

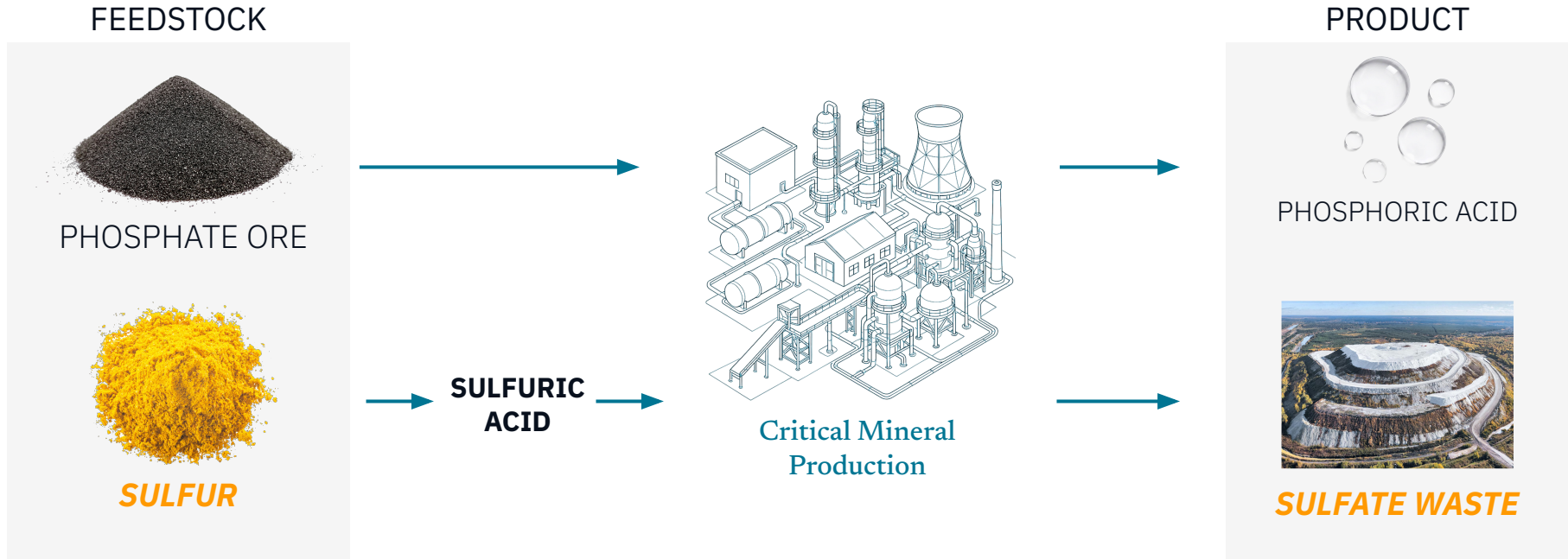
Next-Gen Phosphate Production

decoupling from sulfur & eliminating waste

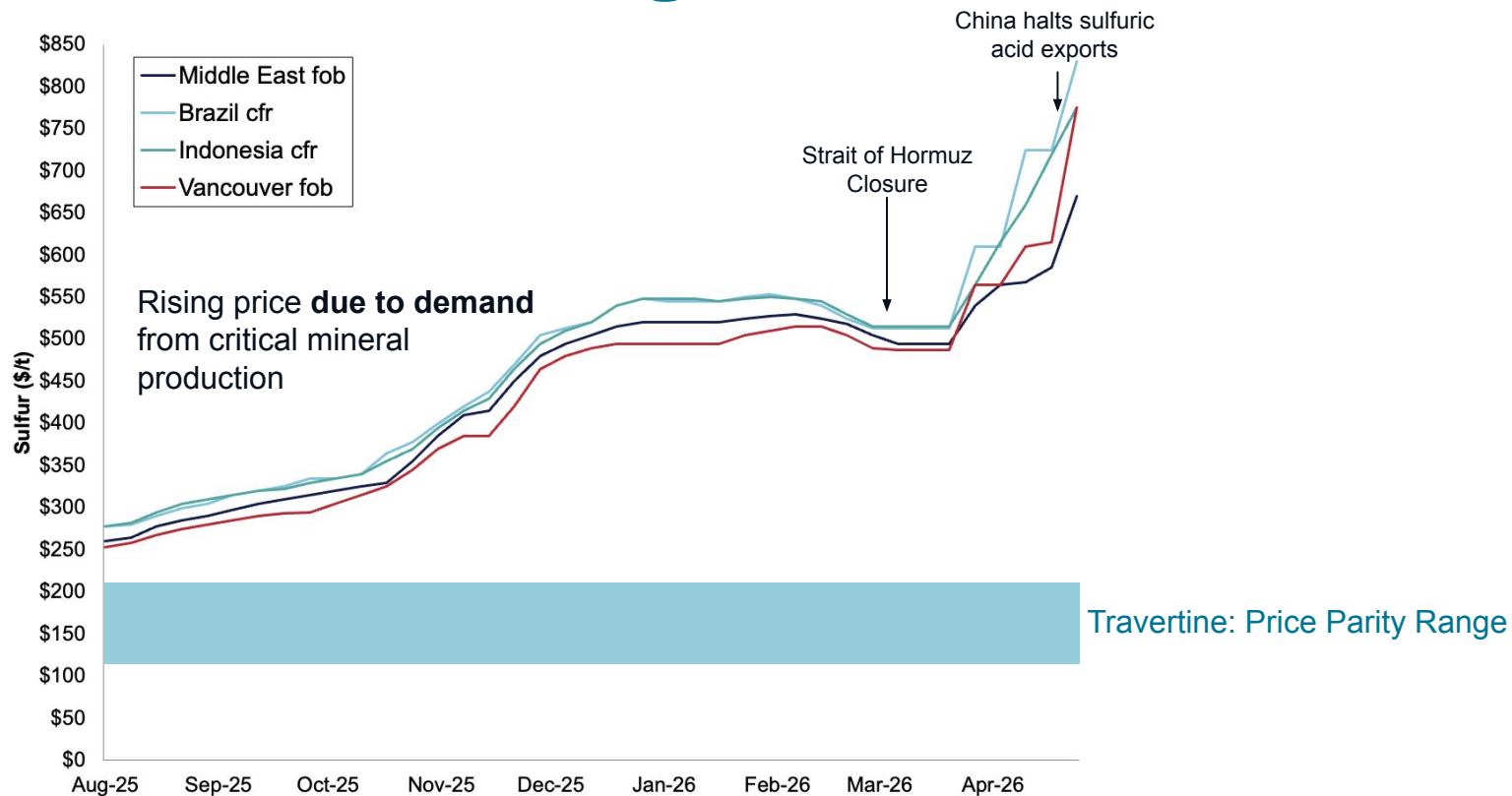
Series A: May 2026

 travertine

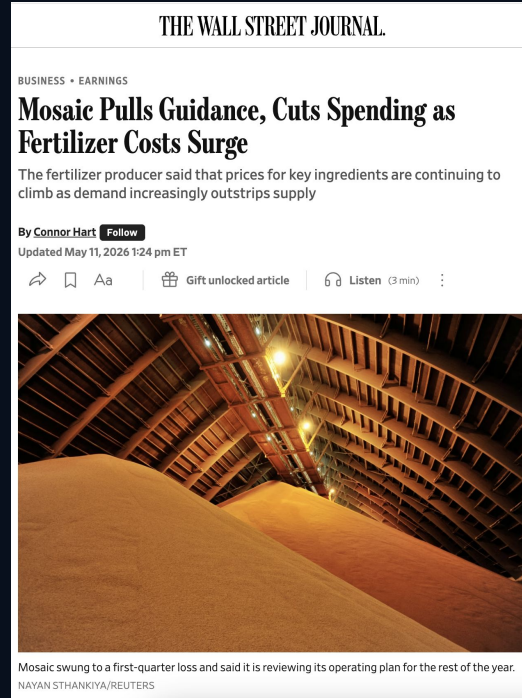
Sulfur is up to **30% of OPEX** for critical mineral production & sulfate waste is a massive liability.



Economics improve further with increased pressure on sulfur price **due to increasing demand.**



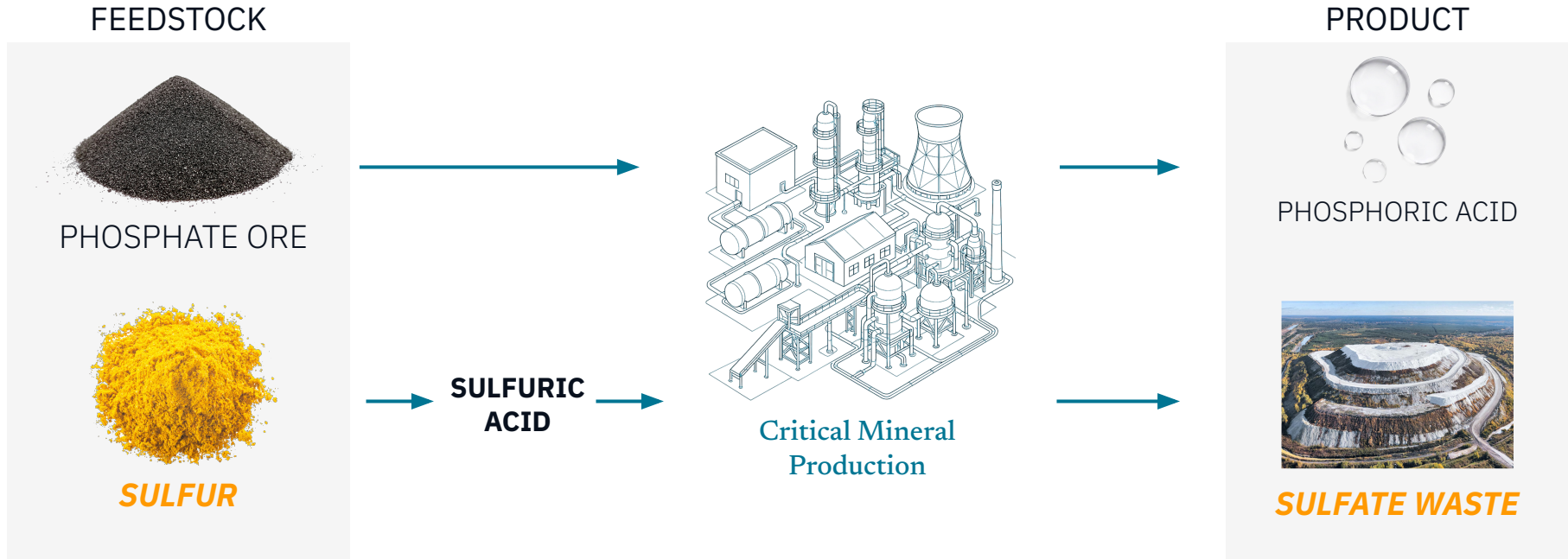
Producers are **curtailing production.**



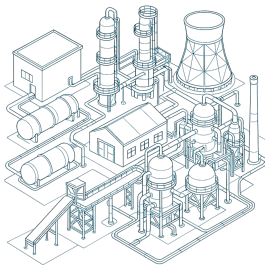
“Many producers are struggling to secure raw materials, resulting in an already tight market becoming even tighter. To put it simply, **there is not going to be enough phosphate to meet global demand.**”

Bruce Bodine, Mosaic CEO.

Sulfur is up to **30% of OPEX** for critical mineral production & sulfate waste is a massive liability.



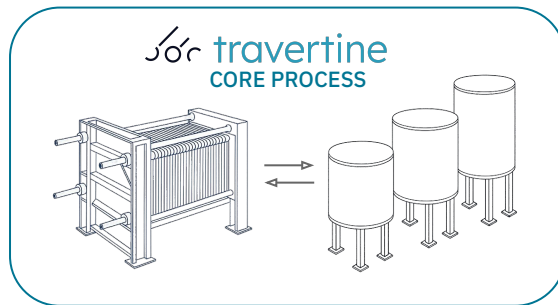
Travertine electrochemically **recycles sulfuric acid** & produces **low-carbon cement co-products**.



Critical Mineral
Production

Reduces sulfur consumption
- and sulfate waste -
by **45-100%**

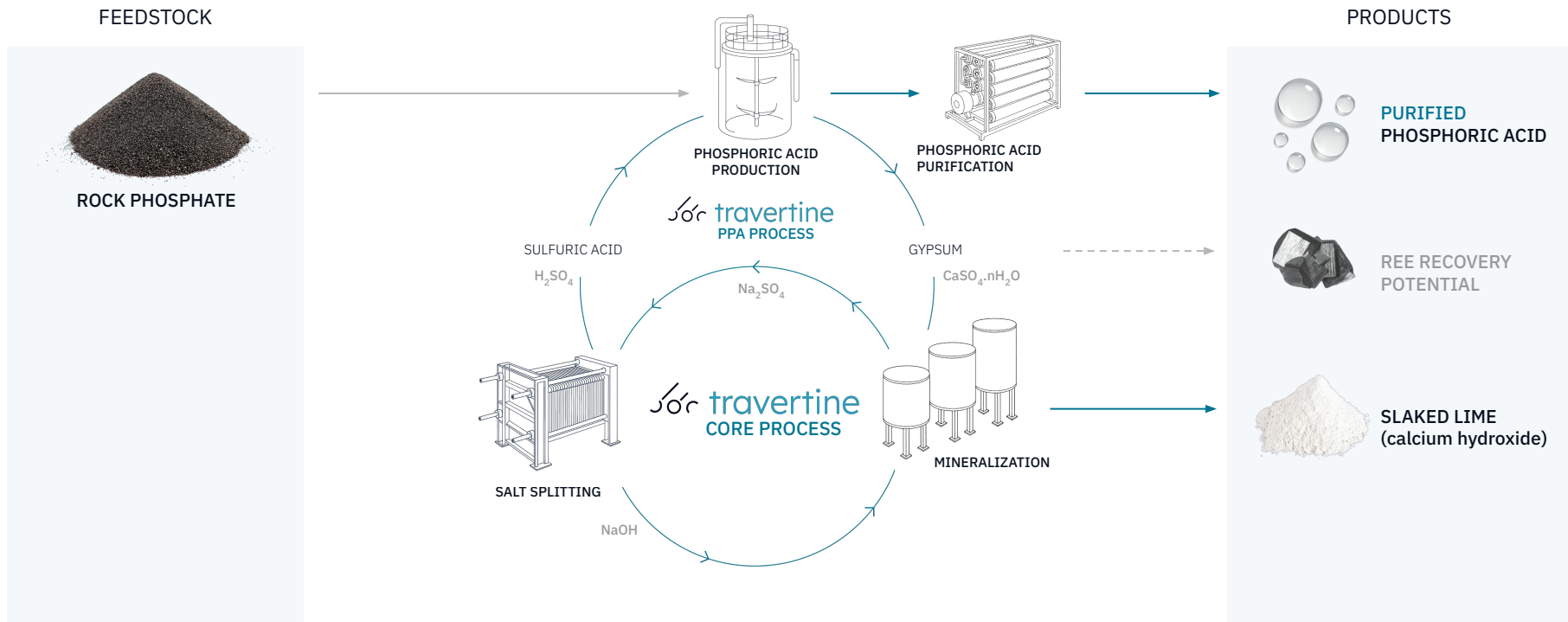
SULFURIC ACID ↑ ↓ Sulfate Waste



→ **CO-PRODUCT**
Slaked Lime or Calcium
Carbonate for Cement/Ready Mix

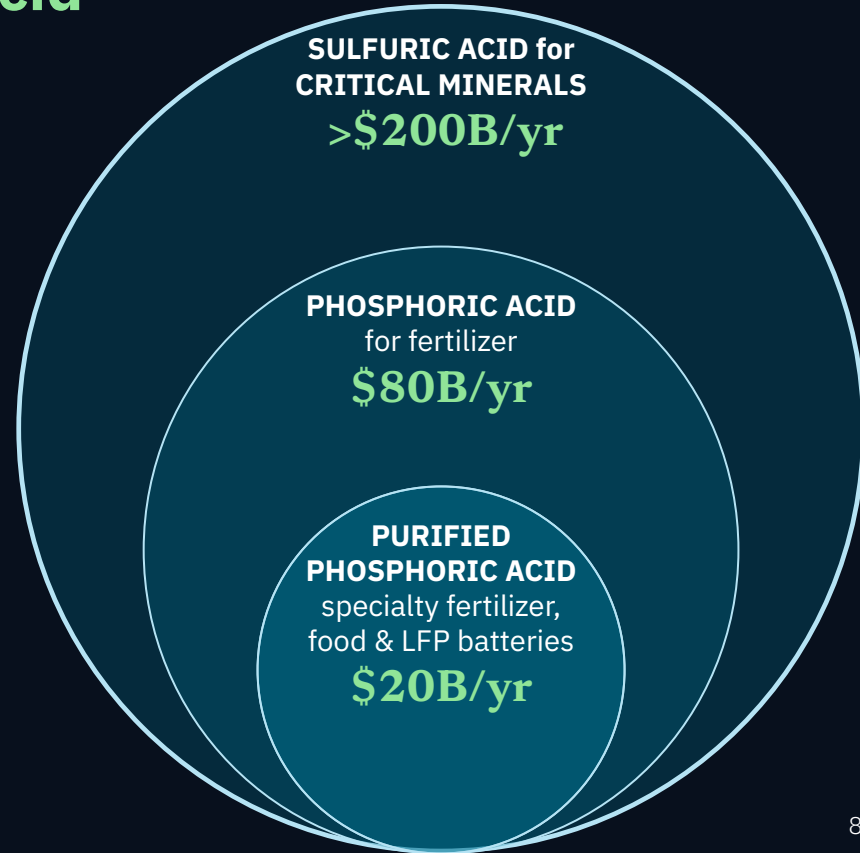
Travertine Process (Lime)

No Sulfur, No Waste, Lower OPEX, More Value

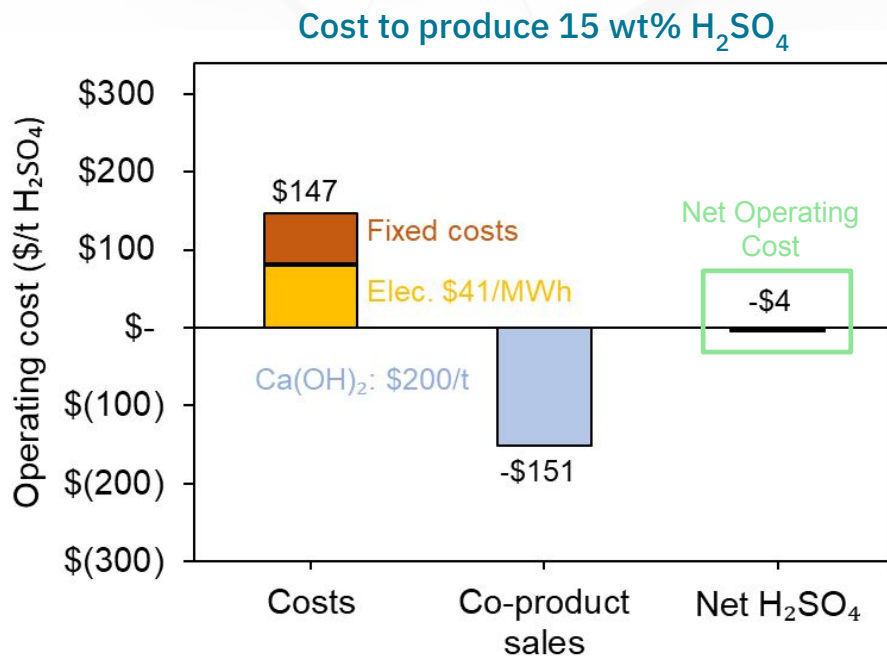


Sulfuric acid extraction is a **\$200B/yr** market.
60% is used to make **phosphoric acid**
for fertilizer & LFP batteries.

