics for long term scandium production.
- Conservative Sc<sub>2</sub>O<sub>3</sub> price assumption targeting wide scale adoption of scandium in key markets (aluminium alloys and fuel cells).

1. Includes pit selection, dilution and mining factors applied
2. 20% contingency on direct capital costs
3. Post Tax, 8% discount rate, 100% equity, real terms

All \$ are in Australian Dollars (AUD) unless otherwise stated.

# Syerston | Scoping Study

## Capital Cost Estimate

Plant Area	COST (AUD\$M)
Beneficiation & Leach Feed	\$2.2
High Pressure Acid Leach (HPAL)	\$25.8
Resin-In-Pulp (RIP)	\$3.0
Purification	\$1.1
Neutralisation & Tailings	\$2.8
Reagents	\$4.0
Services	\$9.5
<b>Total Directs</b>	<b>\$48.4</b>
Indirects, including EPCM	\$17.9
Owners Costs	\$2.4
<b>Capital Cost, excluding Contingency</b>	<b>\$68.7</b>
Contingency (20% of Directs)	\$9.7
<b>Total Capital Cost Estimate (AUD\$M)</b>	<b>\$78.4</b>

## Operating Cost Estimate

Cost Centre	AUDM\$ p.a.	AUD\$ per kg Sc <sub>2</sub> O <sub>3</sub>	USD\$ per kg Sc <sub>2</sub> O <sub>3</sub> <sup>1</sup>
<b>Variable Costs</b>			
Mining	\$1.1	\$25	\$20
Reagents	\$8.6	\$204	\$159
Utilities	\$1.3	\$31	\$24
Consumables	\$0.3	\$8	\$6
Power	\$0.8	\$18	\$14
<b>Subtotal</b>	<b>\$12.1</b>	<b>\$272</b>	<b>\$212</b>
<b>Fixed Costs</b>			
Labour	\$6.1	\$144	\$112
Power	\$0.2	\$6	\$5
Maintenance	\$2.7	\$64	\$50
General & Admin	\$3.1	\$72	\$56
<b>Subtotal</b>	<b>\$12.1</b>	<b>\$286</b>	<b>\$223</b>
<b>Total Avg Operating Cost<sup>2</sup></b>	<b>\$24.2</b>	<b>\$571</b>	<b>\$446</b>

1. Exchange rate of 0.78USD:1AUD applied

2. Average over 20 year life of mine



# Syerston | Fast Track Development Path

Sufficient resource definition for Feasibility Study (Measured & Indicated) - Includes high grade zones for first years of operation.

Development Consent in place, with Mining Lease Applications (MLA) currently over project area.

- Includes all environmental approvals etc.
- Significant reduction in permitting/approvals time and cost.
- Most likely only development consent modification required for scandium mine.

Established borefield with allocation for mine requirement and expansion. As water is scarce in the region, this provides a significant advantage over other projects, as there is no large scale water sources available in the area.



# Syerston | Indicative Development Timeline

Year	2014	2015				2016				2017			
Stage	Q 4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Initial Resource Statement	✓												
Metallurgical Bench Scale Testwork	✓	✓											
Scoping Study		✓	✓										
Feasibility Study Piloting													
Feasibility Study													
Offtake Agreement Negotiations													
Project Funding													
Design & Construction													
Commissioning													

Key Activities proposed for the next 12 months:

- Pilot program to produce Sc<sub>2</sub>O<sub>3</sub> samples for potential customers
- Flow sheet optimisation to form basis of Feasibility Study
- Negotiation of offtake agreements
- Drill program targeting increase in confidence levels of scandium resource
- Completion of Feasibility Study

# Clean TeQ Water | Technology

## Features:

- Moving Ionic (CIF®) or Non-ionic (MPA®) resin bed
- Resin and water flow adjustable
- Fully automatic operation
- Uses low cost easily available chemicals
- Tolerates suspended solids without fouling
- Resin continuously cleaned and regenerated
- Modular construction

## Advantages:

- Low capital investment
- Low operating costs
- Low power use
- High water recovery
- Produces “fit for purpose” water
- Simple operation and low maintenance
- Potential value in by-products

Fluidised Wash Column

Loaded resin is washed from particulates using a fluidised washing process.

Regeneration Column

Loaded resin is regenerated using specific regeneration acids, alkalis or salts.

Wash Column

Regeneration chemicals are washed from the resin and recovered for reuse.

Resin Inlet

Ionic Filtration Column

Feed water enters the bottom of the adsorption column and leaves via the top.

