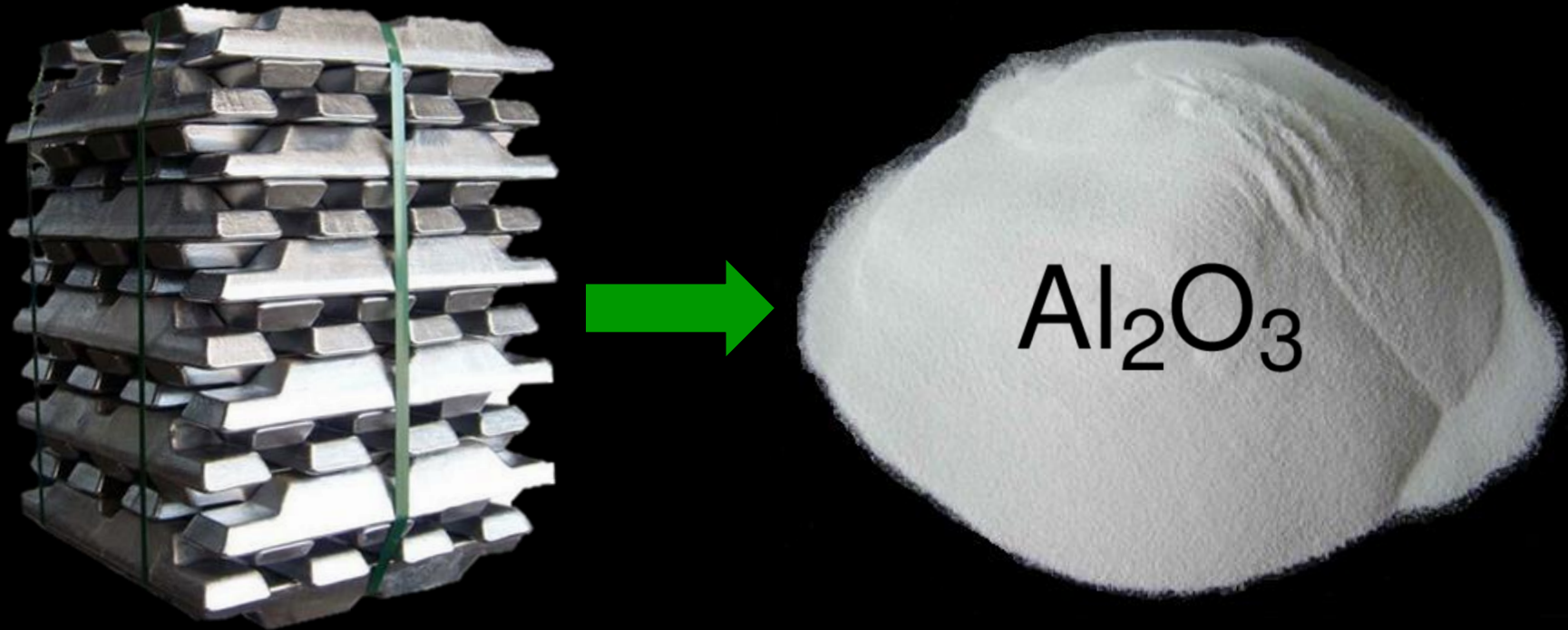


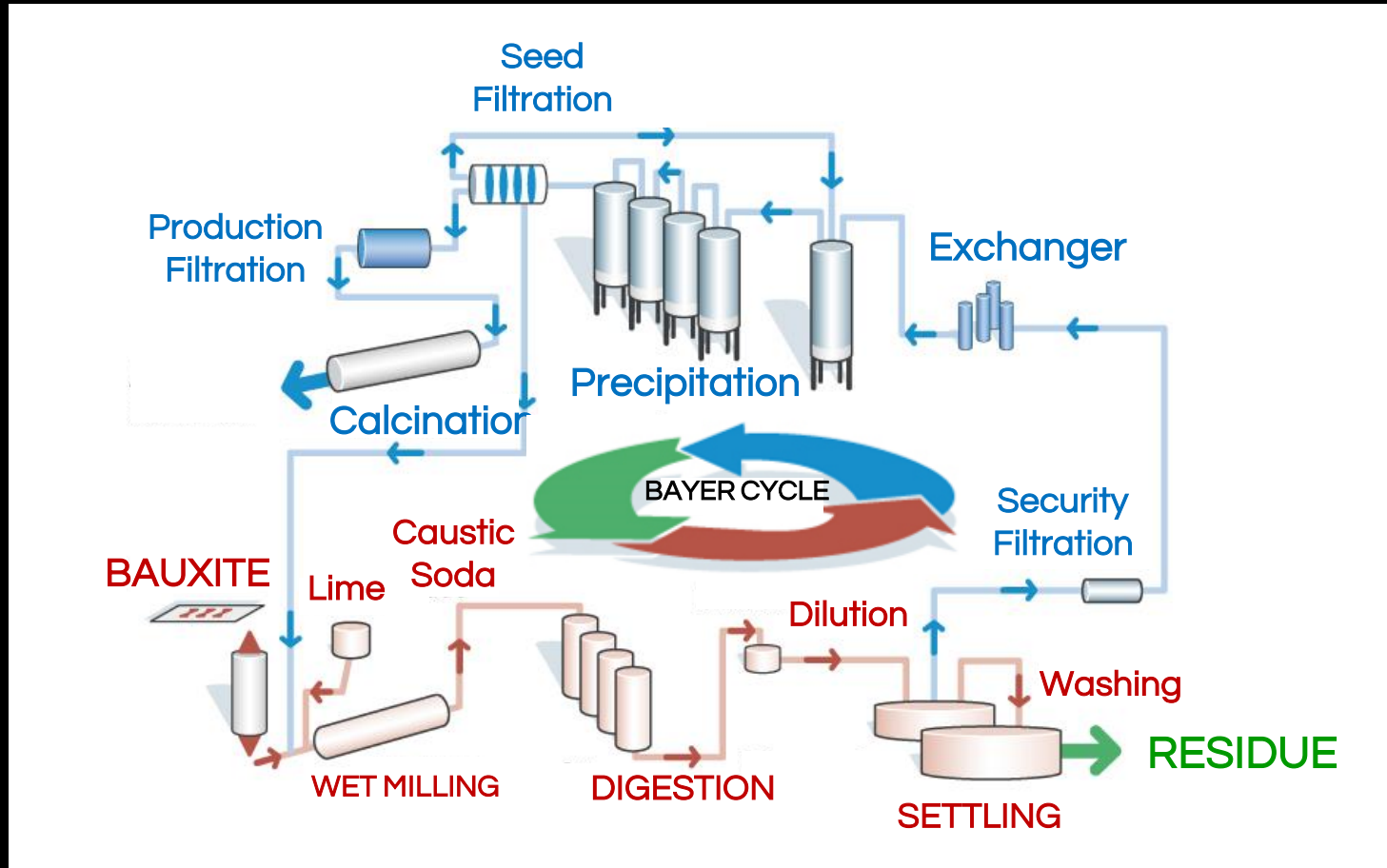
# Aluminum Oxide - Alumina



**A novel, low cost, environmentally friendly process for refining Aluminum into Ultra