Travertine's **go-to-market**
application is to produce
high-value, high-margin,
purified phosphoric acid.



Travertine's sulfuric acid **production cost is net-negative** with co-product sale.



➔ Net-negative OPEX

Gross Margins of Travertine Plants are at least **1.5x** conventional with historical sulfur cost.

	Conventional Purified Phos Acid (\$/T PPA)	Travertine Purified Phos Acid (\$/T PPA)
Total Revenue	\$1,915	\$2,050
Total OPEX	\$1,138	\$753
Net Profit	\$344	\$450
Gross Margin	41%	64%

→ Higher Revenue (sale of co-products)

→ Lower OPEX
(no sulfur input &
no gypsum management cost)

→ Industry-leading gross margins

Travertine Offers **Significant Decarbonization** Opportunity

Product	CO2 per ton conventional*	CO2 per ton Travertine product (minimum)**
SA	0.09 - 0.15	-1.07
PA	0.7 - 0.9	-0.78
PPA	0.95 - 7.4	-0.68

*Considers both wet process and thermal process

**Travertine Process emissions depend strongly on electricity source. Range reflects renewable power. CaCO₃ coproduct only

984

S. Belboom et al. / Journal of Cleaner Production 108 (2015) 978–986

Table 5
Specific environmental values for P₂O₅ using wet (fertilizer and purified grades) and thermal processes.

Category	Quantity and symbol	Unit	Usual unit	Fertilizer grade (1 t P ₂ O ₅)	Purified grade (1 t P ₂ O ₅)	
					Wet	Thermal BAT
Climate change	Mass of CO ₂ equivalent, m_{eq} (CO ₂)	kg	kg _{eq} CO ₂	626	950	7365
Human toxicity	Comparative Toxic Units for humans	CTUh	CTUh	$1.07 \cdot 10^{-4}$	$2 \cdot 10^{-4}$	$1.27 \cdot 10^{-3}$
Particulate matter formation	Mass of particulates 2.5 equivalent, m_{eq} (PM _{2.5})	kg	kg _{eq} PM 2.5	1.78	2.63	16.2
Acidification	Equivalent acidification amount, n_{eq} (H ⁺)	mol	mol _{eq} H ⁺	28.7	43.4	83
Freshwater eutrophication	Mass of phosphorus equivalent, m_{eq} (P)	kg	kg _{eq} P	1.1	1.5	1.04
Land use	Mass of carbon deficit, m_{eq} (C)	kg	kg C deficit	1394	1927	10 197
Fossil depletion	Mass of oil equivalent, m_{eq} (oil)	kg	kg _{eq} oil	187	293	2193

Travertine was founded in 2022 out of **UC Berkeley** & has **rapidly scaled** from the lab

2023

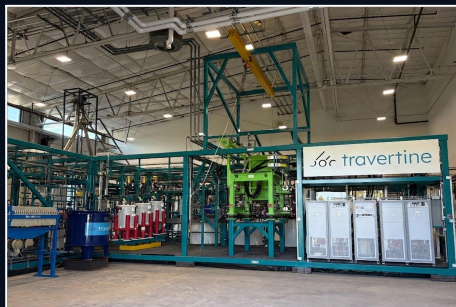
Pilot



Boulder, CO

2025

Demo



Rochester, NY

Commercial-scale
Cells

2028

Small Commercial



Louisiana

Commercial-scale
Stack Modules

2029+

Commercial
& Licensing

Sulfuric Acid Recycling

Purified Phosphoric
Acid Production

Commodity Phosphoric
Acid Production

Demo Plant

Rochester, New York



Travertine's Demo Plant has operated for over 3000 hrs with **commercial-scale** electrochemical cells.



travertine

Rochester, New York

On time
On budget
On spec products
3000+ hours operation
100x scale up from pilot
Grant funded



BUILDERS VISION

Travertine has partnered with **major phosphate and cement companies** to build the first new US phosphoric acid plant in **over 50 years**.

Feedstock committed. **100% of PPA offtake volume signed** with additional demand pipeline.

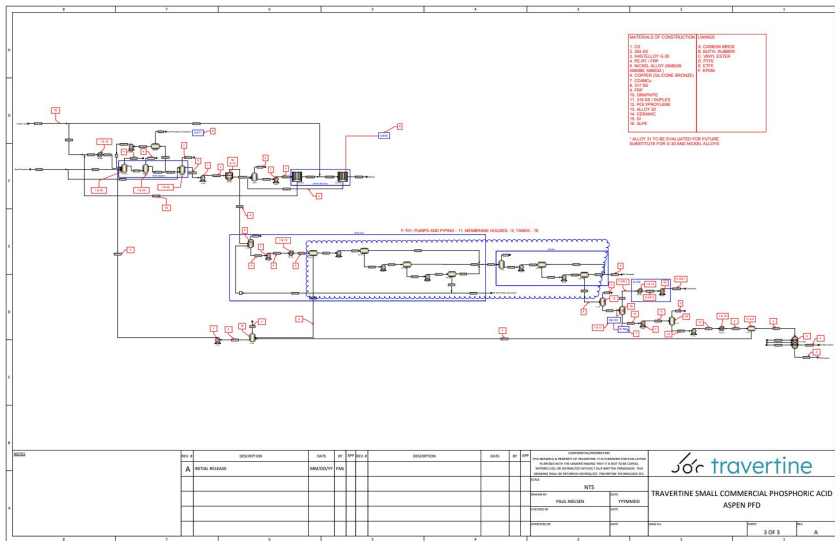
PPA **product validated** food and battery grade.



 **travertine**

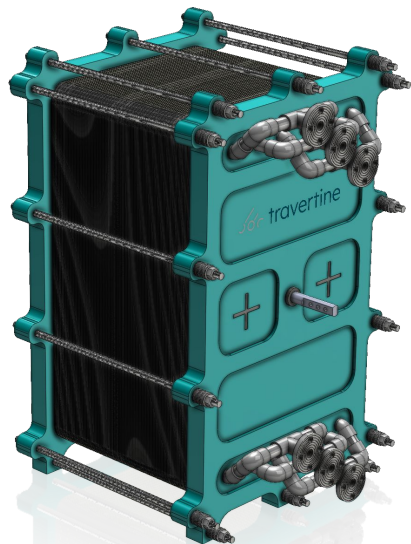
Louisiana, USA

Travertine is developing a process design package for licensing of the **Travertine Process & Travertine Salt-Splitting Stack**.



Protected by four distinct patent families.

The Travertine Salt Splitting Stack is the **missing link** in sulfur-free phosphate production.



Industry Leading Stack Performance

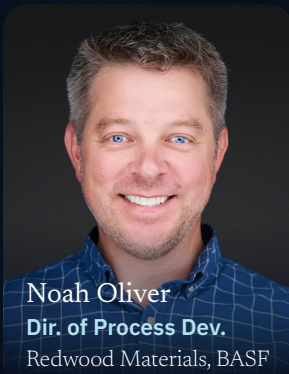
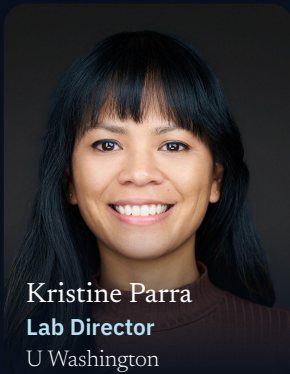
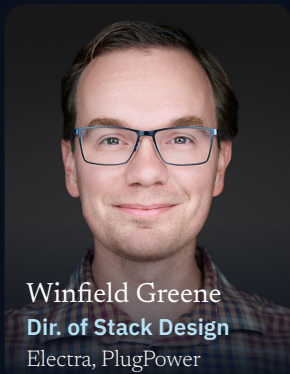
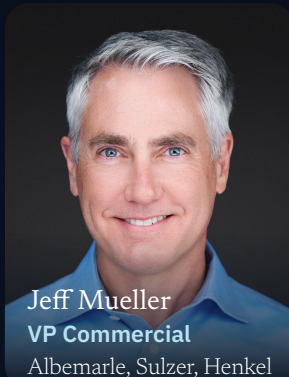
- **0.14 kWh/mol** H_2SO_4 ←
- Up to **350 mA/cm²** ←
- **70+% CE** at **>1.5 M** H_2SO_4 and **>2 M** NaOH ←
- **Modular** design with DFM optimization for cost

Lowest energy consumption for concentrated acid and base

Highest current & power density for **lowest CAPEX + OPEX + footprint**

High concentration + low impurity for critical mineral production

We have **experience** and get it done safely & on time.



Advisors



Raised over \$24m from leading climate tech and strategic investors & **\$5.2m from state and federal grants.**

Grants & Awards



Investors



Travertine is raising **\$25M Series A** to **decouple critical mineral production from sulfur.**

Series A: \$25M

- FEED for Commercial Plant
- Binding Supply & Offtake Agreements
- BMED V2 Stack Prototyping & Manufacturing
- 24 Months Runway

Term sheet signed with Co-Leads, ~\$5m available





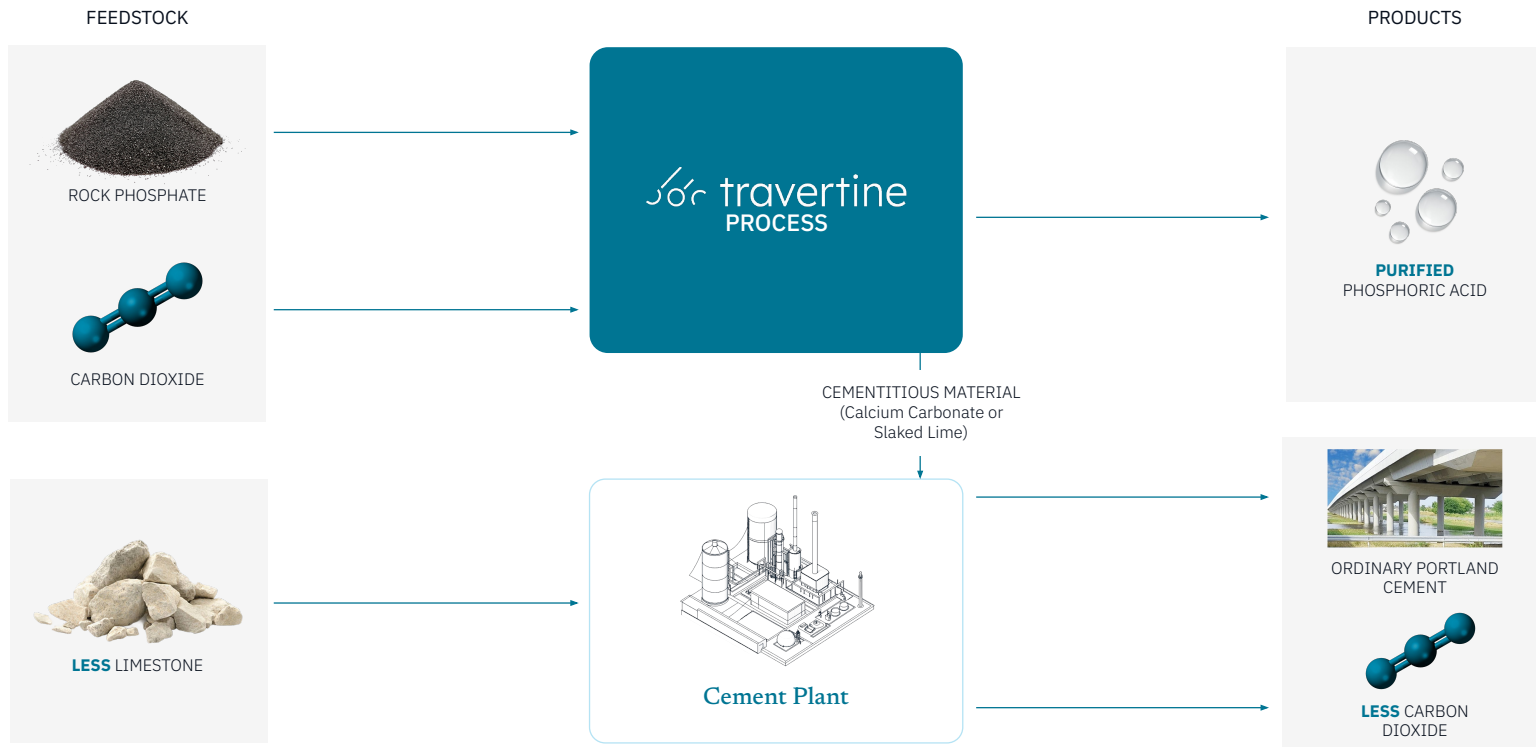
Jórc travertine

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COO
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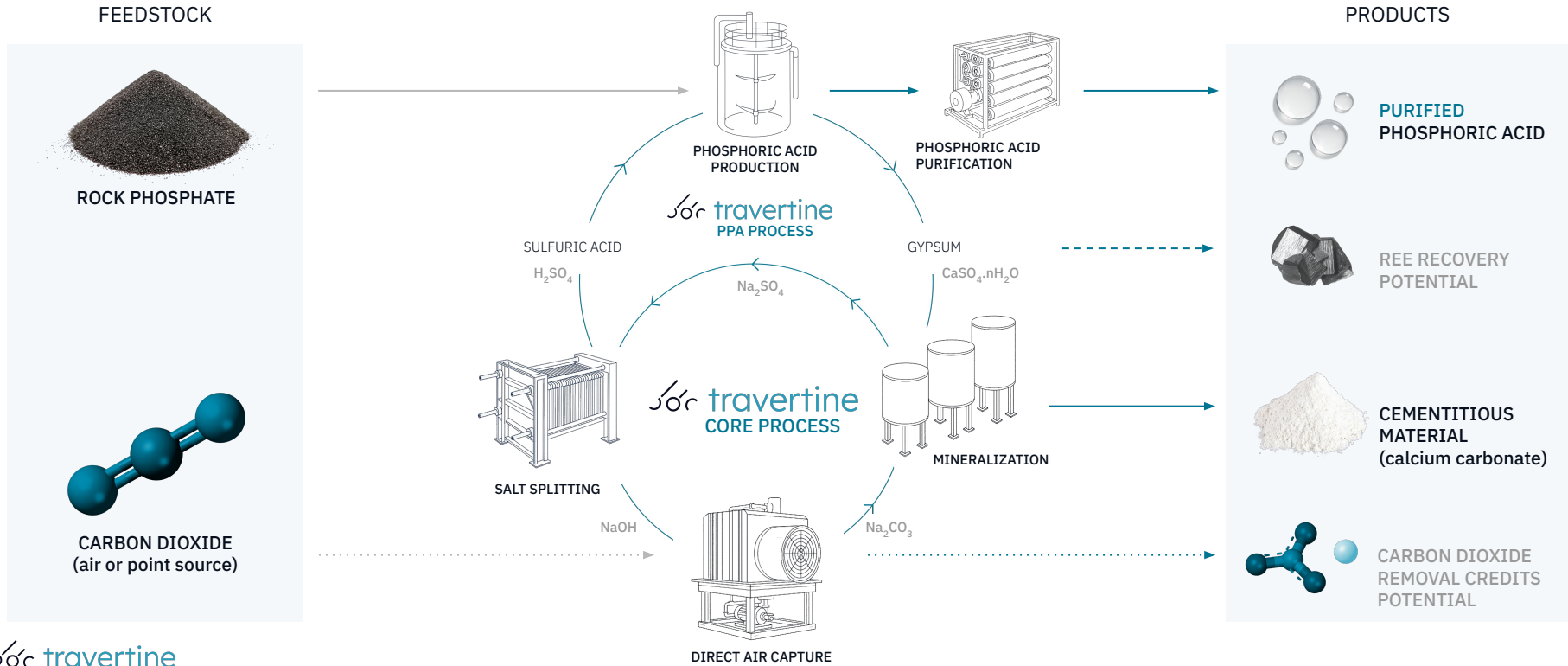
APPENDIX

Travertine converts a waste from the phosphate industry into a feedstock for cement.