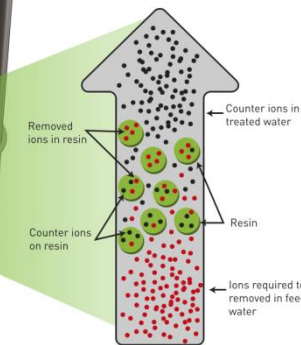
Solution Outlet

Resin Bed

## The ionic filtration process

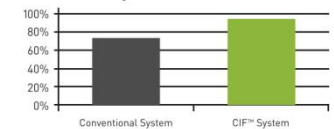
Resin Outlet

Solution Inlet

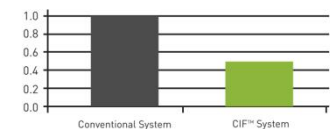


## CIF features and benefits

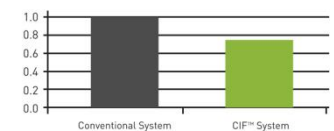
### Recovery



### Capex



### Opex

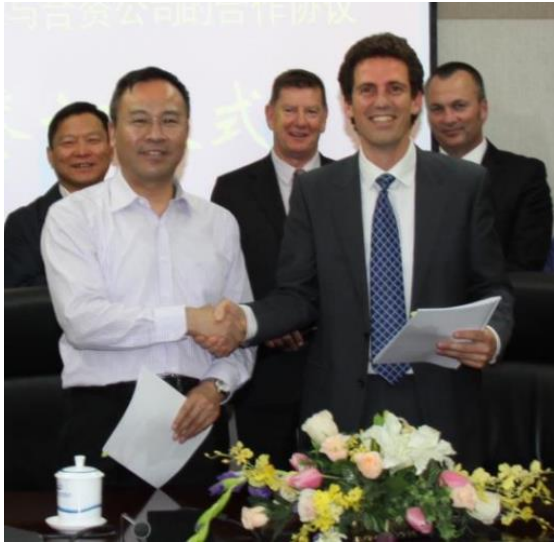


## Process benefits:

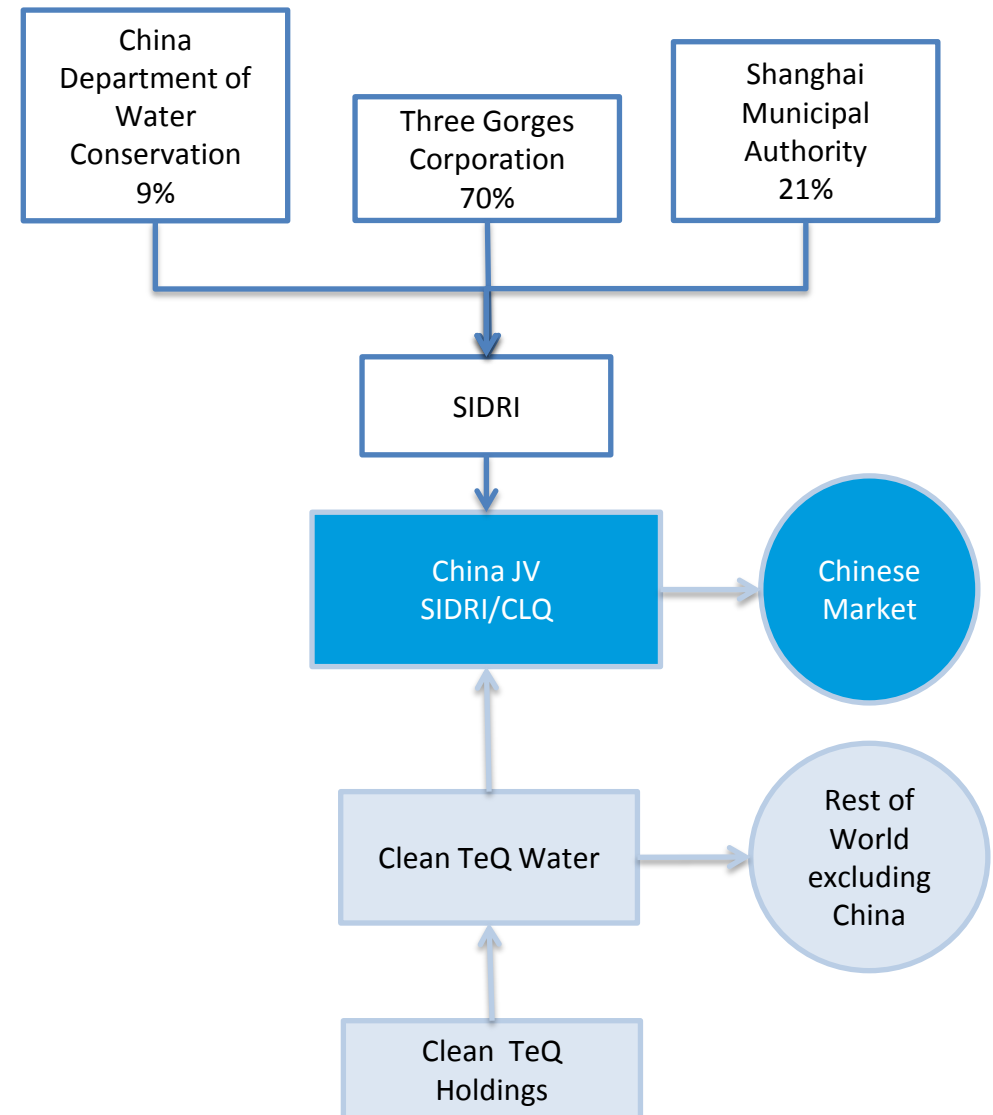
- Low capital cost
- Low power cost
- High water recovery (up to 99%)
- Simple to operate
- Low maintenance
- Potential to produce valuable by-products



# Clean TeQ Water | Strategic Partnerships



- Clean TeQ and Shanghai Investigation Design Research Institute (**SIDRI**) signed a Heads of Agreement to form a joint venture for the provision of industrial water treatment services in China utilising CLQ's Continuous Ion Exchange technology.
- Qualification test work has been completed and negotiations are underway in respect of the final structure of the Chinese Joint Venture Company.
- Clean TeQ is also pursuing a number of other business partnerships and opportunities aimed at commercialising the water purification technology.





# Contact Information



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