High Pure Aluminum Oxide**

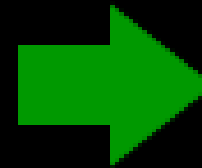
# The Problem

## Existing Aluminum Oxide Production Processes



are expensive and not environmentally friendly

# Our Solution



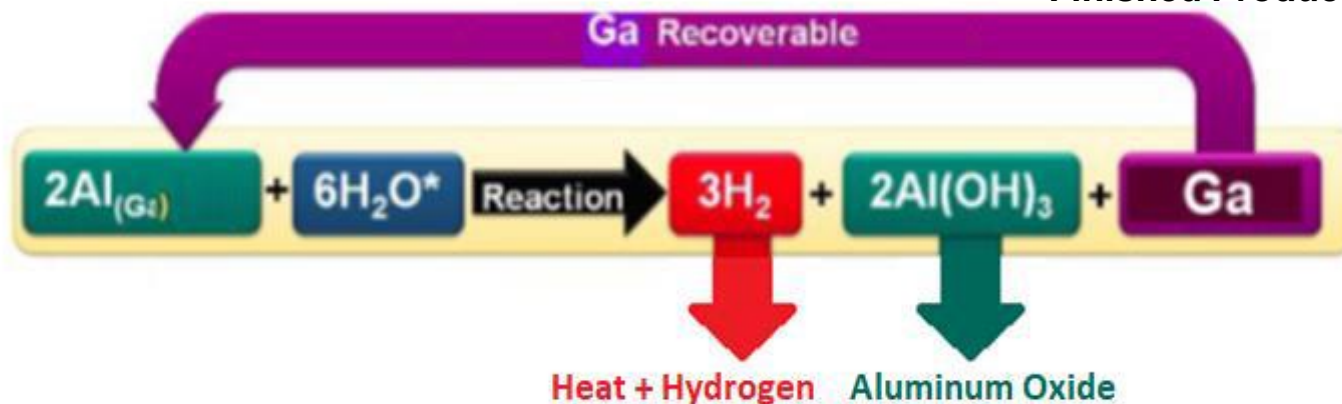
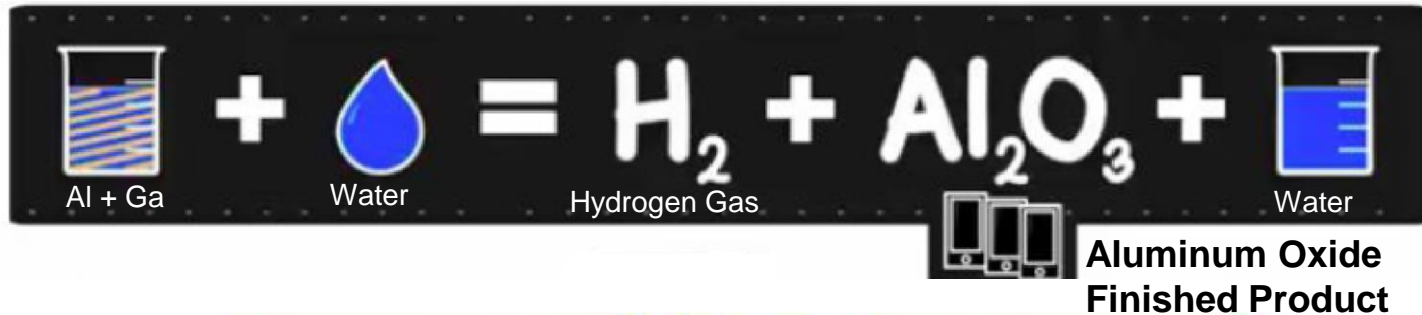
**The novel Woodall process synthesizes  
\$2 per kg aluminum into  
\$40 per kg - N4 - High Purity Alumina (HPA)**