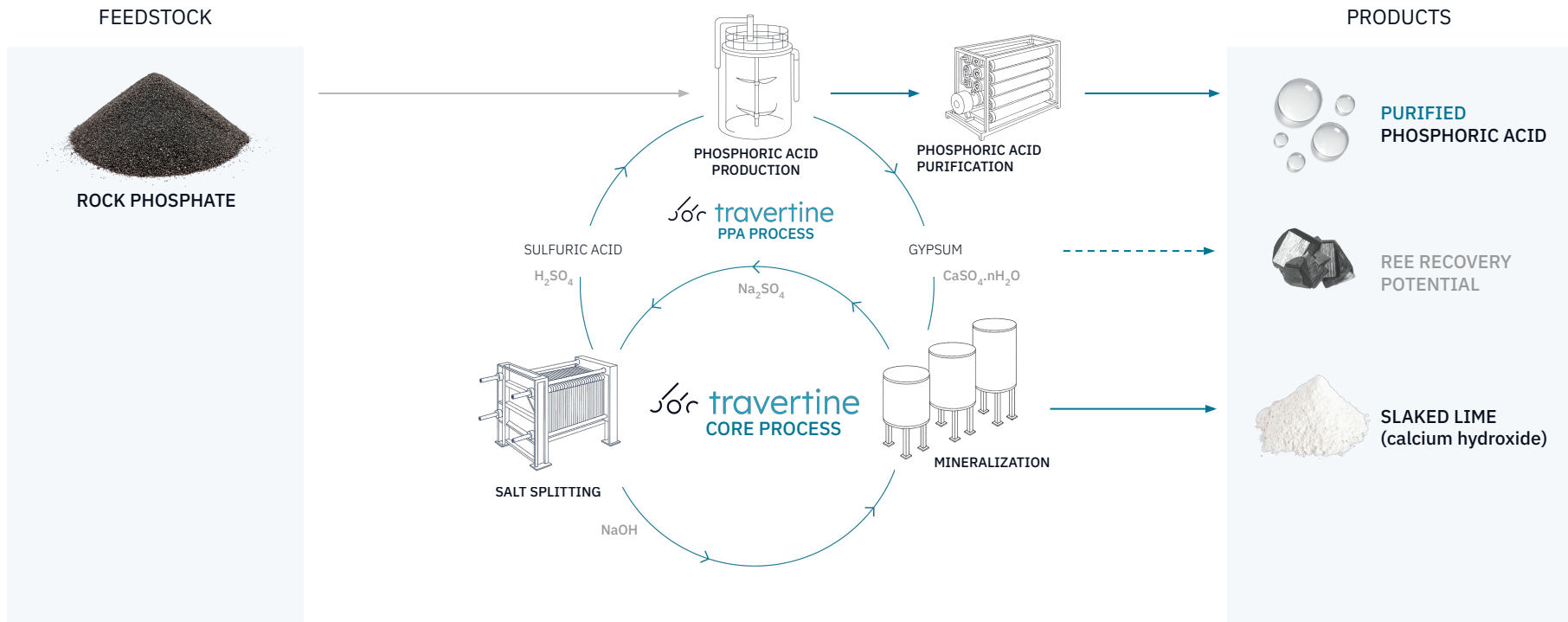
Travertine Process

No Sulfur, No Waste, Lower OPEX, More Value



Travertine Process (Lime)

No Sulfur, No Waste, Lower OPEX, More Value



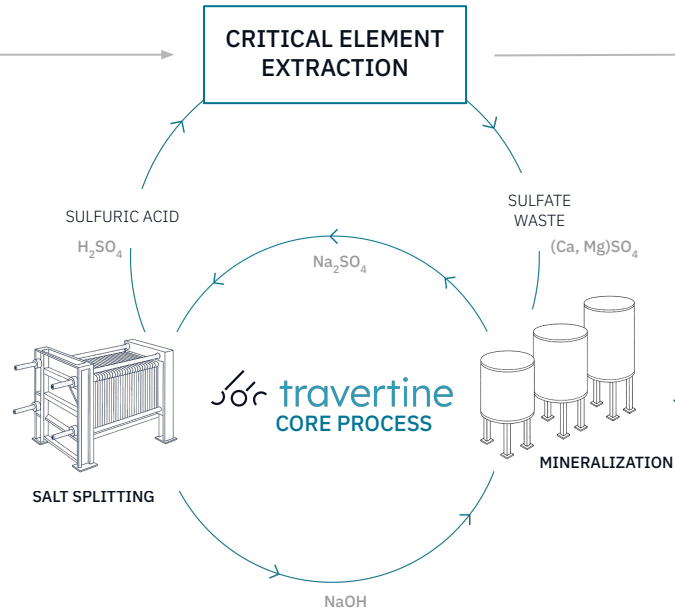
FUTURE APPLICATIONS OF The **Travertine** Process

FEEDSTOCK

ORE

PRODUCTS

LITHIUM, NICKEL,
COBALT, COPPER,
ETC.



ALKALINE MINERAL
PRODUCT
(Mg hydroxide, Ca
hydroxide, etc.)

Demo Plant **Products:** On Spec

Calcium Carbonate

PSD		Lot 1	Lot 2
d10	um	9.4	9.4
d50	um	24.4	27.4
d90	um	73.0	93.7
d[3,2]	um	15.8	16.8
XRD			
Calcite	%	97.3	97.0
Dolomite	%	0.68	0.63
Gypsum	%	0.1	0
Quartz	%	1.8	1.5
Na2SO4	%	0.2	0.8

Conforms to ASTM C1797 - Type A

Calcium Carbonate

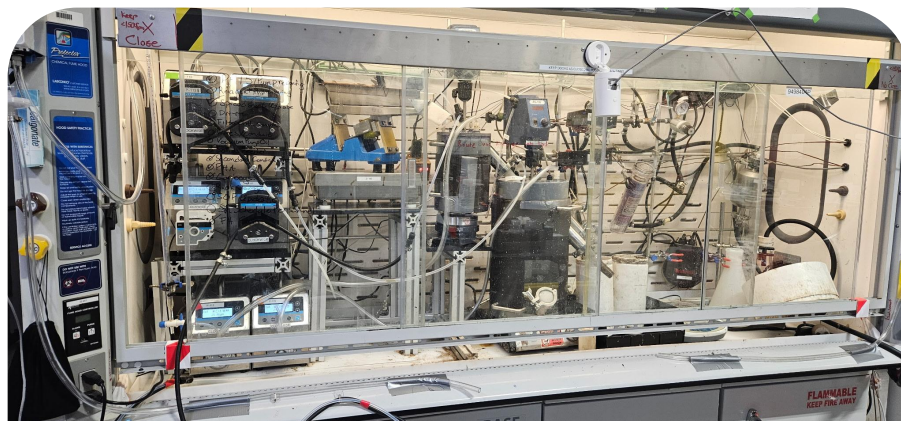


Sulfuric Acid (15-20% w/w)



Travertine Purified Phosphoric Acid Process Pilot: Samples meet purity specs for customers

Product	Phosphoric Acid (CAS# 7664-38-2)
Formula	H_3PO_4
Applications	Liquid Fertilizer Manufacturing LFP CAM Manufacturing Paper Manufacturing Animal Feed Supplements Cane Sugar Refining
Carbon Footprint	-0.8 kgCO₂ eq. per kg of PPA (100% H_3PO_4 basis) with renewable Energy vs. 0.7-0.9kgCO ₂ eq. per kg of conventionally produced PPA
Pilot System	Equivalent scale and sophistication to major phosphate technology licensors (Prayon, JESA/Worley).





Jórc travertine

Dr. Laura Lammers
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laura@travertinetech.com

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COO
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Series A **\$20M**

Series A: \$20M

- Complete FEED
- Operational Data
 - 1 year+ Demo operation
 - 10,000+ hours salt-splitting durability
 - More product samples to customers
- V2 Prototyping & Manufacturing
- Runway to Q4 2027

FOAK Project Capital:

- Commercial Plant: \$130m
 - Project Finance
 - Series B
 - Grants

Gross Margins of Travertine Plants are **1.5x** conventional.

	Conventional Purified Phos Acid (\$/T PPA)	Travertine Purified Phos Acid (\$/T PPA)
Total Revenue	\$1,915	\$2,050
Total OPEX	\$1,138	\$753
Capital Cost (15% ROI pre-tax)	\$ 433	\$ 847
Total Cost of Production	\$1,571	\$1,599
Net Profit	\$344	\$450
Gross Margin	41%	64%

→ Higher Revenue (sale of co-products)

→ Lower OPEX
(no sulfur input &
no gypsum management cost)

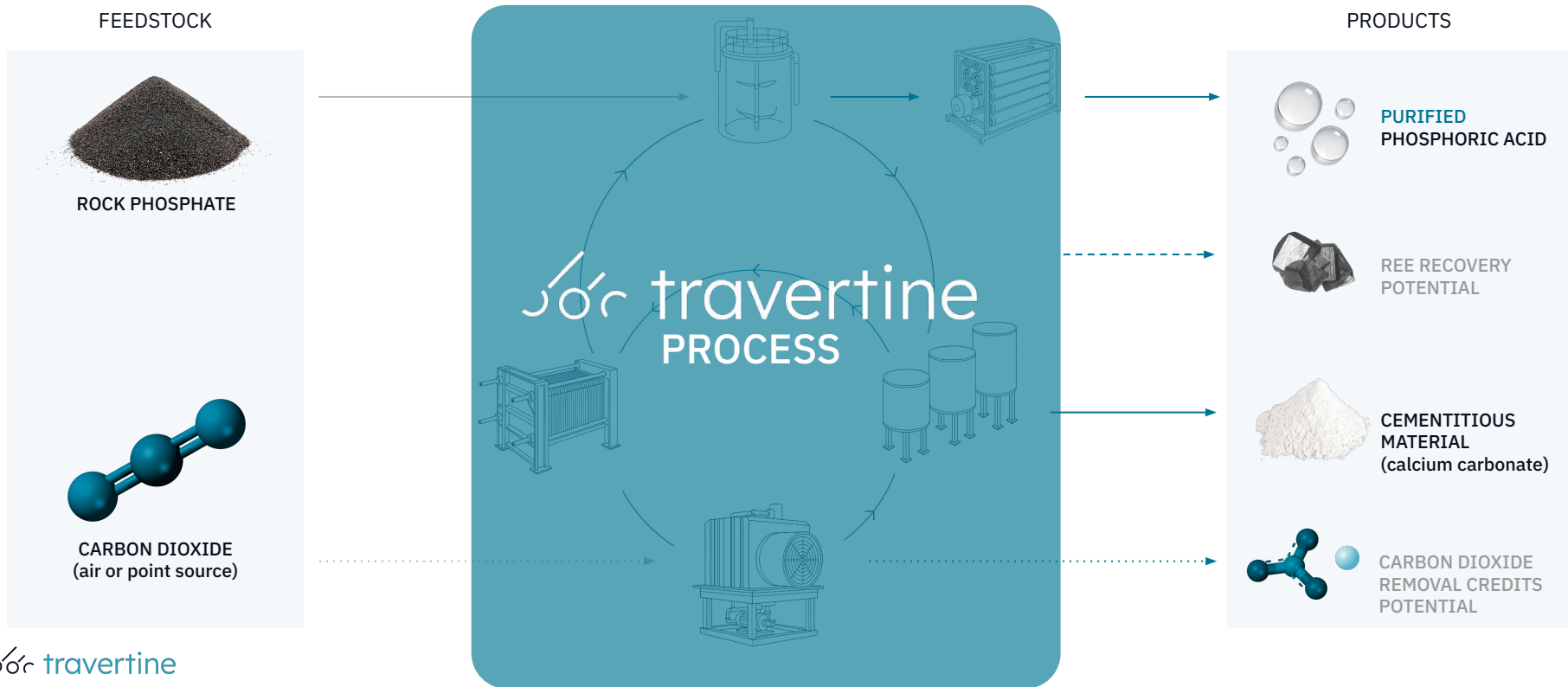
→ Industry-leading gross margins

Demo Plant

Rochester, New York



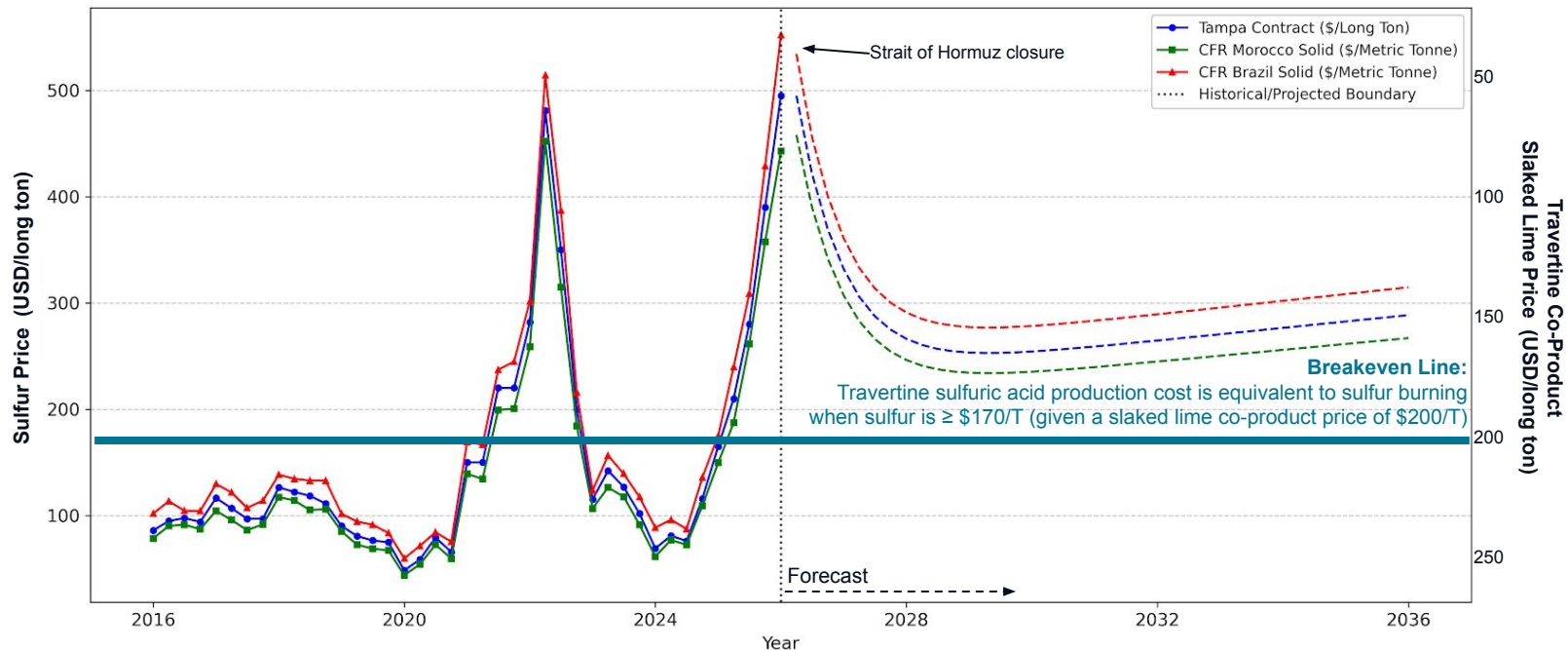
Travertine **eliminates the two OPEX drivers** of critical mineral production: **Sulfur and Waste Management**



Travertine Core Process is cheaper than Sulfur Burning

Slaked lime prices range from \$100 to \$400+/T depending on geography & grade.
Assumes \$0.04/kWh power, \$12/ton steam

Global Sulfur Pricing: Tampa vs CFR Morocco vs CFR Brazil
10-Year History (2016-2026) & 10-Year Projection (2026-2036)



Phosphate is a **critical mineral**

PHOSPHORIC ACID IS USED FOR:



Fertilizer



LFP Batteries



Food & Beverage

The phosphate industry **needs technology to survive**



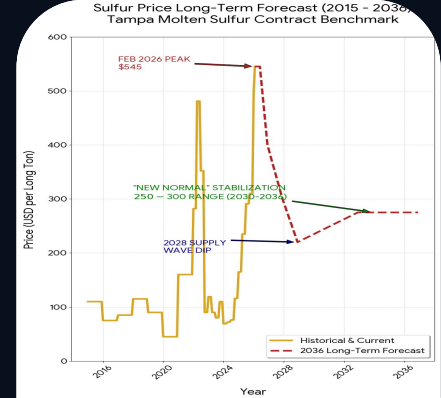
Under-Supplied



Outdated

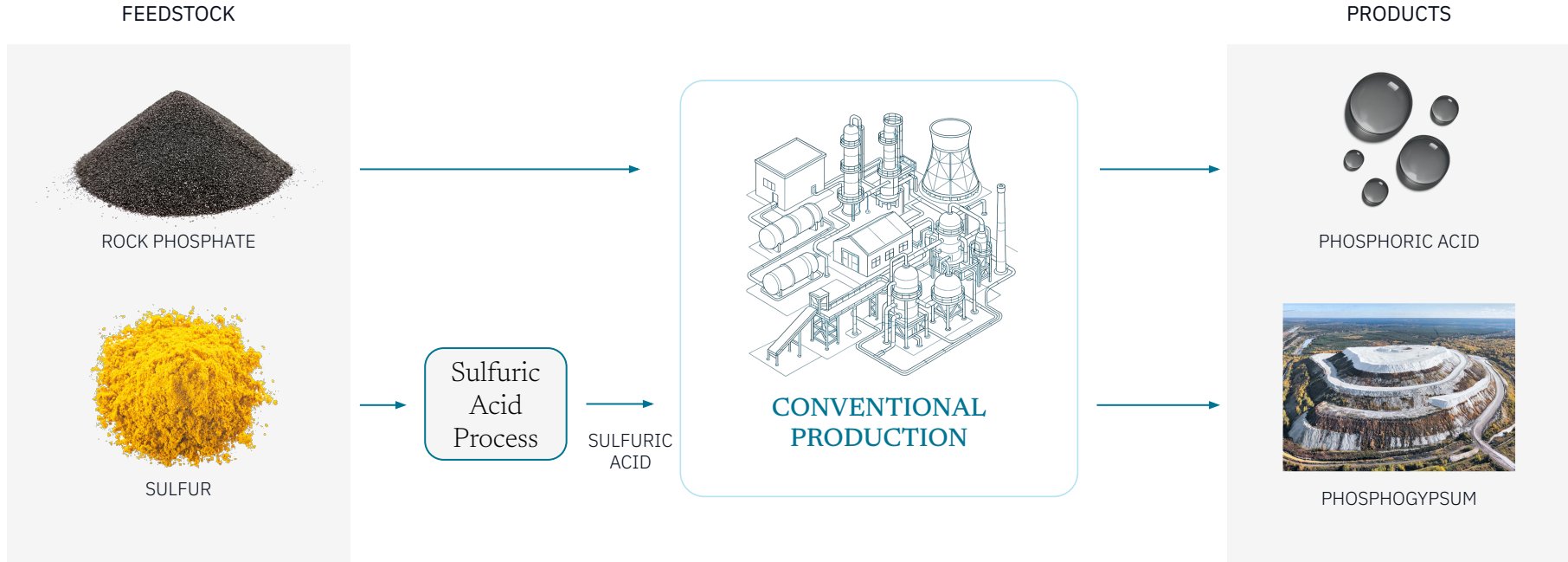


Wasteful



Vulnerable to Sulfur Price

Conventional production is tied to sulfur price & produces gigatons of waste



Recent Inbound from Major Industrials

- Renewed interest from **phosphate and mining majors**:
 - Mosaic Brazil
 - Ma'aden
 - OCP Group
 - Yara
 - Rio Tinto (Nuton & CVC)
 - BHP
- **Sulfur crunch gives an opportunity to capitalize into other markets and applications**

Size of the **market & impact**

Huge Markets

\$200B TAM for critical minerals processed by sulfuric acid

\$80B SAM for phosphoric acid

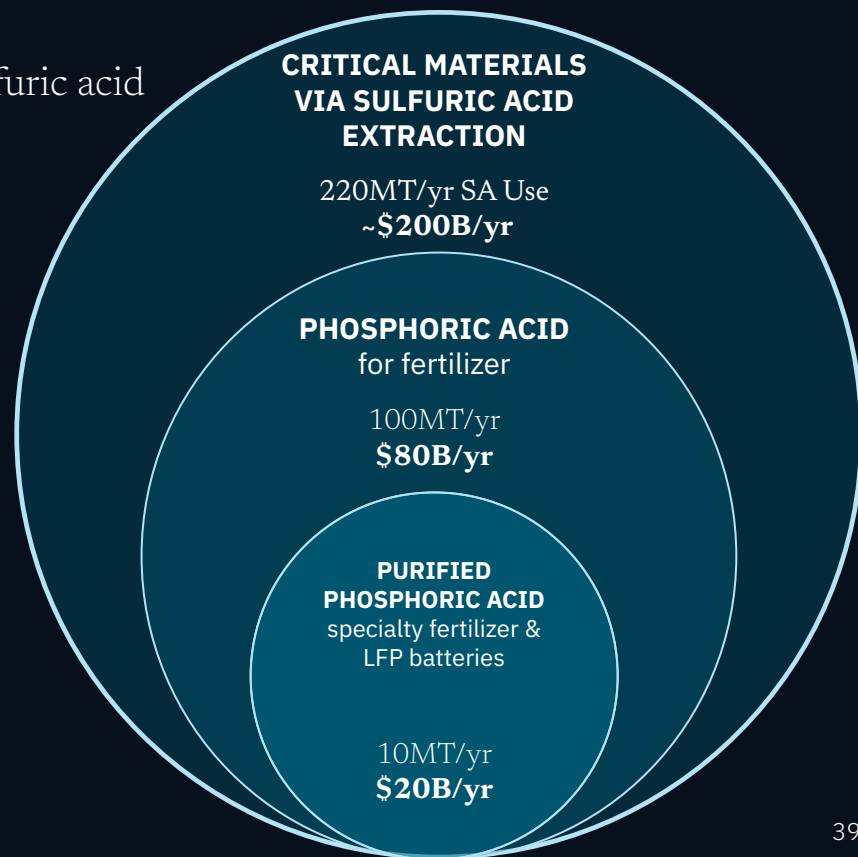
\$8B SOM near-term phosphate projects

Growing Demand

LFP battery demand driving growth of **purified phosphoric acid** market (+15% 2024-29).

Gigaton Carbon Impact

>1GT CO₂ impact over 10 years.



Scale-Up & FOAK Project

Commercial Scale Up

2022-2023
In-House Pilot



**NAMEPLATE
CAPACITY**

2024-2025
DEMONSTRATION PLANT



Sulfuric: 180 T/yr
CO2 Sequestered: 80 T/yr

**PLANT
REVENUE**

NA

FINANCIALS

CAPEX: \$7M
\$3.2M Grant
\$7.5M Venture Debt



**+ Pilot testing of PPA Production*

2028
FOAK PLANT
FEL-1 Complete

PPA: 30,000 T/yr

\$50M/yr
>90% from PPA

CAPEX: \$130M (+-30%)
IRR Unlevered: 17.5%
NPV(12): \$58M

2029+

**PURIFIED
PHOS ACID PLANTS**

PPA: up to 300 kT/yr
Revenue: **\$570M/yr**
>80% from PPA
CAPEX: \$1.1B
IRR Unlevered: ~30%
NPV(12): \$1.6B

**COMMODITY
PHOS ACID PLANTS**

PA: 500 kT/yr
Revenue: **\$838M/yr**
>75% from PA
CAPEX: \$1.5B
IRR Unlevered: ~25%
NPV(12) \$1.7B

**COMMODITY
SULFURIC ACID PLANTS**

SA: 1.6 MTa
Revenue: **\$560M/yr**
~50% from SA
CAPEX: \$1.2B
IRR Unlevered: ~25%
NPV(12): \$0.8B

Core Process Demo Plant

Rochester, New York



Core Process Demo Plant



travertine

Rochester, New York

Tech Derisk

100x from in-house pilot.

Commercial scale salt-splitting system.

De-risking key unit operations & integration.

1500+ hrs of operation.

Project Execution

Within 1% of TIC Budget

Start Up: November 2025

Making On Spec Products

Sulfuric Acid: 180 T/yr

Calcium Carbonate: 180 T/yr

CO₂ Sequestered: 80 T/yr

TIC:

\$7.2M

\$3.2M

Grant

\$7.5M

Venture Debt



BUILDERS VISION

Demo Plant **Products:** On Spec

Calcium Carbonate

PSD		Lot 1	Lot 2
d10	um	9.4	9.4
d50	um	24.4	27.4
d90	um	73.0	93.7
d[3,2]	um	15.8	16.8
XRD			
Calcite	%	97.3	97.0
Dolomite	%	0.68	0.63
Gypsum	%	0.1	0
Quartz	%	1.8	1.5
Na2SO4	%	0.2	0.8

Conforms to ASTM C1797 - Type A

Calcium Carbonate

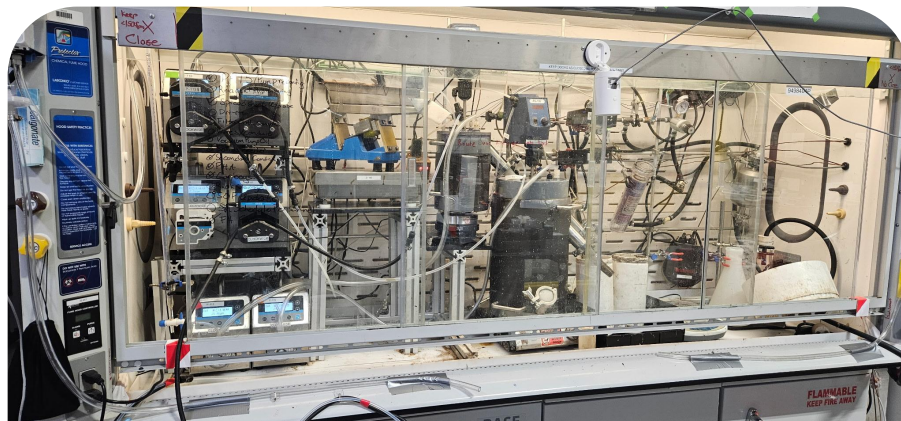


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Travertine Purified Phosphoric Acid Process Pilot: Samples meet purity specs for customers

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Formula	H_3PO_4
Applications	Liquid Fertilizer Manufacturing LFP CAM Manufacturing Paper Manufacturing Animal Feed Supplements Cane Sugar Refining
Carbon Footprint	-0.8 kgCO₂ eq. per kg of PPA (100% H_3PO_4 basis) with renewable Energy vs. 0.7-0.9kgCO ₂ eq. per kg of conventionally produced PPA
Pilot System	Equivalent scale and sophistication to major phosphate technology licensors (Prayon, JESA/Worley).



Purification Performance

Travertine's proprietary solventless purification process meets food grade product specification

	Unit	Raw Acid	After Bulk Purification	After Polishing / Concentration (Trace Analysis)
Al	ppm	6967.5	27.1	0.38
As	ppm	3.604	3.3	<0.5 (0.2)
Ba	ppm	<12.5	<2.5	<0.5 (0.01)
Ca	ppm	2667.5	13.1	6
Cd	ppm	22.41	<0.75	<0.5 (0.009)
Co	ppm	<12.5	<2.5	<0.5
Cu	ppm	<12.5	<2.5	<0.5 (0.02)
Fe	ppm	6140	40.7	1.4
K	ppm	400	<1.25	<2 (1.6)
Mg	ppm	7355	212.9	3.4
Mn	ppm	50.794	<2.5	<0.5 (0.07)
Na	ppm	2045	499	<50 (10.6)
Ni	ppm	47.464	<2.5	<0.5 (0.05)
P2O5	wt%	19.997	12.9	55.3
Pb	ppm	<12.5	<2.5	<1 (0.5)
Si	ppm	650.723	158	7.8
SO4	ppm	21607.5	7830	<5 (3.2)
Zn	ppm	49.958	<2.5	<0.5 (0.03)
F	ppm	3000	756	<10 (5)
Cl	ppm	Not Measured	1008	<10 (0.5)
Br	ppm	<MDL	<MDL	<MDL
Color	APHA	Dark	Dark	<20
Odor	N/A	Mild	Mild	None
Ti	ppm	100.29	5.3	<1 (0.21)

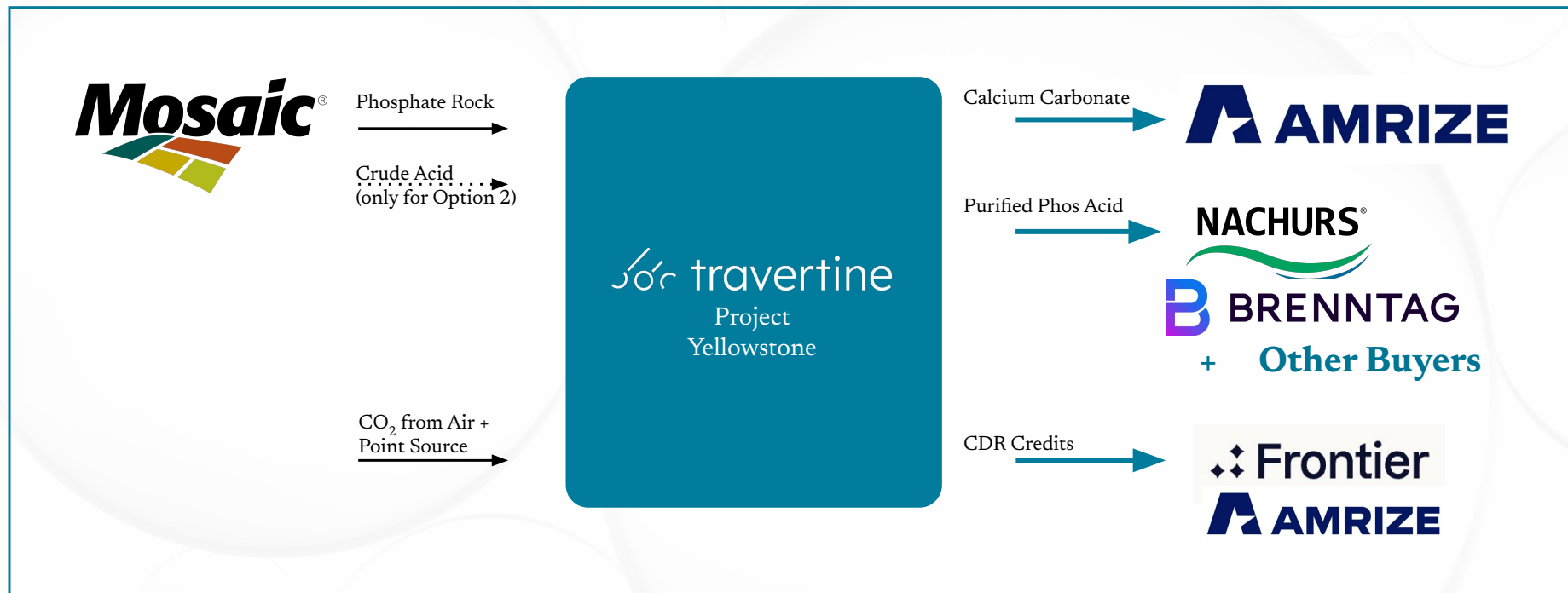
FOAK PLANT PROJECT YELLOWSTONE



 **travertine**

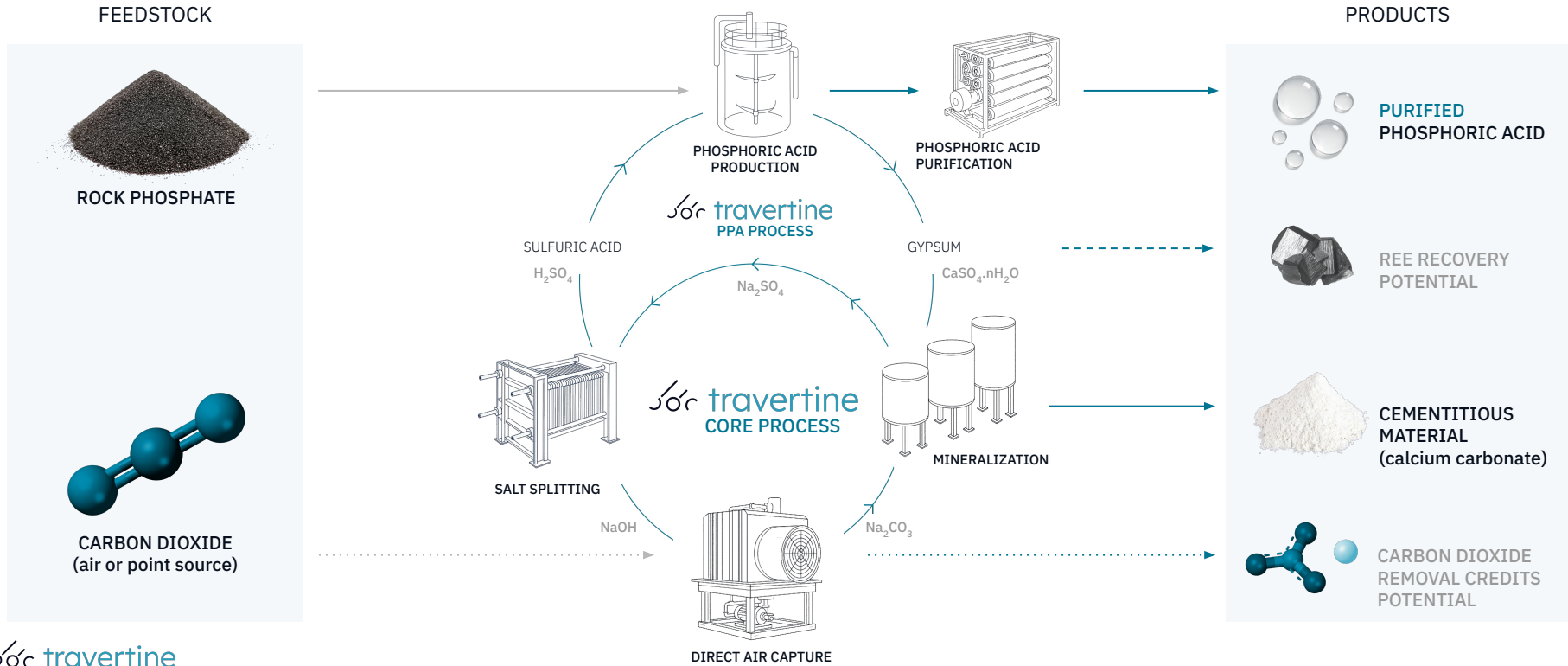
Louisiana

Project Yellowstone: **Partners**



Travertine Process

No Sulfur, No Waste, Lower OPEX, More Value



Executive Summary: Project Yellowstone - Option 1. DEMO SCALE (Grant Funded)

TEA Summary	
Phosphate Rock (T/yr)	2,230
Crude Phos Acid (T/yr)	
CO2 Point Source	213
CO2 Air	399
Electricity (MW)	0.53
Steam (MW)	0.31
Products	
Purified Phosphoric Acid (T H3PO4/yr)	770
Commodity Phosphate (T H3PO4/yr)	86
Calcium hydroxide (T/y)	0
Calcium Carbonate (T CaCO3/yr)	1,617
Point source CO ₂ captured (T CO2/y)	213
DAC-Credit (T CO2e/yr)	399
Gypsum Avoided (T/yr)	3,004
Total Installed Cost (\$M)	50
Total OPEX (\$M)	2.6
Total Revenue (\$M)	2.6
EBITDA (\$M/Yr)	0.0

Location: Co-located with Amrize plant

Feedstock(s): Mosaic Non-Binding MOU Signed, negotiating binding agreement.