# The Woodall process operates at a fraction of the cost of existing processes...

Step 1

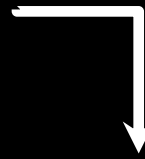


Step 2



...and the only waste products are Heat and Hydrogen Gas

# Our Target Business



Smelter Grade  
Alumina  
SGA 99.5%  
**\$400 per ton**

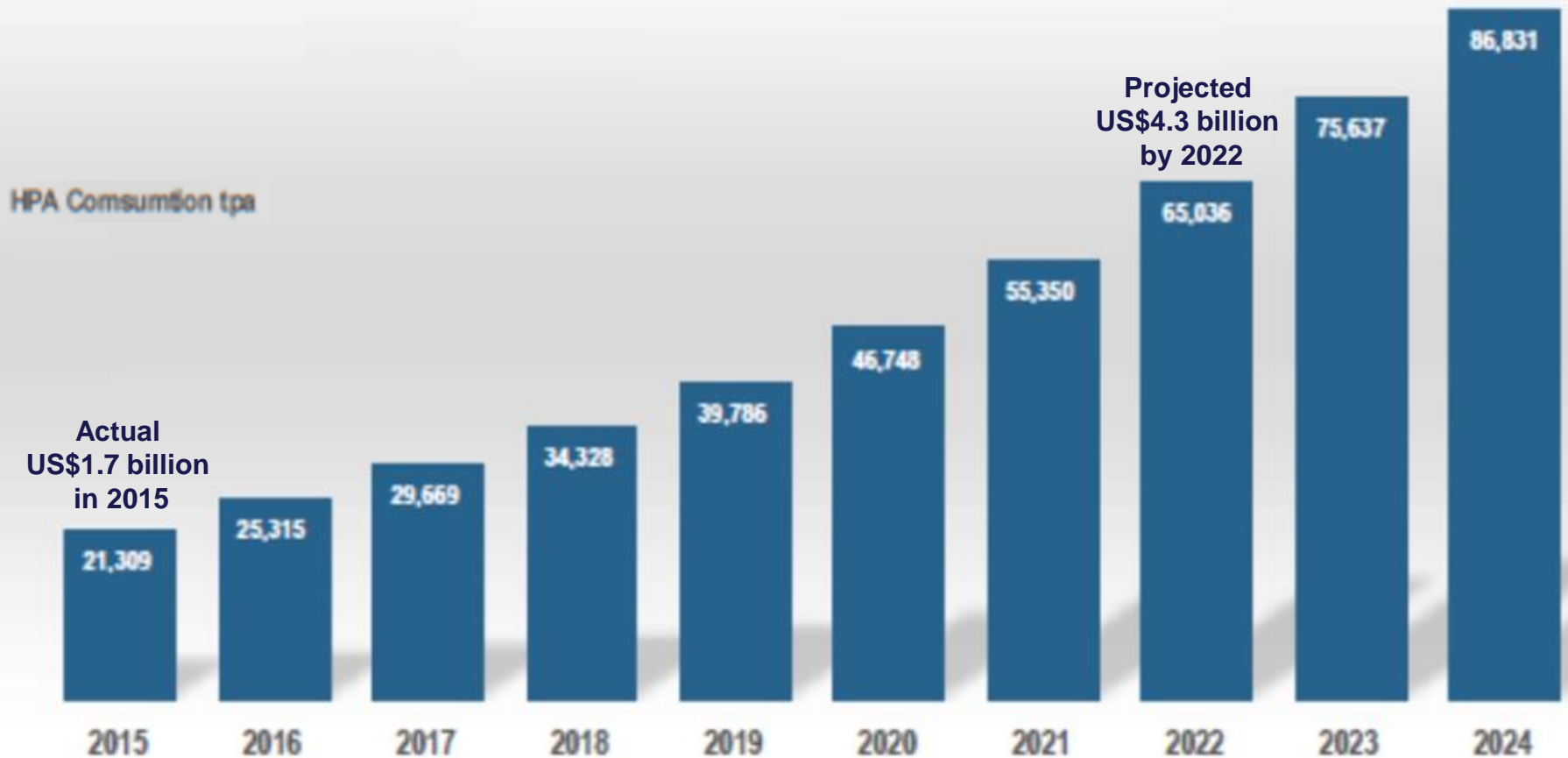
High Purity  
Alumina (3N)  
HPA 99.9%  
**\$6,000 per ton**

High Purity  
Alumina (4N)  
HPA 99.99%  
**\$25,000 per ton**

High Purity  
Alumina (5N)  
HPA 99.999%  
**\$50,000 per ton**

# Total Addressable Market

## Global High Purity Alumina Forecast 2016-2024

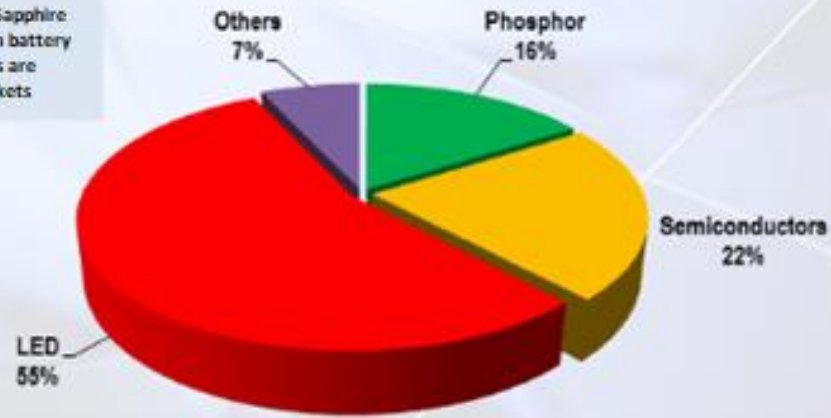


Source: Persistence Market Research and Altech  
"High Purity Alumina Market – Global Industry Analysis and Forecast 2016-2024"