Offtaker(s):

- Nachurs: Sample qualified, finalizing MOU.
- Brenntag: Requested Sample, negotiating MOU.
- Coke & Pepsi: Setting up meetings
- >10 other PPA customers in pipeline (Sylvite, NanoOne, Lantic, etc.)

EPC Approach: FEL-1 completed with Isomer.

Quoting Hybrid Skid/EPC Approach & Full Modular Skid-Built

Government Incentives & Credits: Project aligned with Project Vault. Submitted DOE IIJA Grant Application for FOAK plant (\$75m). Submitting DOE ARPA-E Scale Up (\$20m).

Executive Summary: Project Yellowstone - COMMERCIAL SCALE (Project Finance)

TEA Summary

Inputs

Phosphate Rock (T/yr)	6,337
Crude Phos Acid (T/yr)	24,300
Electricity (MW)	1.9
Steam (MW)	2.6

Products

Purified Phos Acid (T/yr)	21,870
Commodity Phos Acid (T/yr)	2,430
Calcium hydroxide (T/y)	-
Calcium Carbonate (T/yr)	4,596
Point Source CO ₂ Captured (T/y)	606
CDR - Credit (T/yr)	1,134
Gypsum Avoided (T/yr)	8,539

Total Installed Cost (\$M)	\$ 126
Total OPEX (\$M/yr)	\$ 23
Total Revenue (\$M/vr)	\$ 51
EBITDA (\$M/yr)	\$ 28
Unlevered IRR (%)	17.5%
Project NPV(12) (\$M)	\$ 58
Payback Period (non-discounted, yr)	4.5

Location: Louisiana, USA

Feedstock(s): Mosaic MOU Signed

Offtaker(s):

- PPA: Nachurs, Redox, Brenntag, etc.
- Carbon-negative calcium carbonate: Amrize

EPC Approach: FEL-1 completed with Isomer. Evaluating EPCs.

FOAK Financing: Interest from a number of financiers including FOAK developer & financier.

Government Incentives & Credits: Project aligned with Project Vault. Submitted DOE IIJA Grant Application for FOAK plant (\$75M).

Louisiana Industrial Tax Exemption Program, up to 80% tax abatement for 10 years of new manufacturing.

Travertine offers a BETTER PAYBACK in the industrial transformation space

Company	Ballpark CAPEX	Product	Production Capacity (T/yr)	Market Unit Value (\$/T)	Revenue/yr	Total Gross Revenue (30 years)	Ratio of Total Gross Revenue /CAPEX
Travertine Project Yellowstone Commercial	\$130,000,000	Purified Phos. Acid	30,000	\$1,750	\$52,500,000 (PPA only)	\$1,575,000,000	12.1
Travertine Project Yellowstone Demo	\$50,000,000	Purified Phos. Acid	1,000	\$1,750	\$2,500,000	\$75,000,000	1.5
Electra CO Demo	>\$100,000,000	Iron	500	\$400	\$50,000	\$6,000,000	0.06
Sublime Project Holyoke	>\$150,000,000	Cement	30,000	\$170	\$3,000,000	\$153,000,000	<1.0

Commercial Plants: **Near-term Project Pipeline**



1st Small Commercial Plant:

Project Yellowstone: Next to Mosaic plant in Louisiana, USA.

30k T/yr PPA. Option to expand to 100+ kT/yr. **MOU signed.**



Near-Term Project Pipeline:

Project Greystone: New facility in Quebec. Permitted mine.

Phase 1: 3-6 kT/yr PPA. Phase 2 up to 300 kT/yr. Tolling agreement.

MOU Signed. Jointly applying for Canadian Gov Funding.



Project Whitestone: New facility in Saudi Arabia.

Travertine Core Process. Phase 1 underway with paid test work.

R&D Facilities (Boulder, CO)

21,000 sq ft world-class R&D facility

CORE PROCESS RD&D



Salt-splitting: pilot-scale cell



Metathesis circuit



Brine polish



CO₂ capture

PHOSPHORIC ACID RD&D



Phosphoric acid digestion & recrystallization



Membrane purification

ANALYTICAL LAB



Grants, Awards, & Key **Investors**

Successful track record of raising >\$29M to date
EQUITY | DEBT | GRANTS | CDR PRE-PURCHASE

Grants & Awards



Investors



Series A **\$20M**

Series A: \$20M

- Complete FEED
- Operational Data
 - 1 year+ Demo operation
 - 10,000+ hours salt-splitting durability
 - More product samples to customers
- V2 Prototyping & Manufacturing
- Runway to Q4 2027

FOAK Project Capital:

- Commercial Plant: \$130m
 - Project Finance
 - Series B
 - Grants

Series A **\$20M**

Series A: \$20M

- Complete FEED
- Operational Data
 - 1 year+ Demo operation
 - 10,000+ hours salt-splitting durability
 - More product samples to customers
- V2 Prototyping & Manufacturing
- Runway to Q4 2027

FOAK Project Capital:

- Option 1: PPA Demo Plant:
\$10-\$50m depending on scale
 - Grants
 - Series B
- Option 2: Commercial Plant: \$130m
 - Project Finance
 - Series B
 - Grants

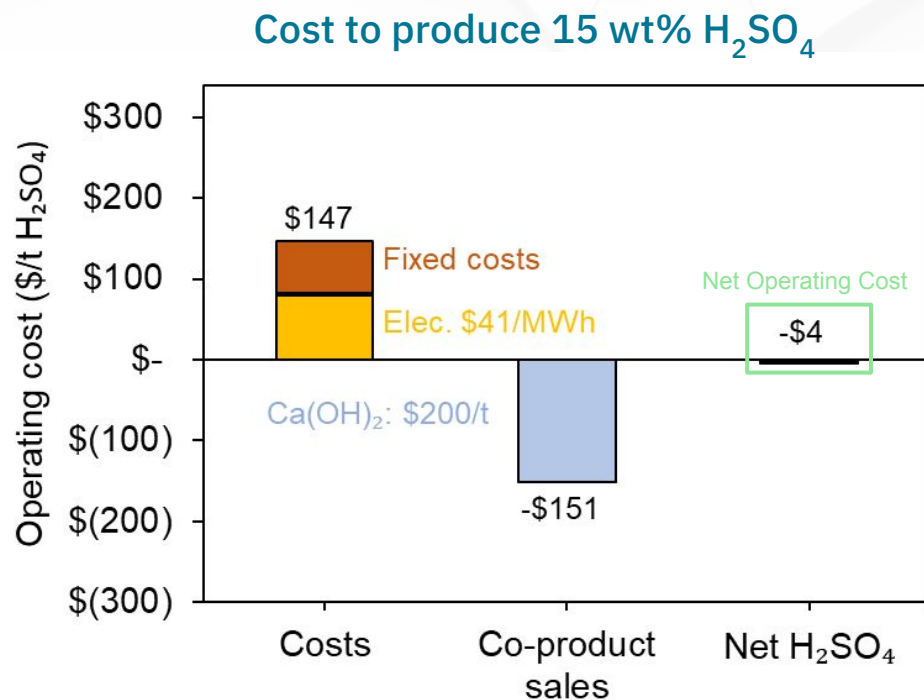


Jórc travertine

Dr. Laura Lammers
CEO | FOUNDER
laura@travertinetech.com

Owen Cadwalader
COO
owen@travertinetech.com

Travertine Core Process TEA: H_2SO_4 Operating Cost at \$0/t PG Management Cost



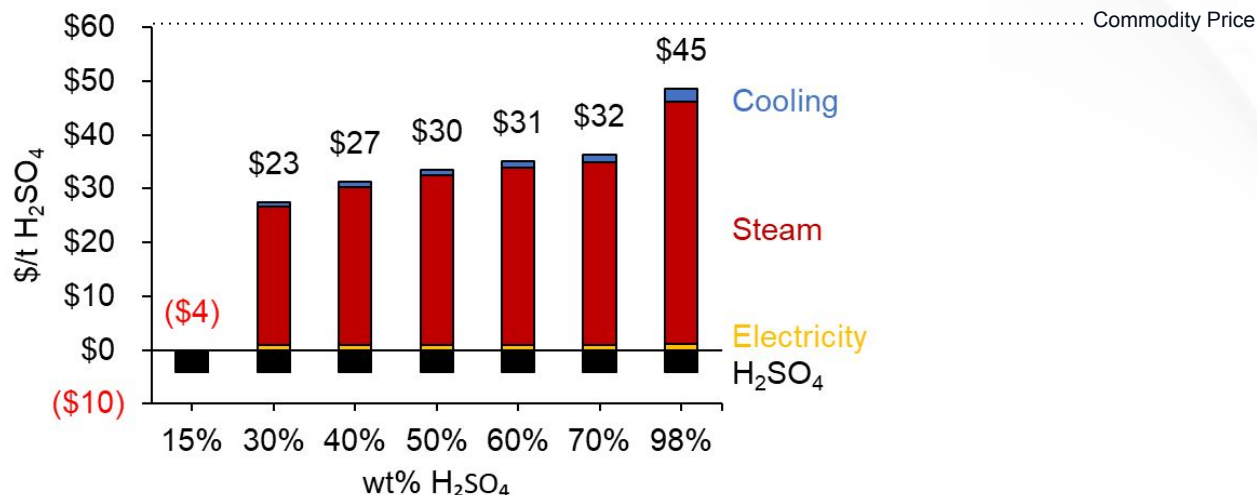
- H_2SO_4 operating cost (no inclusion of CAPEX) is - \$4/t
- OPEX Drivers: Salt Splitting Electricity & Maintenance
- Ca(OH)_2 co-product sales net out most of OPEX

Process Parameters

- Capacity: 1,500 kTa H_2SO_4
- Current Efficiency: 80%
- Salt Splitting: H_2SO_4 15 wt%
- Electricity price: \$41/MWh
- Ca(OH)_2 price: \$200/t
- Gypsum avoided price: \$0/t

Travertine Core Process TEA: with H_2SO_4 Concentration

H_2SO_4 Operating Cost at \$0/t PG Management Cost



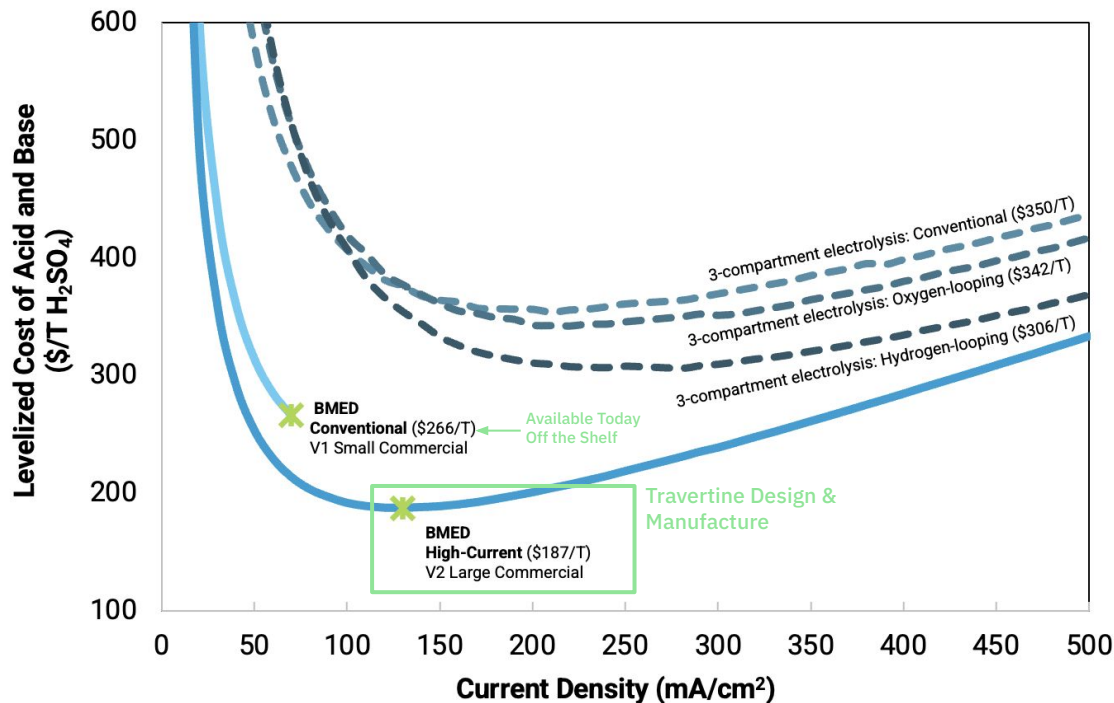
Process Parameters

- Capacity: single train varies w/ final concentration
- Current Efficiency: 80%
- Salt Splitting: 15 wt% H_2SO_4
- Electricity price: \$41/MWh
- $\text{Ca}(\text{OH})_2$ price: \$200/t
- Steam price: \$12/t
- Gypsum avoided price: \$0/t

Salt Splitting Innovation

Travertine is building the **lowest-cost** salt splitting technology that meets the concentration ($>2\text{M}$ acid & base) and purity specifications (low salt) for critical mineral production/refining, energy storage, etc.

High-Current BMED is **lowest-cost** salt-splitting technology for critical minerals, energy storage, chemical recycling...



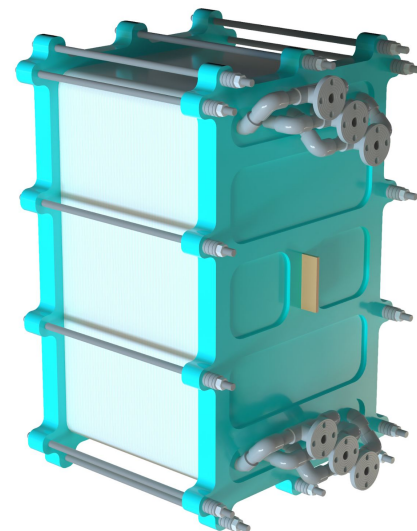
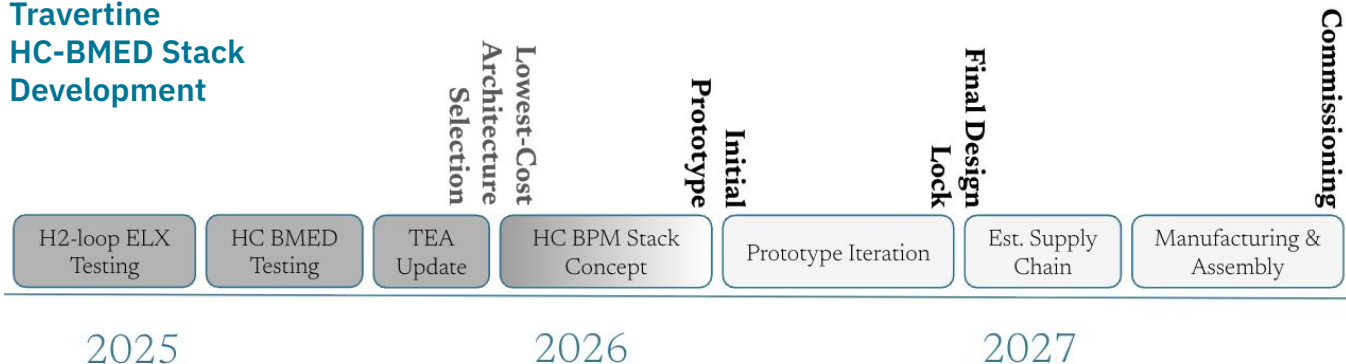
V2 Development Strategy

Develop In-House HC-BMED stack in partnership with novel BPM supplier

The Travertine Team is uniquely qualified to deliver the next-gen HC-BMED Stack:

- Partnership with leading high-current BPM Manufacturer
- High-powered team led by former PlugPower/Giner/Electra Stack Design lead
- Fundamental understanding of energy losses & potential efficiency gains for every component.
- Ability to minimize overall production cost based on full understanding of downstream processes requirements and balance of plant costs (we built a plant that works!).

Travertine HC-BMED Stack Development

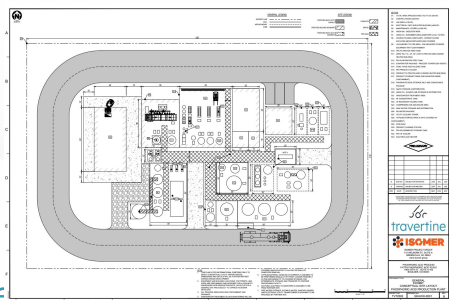
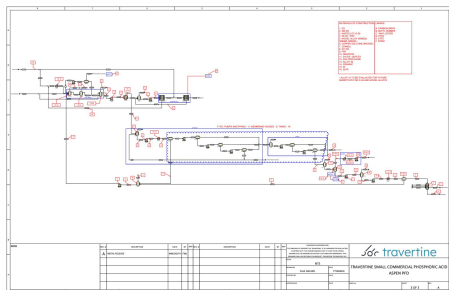


**Travertine
HC-BMED Stack Concept**

Developing a **Licensing Package**

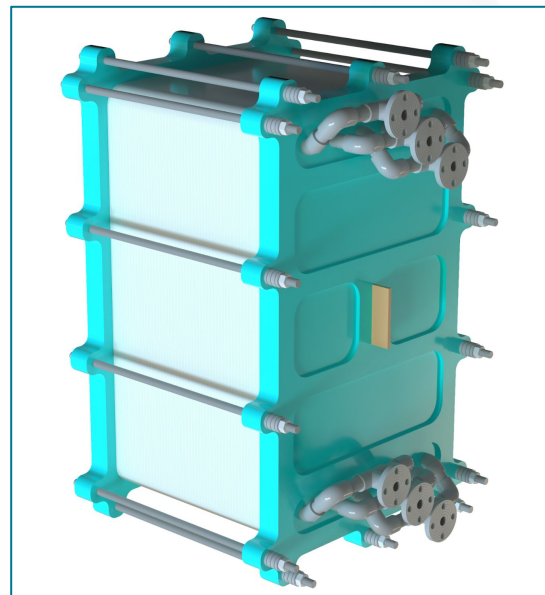
Patents pending

Proprietary Process & Preliminary Plant Design

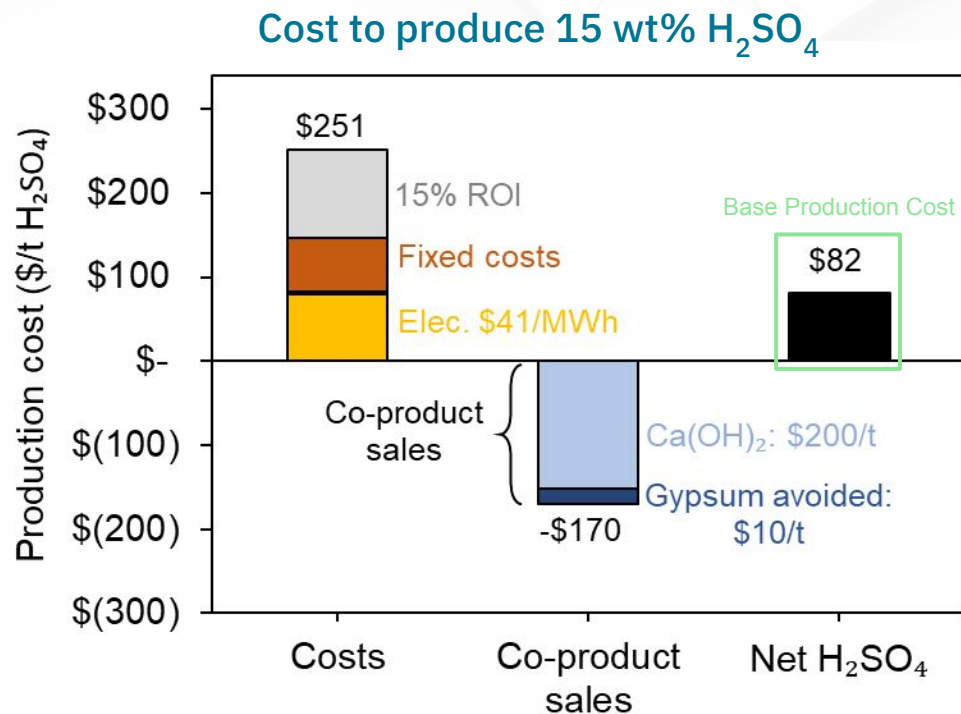


ISOMER TRAVERTINE TECHNOLOGIES - TYT2502 CORE PROCESS - DAC + PHOSPHORIC ACID - FELT ESTIMATE 2025-10-16 Rev. A						
Description	Labor Hours	Labor Costs	Material Costs	Equipment Costs	Subcontract Costs	Total Costs
0000 Description	0	0	0	0	0	0.00%
0100 Materials	1,876	\$7,673	\$2,000	0	1,254,250	2,438,923
1000 Piping	0	0	0	0	4,007,250	2,500%
2000 Construction	2,212	\$2,212	1,478,884	0	0	1,481,096
3000 Plant & Process	3,000	1,500,000	1,048,800	0	0	2,548,800
4000 Equipment	0	0	0	4,000,000	0	4,000,000
5000 Process Equipment	3,000	1,500,000	0	26,754,400	0	28,254,400
6000 Process Equipment Control	2,000	\$2,000	\$2,000	0	0	4,000
7000 Infrastructure	3,000	\$3,000	\$3,000	\$3,000	\$3,000	12,000
8000 Electrical	2,000	\$2,000	\$2,000	\$2,000	\$2,000	8,000
9000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
Subtotal - DIRECT COSTS	96,000	\$1,511,342	\$1,997,284	\$1,324,000	\$1,007,837	\$5,840,463
0000 Description	0	0	0	0	0	0.00%
1000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
2000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
3000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
4000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
5000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
6000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
7000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
8000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
9000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
Subtotal - OTHER DIRECT COSTS	21,556	\$1,076,587	\$0	\$0	\$0	\$1,076,587
0000 Description	0	0	0	0	0	0.00%
1000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
2000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
3000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
4000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
5000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
6000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
7000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
8000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
9000 Construction Subcontract	1,000	\$1,000	\$1,000	\$1,000	\$1,000	4,000
Subtotal - CONSTRUCTION INDIRECT COSTS	0	\$302,020	\$0	\$0	\$0	\$302,020
TOTAL CONSTRUCTION COSTS	121,061	\$4,822,274	\$3,232,764	\$4,324,000	\$1,409,237	\$13,788,275
0000 Description	0	0	0	0	0	0.00%
1000 Construction Management	0	0	0	0	0	0.00%
2000 Engineering & Design	0	0	0	0	0	0.00%
3000 Engineering & Design	0	0	0	0	0	0.00%
4000 Engineering & Design	0	0	0	0	0	0.00%
5000 Engineering & Design	0	0	0	0	0	0.00%
6000 Engineering & Design	0	0	0	0	0	0.00%
7000 Engineering & Design	0	0	0	0	0	0.00%
8000 Engineering & Design	0	0	0	0	0	0.00%
9000 Engineering & Design	0	0	0	0	0	0.00%
Subtotal - PROJECT INDIRECT COSTS	0	\$1,138,500	\$0	\$0	\$0	\$1,138,500
GRAND TOTAL	121,061	\$6,060,774	\$3,232,764	\$4,324,000	\$1,409,237	\$14,788,275

Proprietary Equipment (HC-BMED Stack)



Travertine Core Process TEA: H_2SO_4 Production Cost at \$10/t PG Management Cost



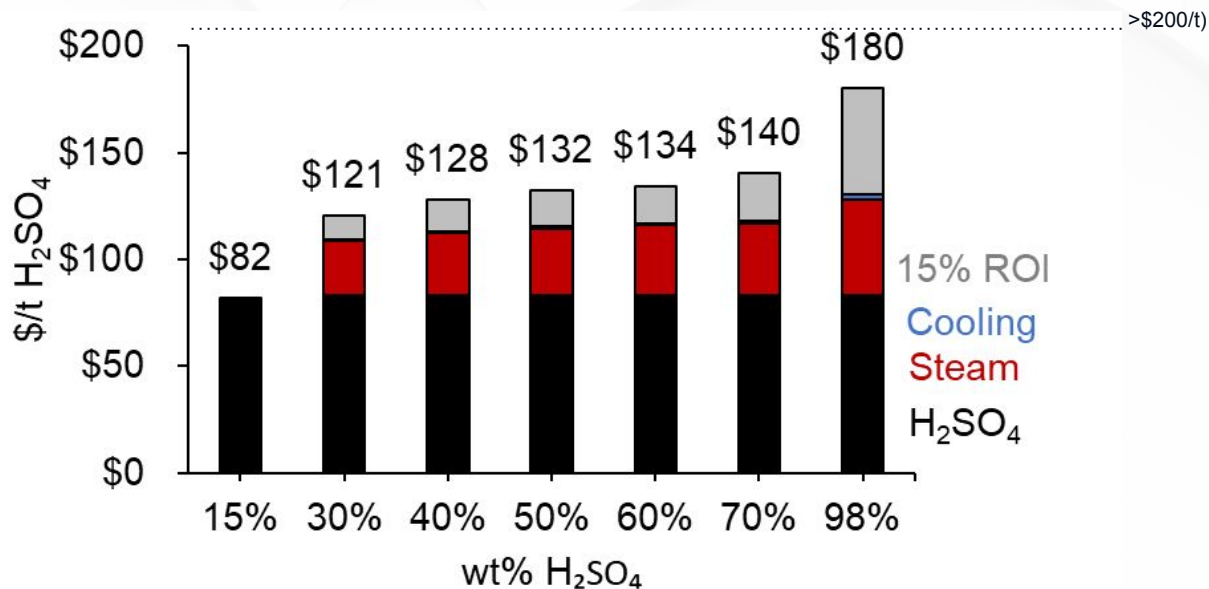
- H_2SO_4 Base Production Cost is \$82/t
- OPEX Drivers: Salt Splitting Electricity & Maintenance
- Capital costs are included assuming a 15% ROI on TIC (\$105/t H_2SO_4)
- Co-products net out most of OPEX

Process Parameters

- Capacity: 1,500 kTa H_2SO_4
- Current Efficiency: 80%
- Salt Splitting: H_2SO_4 15 wt%
- Electricity price: \$41/MWh
- $\text{Ca}(\text{OH})_2$ price: \$200/t
- Gypsum avoided price: \$10/t

Travertine Core Process TEA: with H_2SO_4 Concentration

H_2SO_4 Production Cost at \$10/t PG Management Cost



Process Parameters

- Capacity: single train varies w/ final concentration
- Current Efficiency: 80%
- Salt Splitting: 15 wt% H_2SO_4
- Electricity price: \$41/MWh
- $\text{Ca}(\text{OH})_2$ price: \$200/t
- Steam price: \$12/t
- Gypsum avoided price: \$10/t

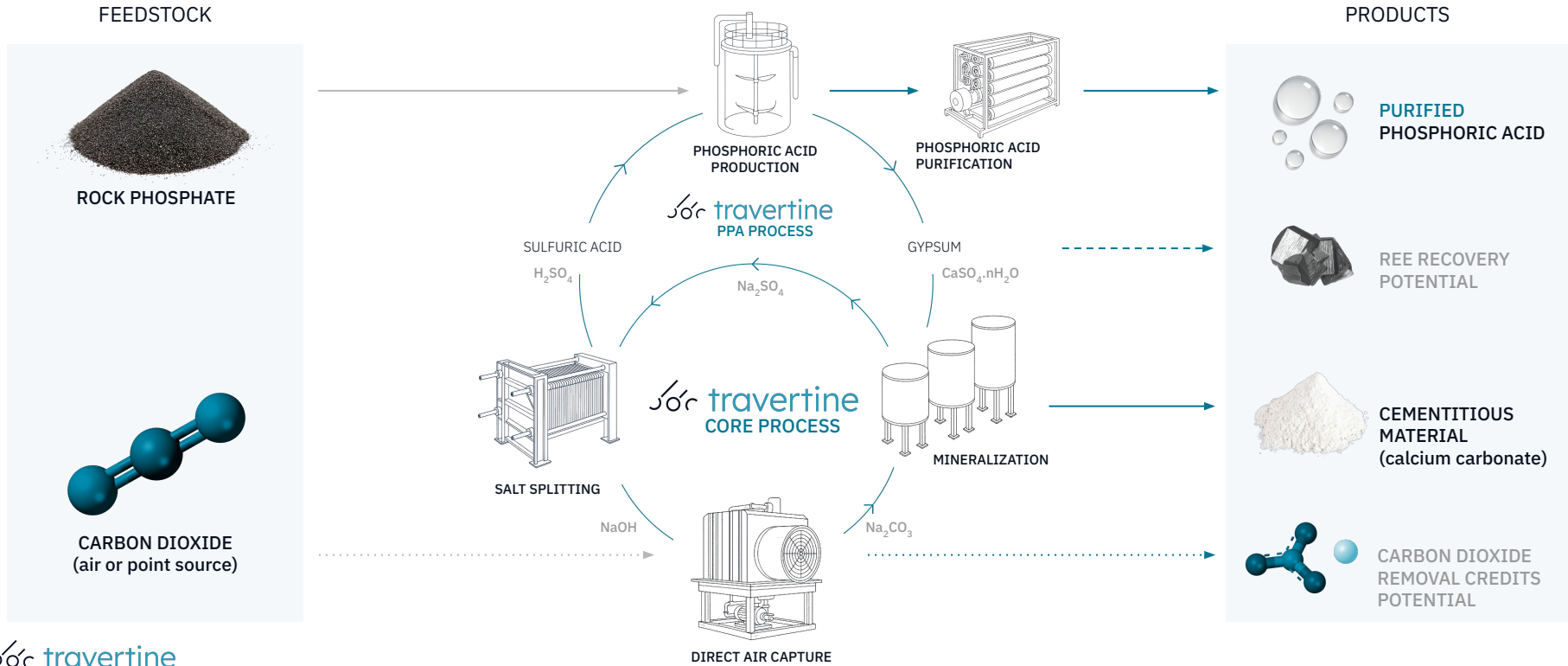
The Travertine Phosphoric Acid Process is better & cheaper than conventional

		Travertine PPA	Conventional PPA
PPA Nameplate	T/yr	100,000	100,000
Total OPEX	\$/T H3PO4 PPA	\$753	\$1,266
Capital cost (15% ROI pre-tax)	\$/T H3PO4 PPA	\$ 847	\$ 433
Total Cost of Production	\$/T H3PO4 PPA	\$1,599	\$1,699
Total Revenue	\$/T H3PO4 PPA	\$2,050	\$1,915
Net Profit	\$/T H3PO4 PPA	\$450	\$215
Gross Margin		64%	34%

Travertine has better economics: lower OPEX (no sulfur input and no gypsum management cost) & higher revenue (sale of co-products). Details in appendix.

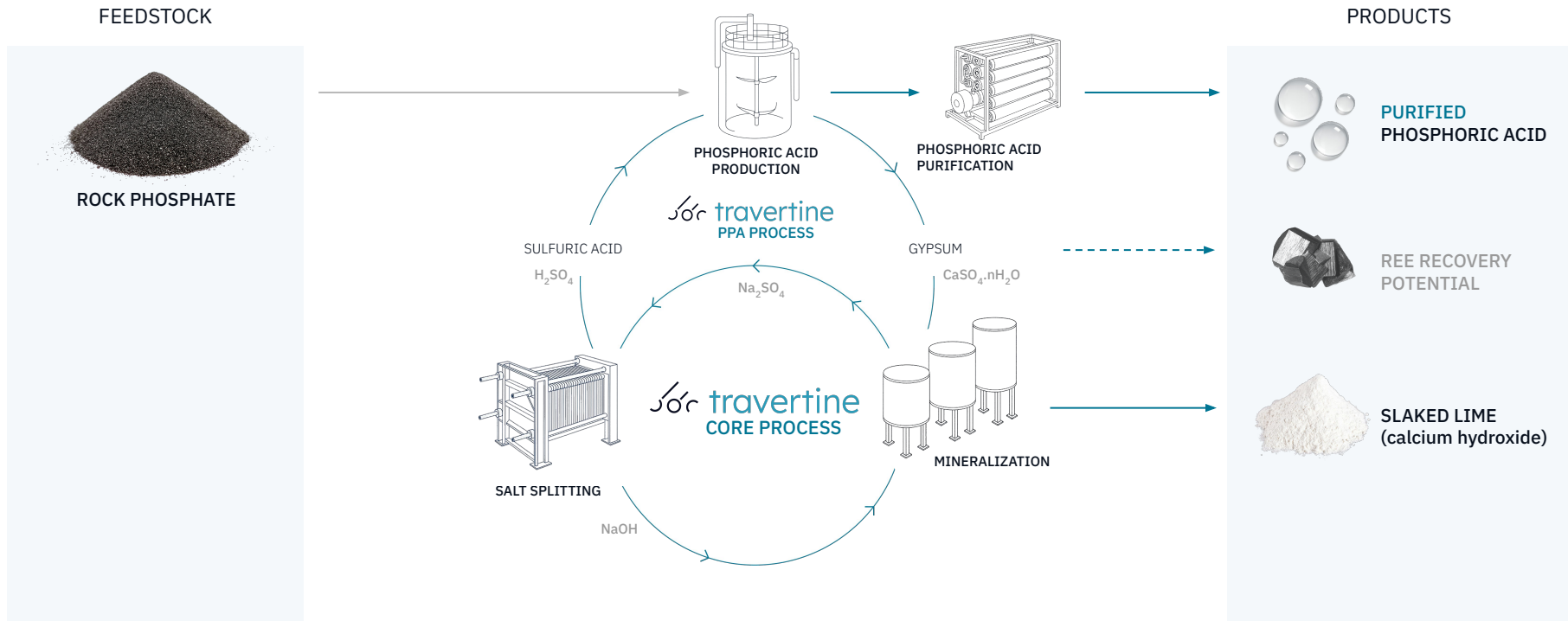
Travertine Process

No Sulfur, No Waste, Lower OPEX, More Value

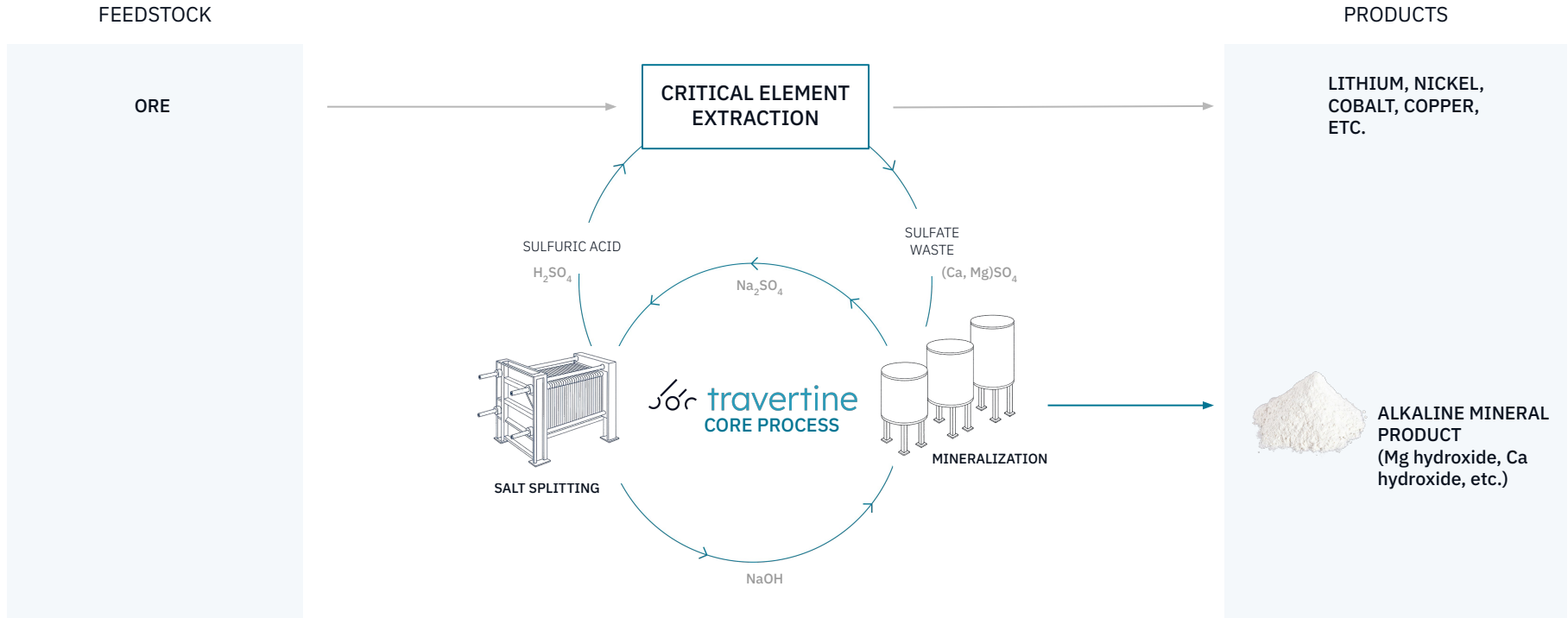


Travertine Process (Lime)