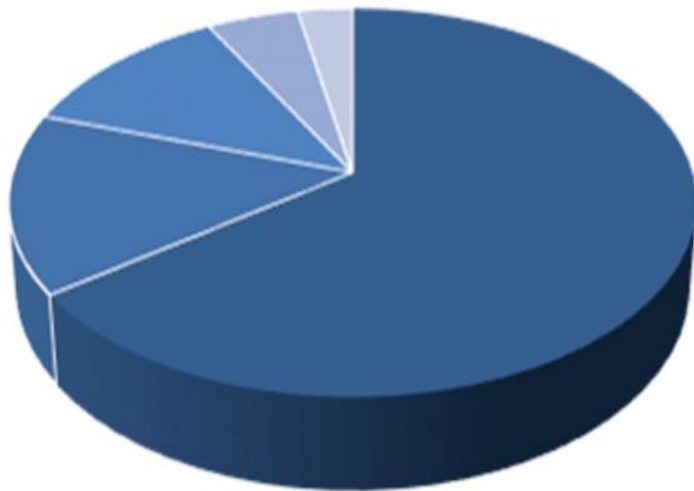
# The Aluminum Oxide Market

Smartphone Sapphire glass and Li-Ion battery separators are new markets



Source: Technavio Research "2014-2018 Global High-purity Alumina Market"

## HIGH PURITY ALUMINA MARKET 2018



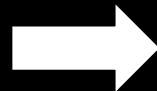
- Asia-Pacific
- North-America
- Europe
- MEA
- South America



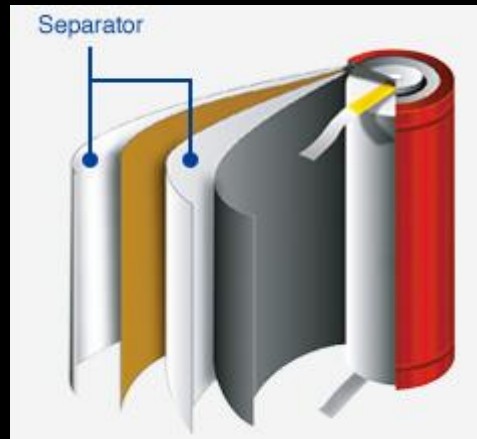
# Go To Market with Lithium Ion Battery Separators

HPA coated battery separator membranes were commercialized in 2008 in response to demand for Li-Ion battery separators that could provide safer batteries with greater short protection and better structural integrity, at higher temperatures.

**Alumina  
Nano Powder**



**Lithium-ion Battery  
Separator Coatings**



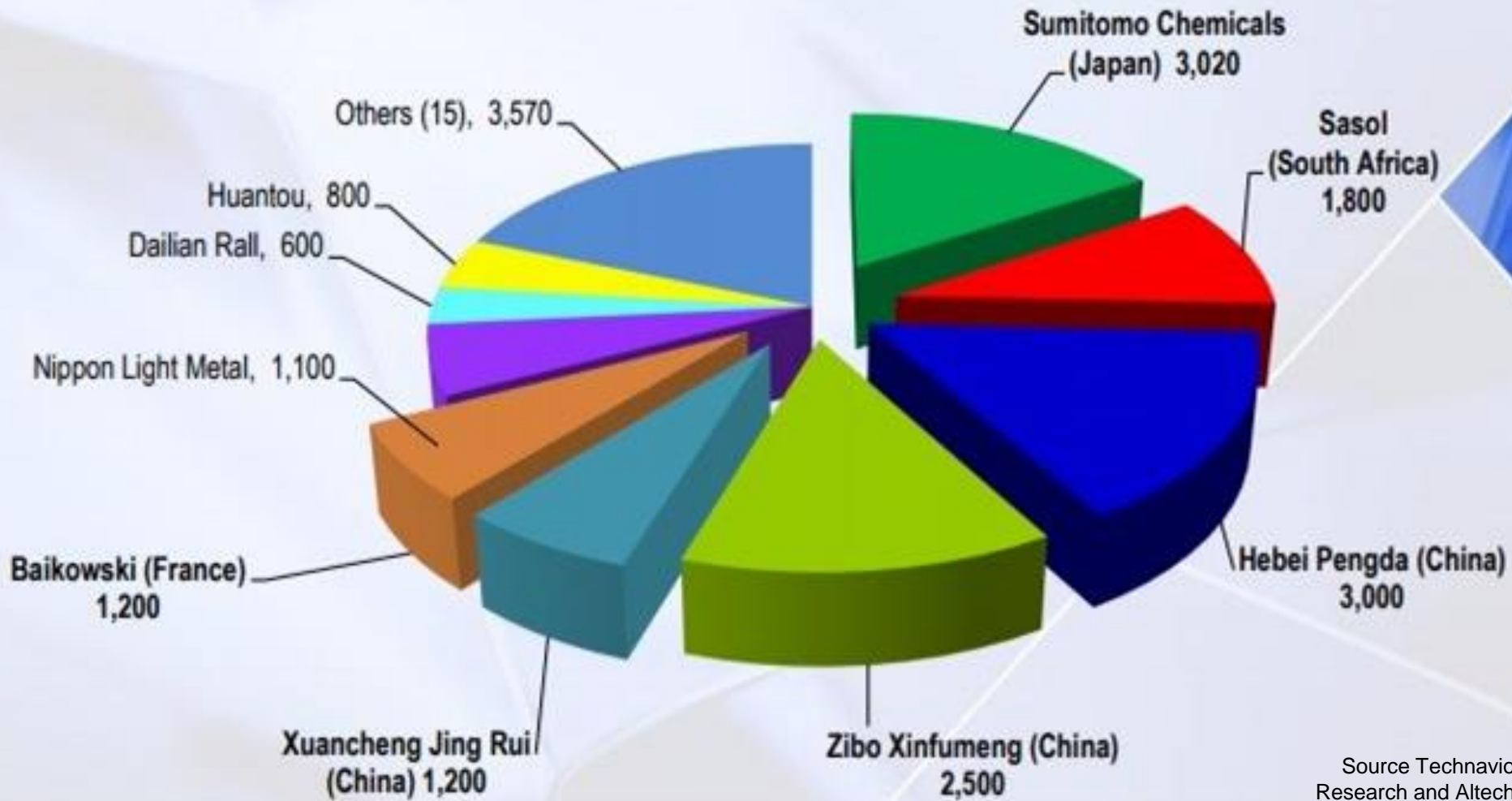
**An Electric Car needs  
approx. 1.6kg of Alumina**



Nano sized particles of high purity alumina (HPA) significantly improves the mechanical strength, thermal stability and ionic conductivity of polymer separator membranes and hence the rapid rise in demand from this new market HPA worldwide.



# Competition



Source Technavio  
Research and Altech

**The six largest High Purity Alumina producers and other competitors:  
China (3), Japan (1), South Africa (1), France (1)**

# Lowest Cost Competitor \*

Sales Price = \$ 25 / kg \* 99.99% (N4)  
Cost of Production = \$ 10 / kg  
-----  
Gross Margin = \$ 15 / kg 60% Gross Margin  
=====

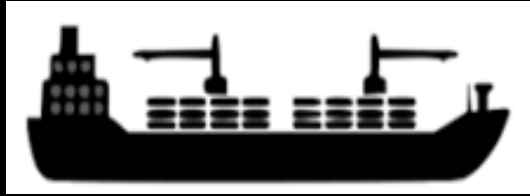
\* Nearest low cost competitor, Altech, is many times more expensive @ a cost per ton of \$9,070 with a \$270M capital investment.

## Our Financials

Sales Price = \$ 20 / kg \* 99.999% (N5)  
Feedstock = \$ 1 / kg  
-----  
Gross Margin = \$ 19 / kg 95% Gross Margin  
=====