No Sulfur, No Waste, Lower OPEX, More Value



FUTURE APPLICATIONS OF The **Travertine** Process



Appendix

Travertine **IP Portfolio**

6 patent families

7 pending US patent applications

10 pending foreign patent applications

Core Process

Electrochemical sulfuric acid recycling
combined with carbon capture and
mineralization

Critical Element Recovery

REE extraction, Ni extraction, lithium
extraction, etc

Salt Splitting Technology

Half-MEA for H₂-depolarized salt-splitting

Purified Phosphoric Acid Process

Phosphoric acid production and purification
using dilute sulfuric acid

Fertilizer Production

Ammonium salts production using
electrochemically recycled sulfuric acid

Travertine **PPA** vs. Conventional Comparison

Phosphoric Acid Cost of Production		Travertine PPA V2 ELX	Conventional PPA
PPA Nameplate	T/yr	100,000	100,000
PPA Yield	%	90%	69%
Phosphate Rock	\$/T H3PO4 PPA	\$209	\$273
Sulfuric Acid	\$/T H3PO4 PPA	-	\$468
Electricity	\$/T H3PO4 PPA	\$209	\$21
Steam	\$/T H3PO4 PPA	\$30	\$66
Solvent	\$/T H3PO4 PPA	-	\$5
Gypsum management	\$/T H3PO4 PPA	-	\$221
Membranes	\$/T H3PO4 PPA	\$100	-
Other OPEX	\$/T H3PO4 PPA	\$205	\$212
Total OPEX	\$/T H3PO4 PPA	\$753	\$1,266
Capital cost (15% ROI pre-tax)	\$/T H3PO4 PPA	\$ 847	\$ 433
Total Cost of Production	\$/T H3PO4 PPA	\$1,599	\$1,699
Purified Phos Acid Revenue	\$/T H3PO4 PPA	\$1,800	\$1,800
Return Acid Revenue	\$/T H3PO4 PPA	\$56	\$115
Other Revenue	\$/T H3PO4 PPA	\$194	-
Total Revenue	\$/T H3PO4 PPA	\$2,050	\$1,915
Net Profit	\$/T H3PO4 PPA	\$450	\$215
Gross margin	%	64%	34%

Pricing assumptions: Sulfur (\$400/T), Gypsum Management (\$40/T CaSO₄·2H₂O).

Travertine **PA** vs. Conventional Comparison

Phosphoric Acid Cost of Production		Travertine PA V2 ELX	Conventional PA
PA Nameplate	T/yr	690,00	690,000
PA Yield	%	0%	0%
Phosphate Rock	\$/T H3PO4 PA	\$188	\$188
Sulfuric Acid	\$/T H3PO4 PA	-	\$322
Electricity	\$/T H3PO4 PA	\$185	\$5
Steam	\$/T H3PO4 PA	\$30	\$20
Solvent	\$/T H3PO4 PA	-	-
Gypsum management	\$/T H3PO4 PA	-	\$152
Membranes	\$/T H3PO4 PA	\$89	-
Other OPEX	\$/T H3PO4 PA	\$76	\$26
Total OPEX	\$/T H3PO4 PA	\$568	\$712
Capital cost (15% ROI pre-tax)	\$/T H3PO4 PA	\$328	\$80
Total Cost of Production	\$/T H3PO4 PA	\$896	\$792
Phos Acid Revenue	\$/T H3PO4 PA	\$1,000	\$1,000
Return Acid Revenue	\$/T H3PO4 PA	-	-
Other Revenue	\$/T H3PO4 PA	\$197	-
Total Revenue	\$/T H3PO4 PA	\$1,197	\$1,000
Net Profit	\$/T H3PO4 PA	\$301	\$208
Gross margin		53%	29%

Pricing assumptions: Sulfur (\$400/T), Gypsum Management (\$40/T CaSO₄.2H₂O).

Basis of Conventional Costs: Fox River PEA.

Travertine **Core Process** vs Conventional Comparison

Phosphoric Acid Cost of Production		Travertine	Conventional SA
SA Nameplate	T/yr	1,082,262	1,242,095
Sulfur	\$/T H ₂ SO ₄	-	\$114
Electricity	\$/T H ₂ SO ₄	\$65	-
Steam	\$/T H ₂ SO ₄	\$51	(\$13)
Gypsum management	\$/T H ₂ SO ₄	-	\$69
Membranes	\$/T H ₂ SO ₄	\$58	-
Other OPEX	\$/T H ₂ SO ₄	\$29	\$10
Total OPEX	\$/T H ₂ SO ₄	\$203	\$180
Capital cost (12% ROI pre-tax)	\$/T H ₂ SO ₄	\$104	\$26
Total Cost of Production	\$/T H ₂ SO ₄	\$307	\$207
Sulfuric Acid Revenue	\$/T H ₂ SO ₄	\$200	\$200
Other Revenue	\$/T H ₂ SO ₄	\$130	-
Total Revenue	\$/T H ₂ SO ₄	\$330	\$200
Net Profit	\$/T H ₂ SO ₄	\$23	(\$7)
Gross margin		38%	10%

Pricing assumptions: Sulfur (\$350/T), Gypsum Management (\$40/T CaSO₄·2H₂O), Lime (\$200/T), Steam (\$12/T), Electricity (\$0.04/kWh).

Appendix 2

Performance fundamentals

Key heuristics for commercial design

Internal electrochemical testing

Polarization behavior,
including electrode kinetics

Impedance response,
component resistances

Acid / base production
during chronopotentiometry

Voltage during
chronopotentiometry

TEA input

Simulated cell voltage

Drives OpEx - power costs

Acid/base current efficiency

Drives CapEx & OpEx

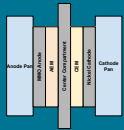
Predicted durability

Drives OpEx - replacement costs

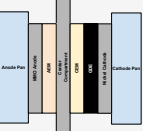
TEA output

**Levelized cost of
acid + base
($\$/\text{ton H}_2\text{SO}_4$)**

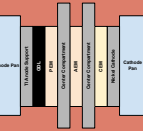
Electrolyzer architectures options



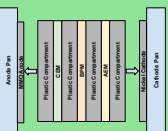
Three-compartment salt-splitting



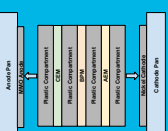
O₂ Looping



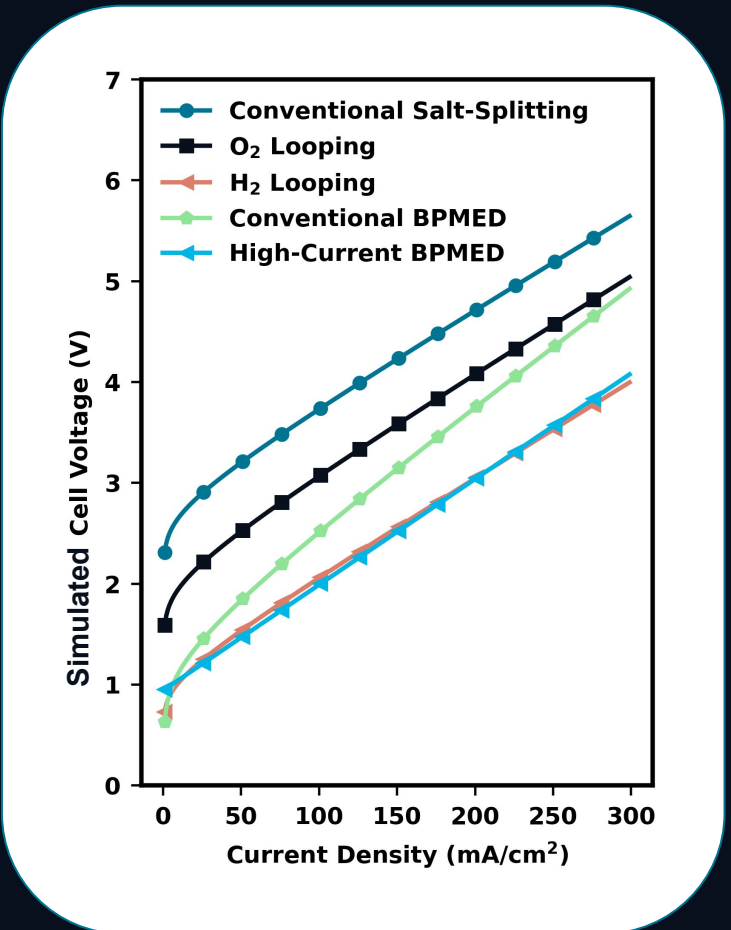
H₂ Looping



Low-current BPMED



High-current BPMED



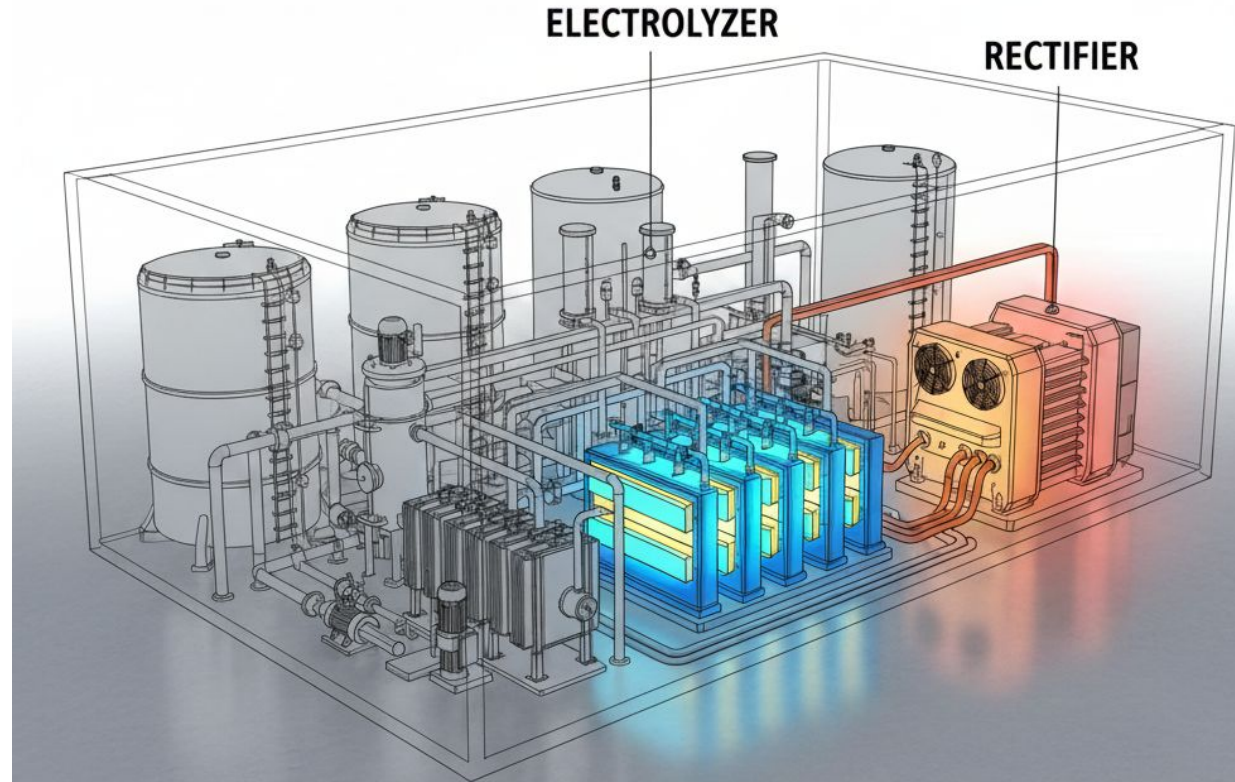
Subsystems Optimized in LCOP Analysis

In Scope:

- Electrolyzer
- Rectifier

Out of Scope:

- Building (Footprint)
- All BOP Beyond Stack
- Reconcentration Equip.



Goal of Techno-Economic Model:

For each architecture, determine an optimal configuration for fair comparison

Knowns

Components:

- Initial Cost
- Lifetime
- Integration Constraints

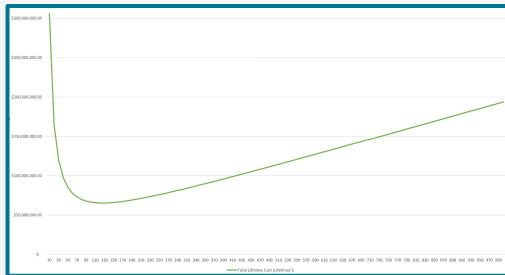
Performance Data:

- Polarization Curve
- Faradaic Efficiencies (80%)

Optimization

Generate Configuration For:
Lowest total $\$/T H_2SO_4$ Levelized

30 Year Plant Lifetime
10 kTPA Capacity



Configuration

$\$/T H_2SO_4$
(lifetime, levelized)

Current Density
(mA/cm²)

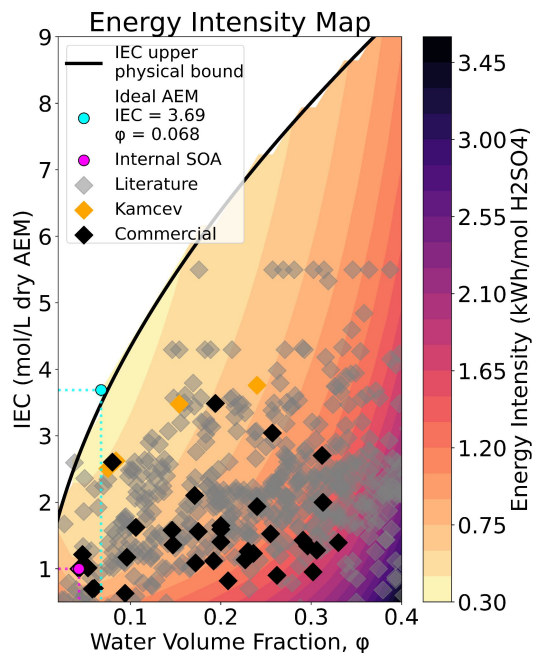
Stack Configuration
(# Cells, # Stacks)

Energy Consumption
(MW, MWh, kWh/T)

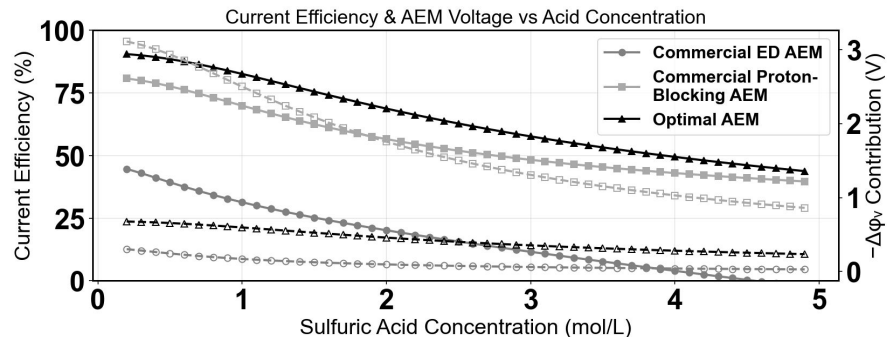
Capital Cost
(\$MM)

Service Costs
(Monthly Basis over 30 years)

Travertine AEM Development: Rational design for next-gen performance



- ✓ **Step 1.** Screened 25 state-of-art AEM materials and developed data-informed physics-based model (Nernst Planck) to predict AEM performance from material properties. (>100 experiments & proprietary model)
- ✓ **Step 2.** Isolated optimal material properties that minimize acid cost of production.
- **Step 3.** Perform TEA-informed rational design of AEM with manufacturing partner to synthesize our next-gen AEM



Risk Management

Type of Risk	Mitigation	Status
<i>Technical Risk</i>		
Core Process	30x scale up from Demo Plant (in operation)	Complete
Phosphoric Acid Process	Industry Standard Piloting at R&D Facility	Complete
Purification Process	Industry Standard Piloting at R&D Facility	Ongoing
Key Equipment	Off-the-Shelf Salt Splitting Stack	Complete
<i>Site Risk</i>		
Site Availability	3 site options	Complete
Power Availability	>2MW available at all sites	Complete
Power Price	<\$0.06/kWh at all sites	Complete
<i>Permitting</i>		
Federal	Early engagement with EPA	Ongoing
State & Local	Planned early engagement or colocation	Ongoing

Commercial Scale Up

2022-2023

In-House Pilot



**NAMEPLATE
CAPACITY**

2024-2025

DEMO PLANT - Core Process



Sulfuric: 180 T/yr
CO2 Sequestered: 80 T/yr

**PLANT
REVENUE**

NA

FINANCIALS

CAPEX: \$7M
\$3.2M Grant
\$7.5M Venture Debt



**+ Pilot testing of PPA Production*

2028

FOAK PLANT - PPA

FEL-1 Complete

PPA: 1,000 T/yr

~\$2.5M/yr
>90% from PPA

CAPEX: \$50M (+-30%)
GOALS:

- Large enough to enable tech licensing.
- Positive gross margin.