**Phase 4 = \$960,000,000**

Ship scale – 24,000 tons per year



**Phase 3 = \$96,000,000**

Full scale – 2,400 tons per year



**Phase 2 = \$9,600,000**

Factory scale – 240 tons per year

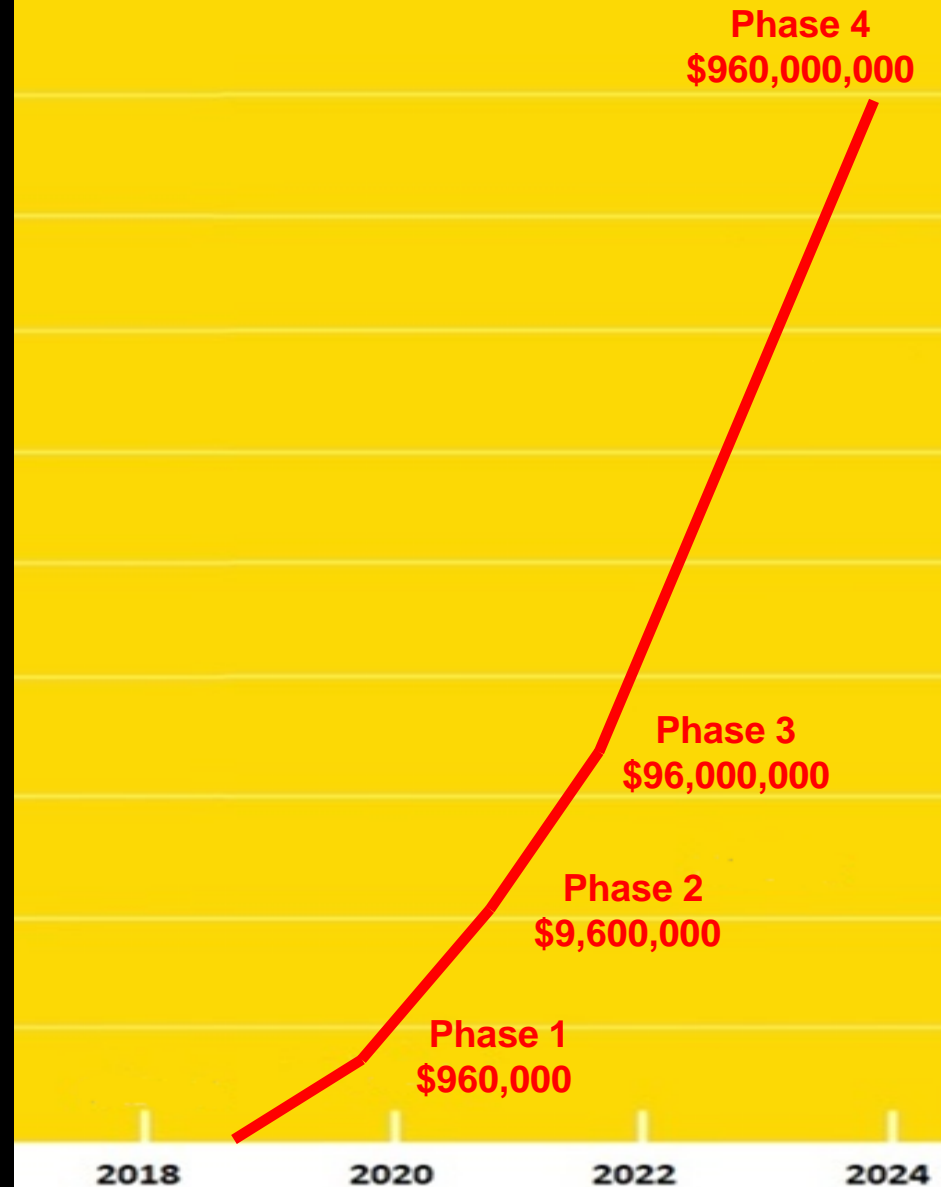


**Phase 1 = \$960,000**

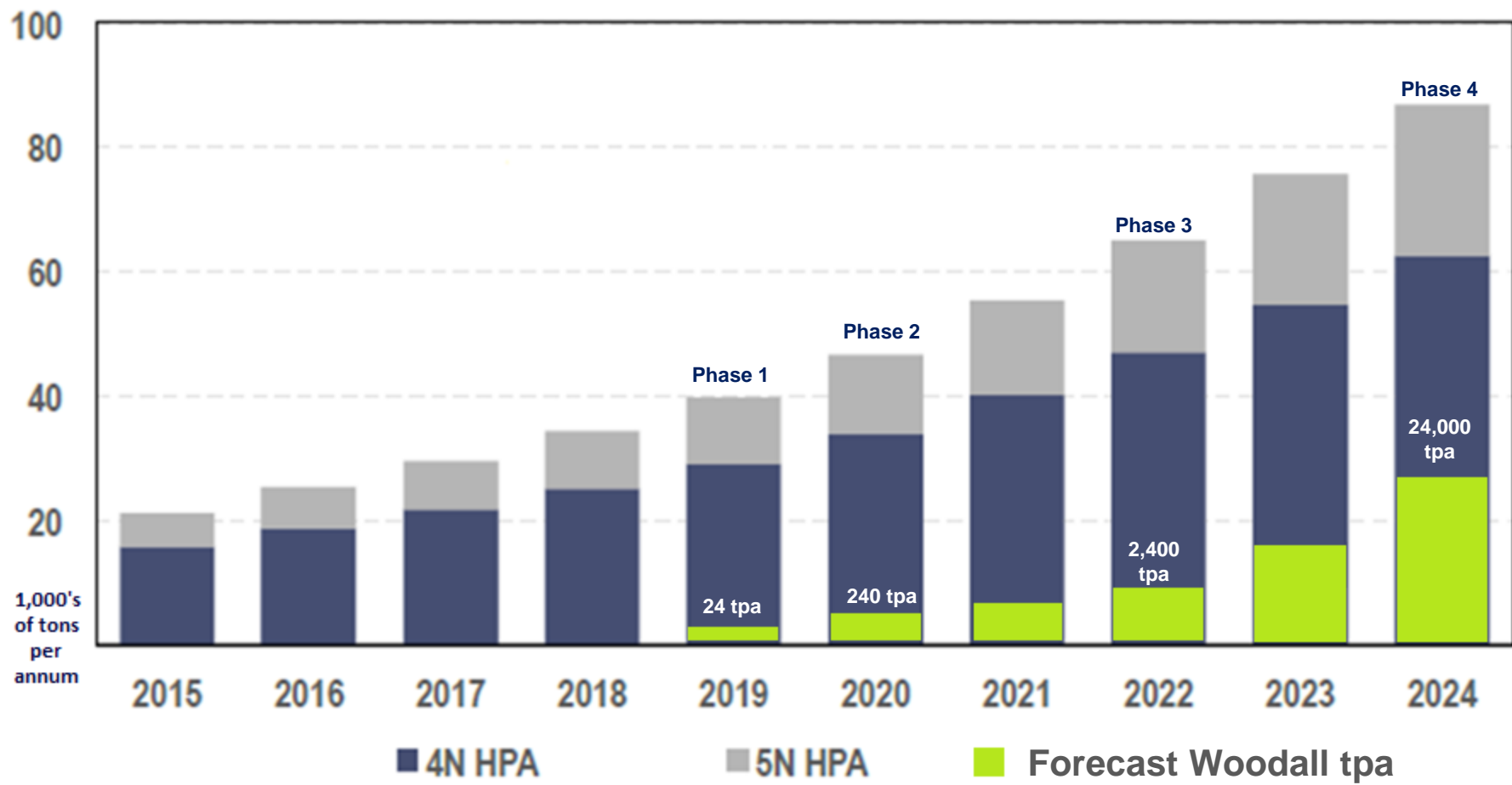
Pilot scale – 24 tons per year



# Revenue Growth



# Combined N4 and N5 HPA market



# Team



**Shawn Headley** – U.C. Davis Engineer and researcher from the Woodall laboratory

**Peter Bell** – 25 year entrepreneur, 3 start-ups including a biofuel venture with Willie Nelson and an angel investor in 23 start-ups, with 4 exits to date

## Advisors

**Dr. Jerry Woodall** – National Medal of Technology Laureate, Inventor of commercial LED, Distinguished Professor at UC Davis, Holder of 85 US patents and author of 386 published journal articles.

**Tim Keller** – Founder of Inventopia.org and a U.C. Davis graduate



# The Ask

**\$100,000**

## Use of Funds

Build Pilot Plant - **\$35,000**

Working Capital - **\$65,000**

## Runway

\$100,000 provides sufficient runway to get the venture to an MVP, with first revenues in 2020 and the business financially self sustaining by the end of 2020.

## Investor Exit Strategy

Return of investment capital through a 5% equity stake in a \$2 mil SAFE

***Thank You !***



***Peter Bell***  
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***+1-972-948-8355***