2029+

**PURIFIED
PHOS ACID PLANTS**

PPA: up to 300 kT/yr
Revenue: **\$570M/yr**
>80% from PPA
CAPEX: \$1.1B
IRR Unlevered: ~30%
NPV(12): \$1.6B

**COMMODITY
PHOS ACID PLANTS**

PA: 500 kT/yr
Revenue: **\$838M/yr**
>75% from PA
CAPEX: \$1.5B
IRR Unlevered: ~25%
NPV(12) \$1.7B

**COMMODITY
SULFURIC ACID PLANTS**

SA: 1.6 MTa
Revenue: **\$560M/yr**
~50% from SA
CAPEX: \$1.2B
IRR Unlevered: ~25%
NPV(12): \$0.8B

Travertine's **electrochemical salt-splitting** innovation

V1 - 2027

Small Commercial Plant

**PROTON (H⁺)
BLOCKING AEM**
H⁺ blocking

**ARCHITECTURE
SELECTION**
Reduced IED

V2 - 2029

Subsequent Commercial Plants

Advanced Innovation Areas

**REDUCED
OVERPOTENTIAL AT
HIGH CURRENT**
Depolarization

ENHANCED AEM
H⁺ blocking | Lower resistance

**IMPROVED FLOW AT
HIGH CURRENT**
Optimized flow distribution

Better, Cheaper, Faster

		Travertine PPA	Conventional PPA
PPA Nameplate	T/yr	100,000	100,000
Total OPEX	\$/T H3PO4 PPA	\$753	\$1,266
Capital cost (15% ROI pre-tax)	\$/T H3PO4 PPA	\$ 847	\$ 433
Total Cost of Production	\$/T H3PO4 PPA	\$1,599	\$1,699
Total Revenue	\$/T H3PO4 PPA	\$2,050	\$1,915
Net Profit	\$/T H3PO4 PPA	\$450	\$215
Gross Margin		64%	34%

Travertine Commercial Traction

Partnership, Supply, Offtake, and Investment Interest
from Up- and Down-Stream Industries

FERTILIZER | CEMENT | LFP BATTERIES | SPECIALTY FERTILIZER | CDR

PARTNERS



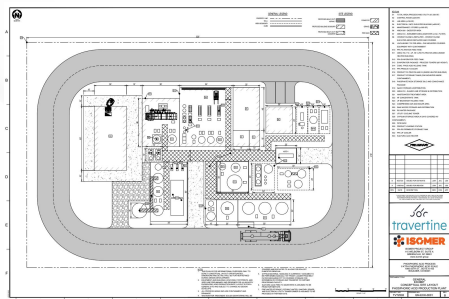
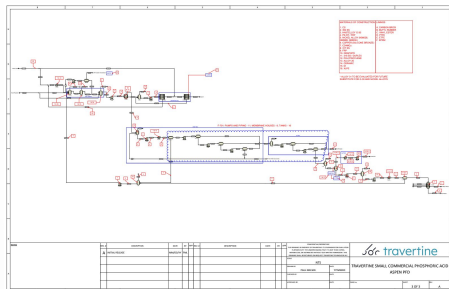
POTENTIAL DIRECT OFFTAKERS



Developing a **Licensing Package**

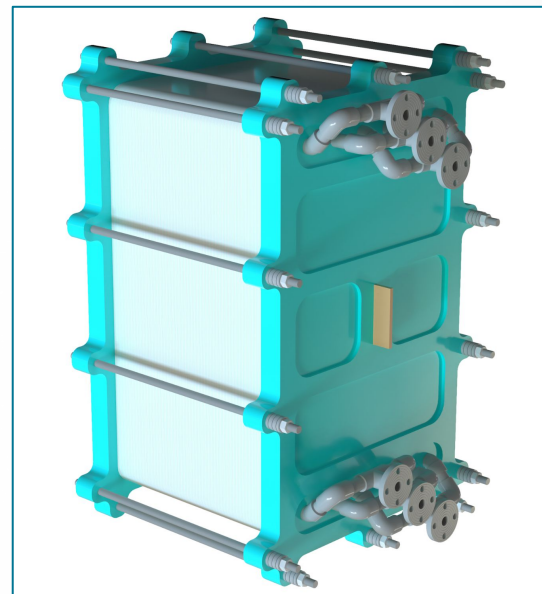
Patents pending

Proprietary Process & Preliminary Plant Design



TRAVERTINE TECHNOLOGIES - TVT2502 CORE PROCESS - ISAC - PHOSPHORIC ACID - FEL - ESTIMATE							2025-10-16 Rev. A
Description	Labor Hours	Labor Cost	Material Cost	Equipment Cost	Subcontract Cost	Total Cost	% Tot Job
1000 Description	0	0	0	0	0	0	0.00%
1100 Materials	4,500	\$51,810	\$3,000	0	\$175,210	\$229,020	1.90%
1200 Prep	0	0	0	0	\$300,000	\$300,000	2.55%
1300 Construction	2,275	\$26,106	\$10,000	0	0	\$36,106	0.31%
1400 Start & Project	0	0	0	0	0	\$149,125	1.27%
1500 Construction	0	0	0	0	\$490,000	\$490,000	4.19%
1600 Process Equipment	0	0	0	\$6,710,000	0	\$6,710,000	56.85%
1700 Process Equipment Total	0	0	0	0	\$6,710,000	\$6,710,000	56.85%
1800 Infrastructure	3,000	\$36,000	\$250,000	\$500,000	\$500,000	\$1,386,000	11.67%
1900 Infrastructure	3,000	\$36,000	\$250,000	\$500,000	\$500,000	\$1,386,000	11.67%
2000 Electrical	3,000	\$36,000	\$250,000	\$500,000	\$500,000	\$1,386,000	11.67%
Subtotal - DIRECT COSTS	10,275	\$133,916	\$1,250,000	\$11,210,000	\$10,000,000	\$22,593,916	19.00%
2100 Construction Support Labor	0	0	0	0	0	\$75,000	0.64%
2200 Construction Support Labor	0	0	0	0	0	\$75,000	0.64%
2300 Construction Support Labor	0	0	0	0	0	\$75,000	0.64%
2400 Construction Support Labor	0	0	0	0	0	\$75,000	0.64%
2500 Construction Support Labor	0	0	0	0	0	\$75,000	0.64%
2600 Construction Support Labor	0	0	0	0	0	\$75,000	0.64%
2700 Construction Support Labor	0	0	0	0	0	\$75,000	0.64%
2800 Construction Support Labor	0	0	0	0	0	\$75,000	0.64%
2900 Construction Support Labor	0	0	0	0	0	\$75,000	0.64%
3000 Construction Support Labor	0	0	0	0	0	\$75,000	0.64%
Subtotal - OTHER DIRECT COSTS	0	\$0	\$0	\$0	\$0	\$1,050,000	8.90%
3100 Fast Response - Included in Wage Rates	0	0	0	0	0	0	0.00%
3200 Fast Response - Included in Wage Rates	0	0	0	0	0	0	0.00%
3300 Fast Response - Included in Wage Rates	0	0	0	0	0	0	0.00%
3400 Fast Response - Included in Wage Rates	0	0	0	0	0	0	0.00%
3500 Fast Response - Included in Wage Rates	0	0	0	0	0	0	0.00%
3600 Fast Response - Included in Wage Rates	0	0	0	0	0	0	0.00%
3700 Fast Response - Included in Wage Rates	0	0	0	0	0	0	0.00%
3800 Fast Response - Included in Wage Rates	0	0	0	0	0	0	0.00%
3900 Fast Response - Included in Wage Rates	0	0	0	0	0	0	0.00%
4000 Fast Response - Included in Wage Rates	0	0	0	0	0	0	0.00%
Subtotal - CONSTRUCTION INDIRECT COSTS	0	\$100,000	\$0	\$0	\$0	\$100,000	0.86%
TOTAL CONSTRUCTION COSTS	10,275	\$133,916	\$1,250,000	\$11,210,000	\$10,000,000	\$23,693,916	20.00%
4100 Construction Management	0	0	0	0	\$400,000	\$400,000	3.40%
4200 Construction Management	0	0	0	0	\$400,000	\$400,000	3.40%
4300 Construction Management	0	0	0	0	\$400,000	\$400,000	3.40%
4400 Construction Management	0	0	0	0	\$400,000	\$400,000	3.40%
4500 Construction Management	0	0	0	0	\$400,000	\$400,000	3.40%
4600 Construction Management	0	0	0	0	\$400,000	\$400,000	3.40%
4700 Construction Management	0	0	0	0	\$400,000	\$400,000	3.40%
4800 Construction Management	0	0	0	0	\$400,000	\$400,000	3.40%
4900 Construction Management	0	0	0	0	\$400,000	\$400,000	3.40%
5000 Construction Management	0	0	0	0	\$400,000	\$400,000	3.40%
Subtotal - PROJECT INDIRECT COSTS	0	\$0	\$0	\$0	\$1,600,000	\$1,600,000	13.50%
GRAND TOTAL	10,275	\$133,916	\$1,250,000	\$11,210,000	\$11,600,000	\$25,293,916	100.00%

Proprietary Equipment



Better Unit Economics vs Conventional

Phosphoric Acid Cost of Production		Travertine PPA V2 ELX	Conventional PPA
PPA Nameplate	T/yr	100,000	100,000
PPA Yield	%	90%	69%
Phosphate Rock	\$/T H3PO4 PPA	\$209	\$273
Sulfuric Acid	\$/T H3PO4 PPA	-	\$468
Electricity	\$/T H3PO4 PPA	\$209	\$21
Steam	\$/T H3PO4 PPA	\$30	\$66
Solvent	\$/T H3PO4 PPA	-	\$5
Gypsum management	\$/T H3PO4 PPA	-	\$221
Membranes	\$/T H3PO4 PPA	\$100	-
Other OPEX	\$/T H3PO4 PPA	\$205	\$212
Total OPEX	\$/T H3PO4 PPA	\$753	\$1,266
Capital cost (15% ROI pre-tax)	\$/T H3PO4 PPA	\$ 847	\$ 433
Total Cost of Production	\$/T H3PO4 PPA	\$1,599	\$1,699
Purified Phos Acid Revenue	\$/T H3PO4 PPA	\$1,800	\$1,800
Return Acid Revenue	\$/T H3PO4 PPA	\$56	\$115
Other Revenue	\$/T H3PO4 PPA	\$194	-
Total Revenue	\$/T H3PO4 PPA	\$2,050	\$1,915
Net Profit	\$/T H3PO4 PPA	\$450	\$215
Gross margin	%	64%	34%

Pricing assumptions: Sulfur (\$400/T), Gypsum Management (\$40/T CaSO₄·2H₂O).

Basis of Conventional Costs:
Fox River PEA, Gilmour (2014). 88

Travertine **IP Portfolio**

6 patent families

7 pending US patent applications

10 pending foreign patent applications

Core Process

Electrochemical sulfuric acid recycling
combined with carbon capture and
mineralization

Critical Element Recovery

REE extraction, Ni extraction, lithium
extraction, etc

Salt Splitting Technology

Half-MEA for H₂-depolarized salt-splitting
Proprietary HC BMED cell design

Purified Phosphoric Acid Process

Phosphoric acid production and purification
using dilute sulfuric acid

Fertilizer Production

Ammonium salts production using
electrochemically recycled sulfuric acid

R&D Facilities (Boulder, CO)

21,000 sq ft world-class R&D facility

CORE PROCESS RD&D



Salt-splitting: pilot-scale cell



Metathesis circuit



Brine polish



CO₂ capture

PHOSPHORIC ACID RD&D



Phosphoric acid digestion & recrystallization



Membrane purification

ANALYTICAL LAB



Phosphate Licensing Players

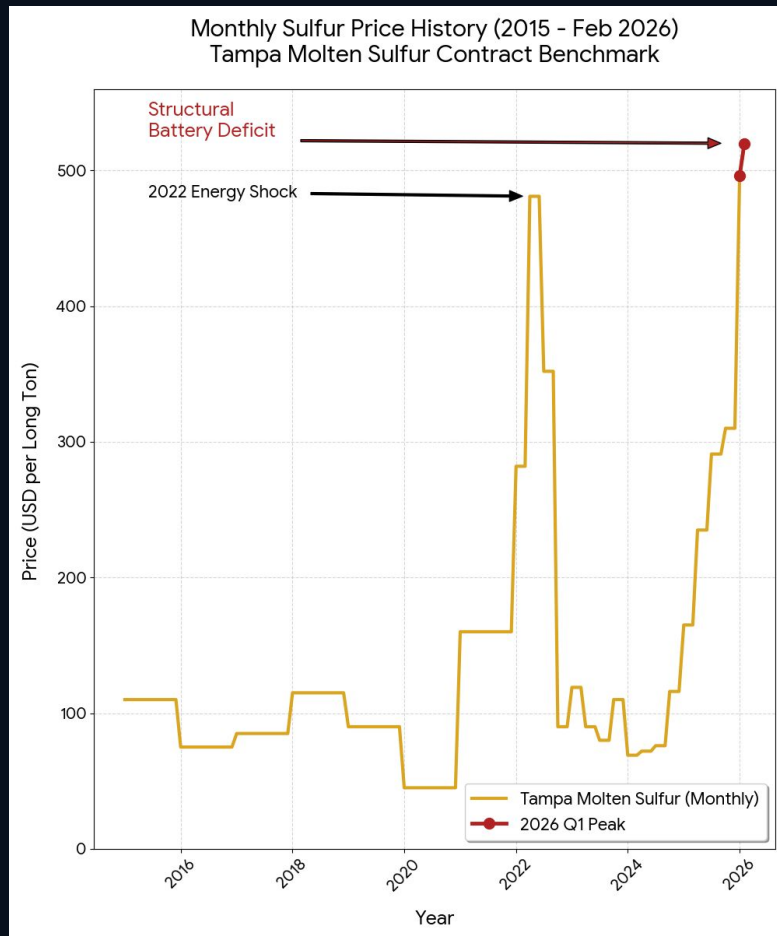
A few major licensors dominate the global phosphate industry.

Licensor	Licensed Technology	Major Customers	Approx. Licensed Capacity (Mtpa P_2O_5)*
Prayon	Dihydrate (DH), Hemihydrate (HH), HDH	OCF Group , ThyssenKrupp Uhde, Ballestra	18-22 Mtpa
JESA- Worley	Jacobs DH, HH, & Conversion	JESA (OCF Joint Venture), Ma'aden , Mosaic	12-15 Mtpa
Technip Energies	DIPLO, LCFC, UCEGO Filter	Andritz, TIFERT, PhosAgro	6-8 Mtpa
Wengfu Group	Solvent Extraction (PPA) / Wet Process	Ma'aden , Zijin Mining, Beluckey	2.5-4.0 Mtpa
Tenova	PPA Solvent Extraction	ICL Group , Mosaic	1.5-3 Mtpa
KEMWorks	Isothermal Reactor, Revamps	Nutrien, J.R. Simplot, Indorama	1.0-2.0 Mtpa

*Travertine is discussing licensing collaboration with **Prayon**, **Worley** and **Tenova**

Sulfur prices under pressure

Structural deficit is raising global prices due to uptick in battery supply chain demand.



Core Process Demonstration Plant



Commercial scale electrolyzer.
100x from in-house pilot.

Within <1% of TIC Budget

Start Up: November 2025 (only 6 weeks
delayed from plan)

Making On Spec Products

Sulfuric Acid: 180 T/yr

Calcium Carbonate: 180 T/yr

CO2 Sequestered: 80 T/yr

TIC:
\$7.2M

\$3.2M
Grant

\$7.5M
Venture Debt



BUILDERS VISION

Rochester, New York

travertine

Plant Scale Up Economics

	Demo Plant	Small Commercial PPA Plant	Large Commercial PPA Plant	Large Commodity PA Plant
Nameplate PPA	NA			
Nameplate SA	180			
Scale factor (x)	100x			
Power (MW)	<1			
TIC (\$M)	\$7.2M			
Revenue				
OPEX				
Net Revenue				
IRR				

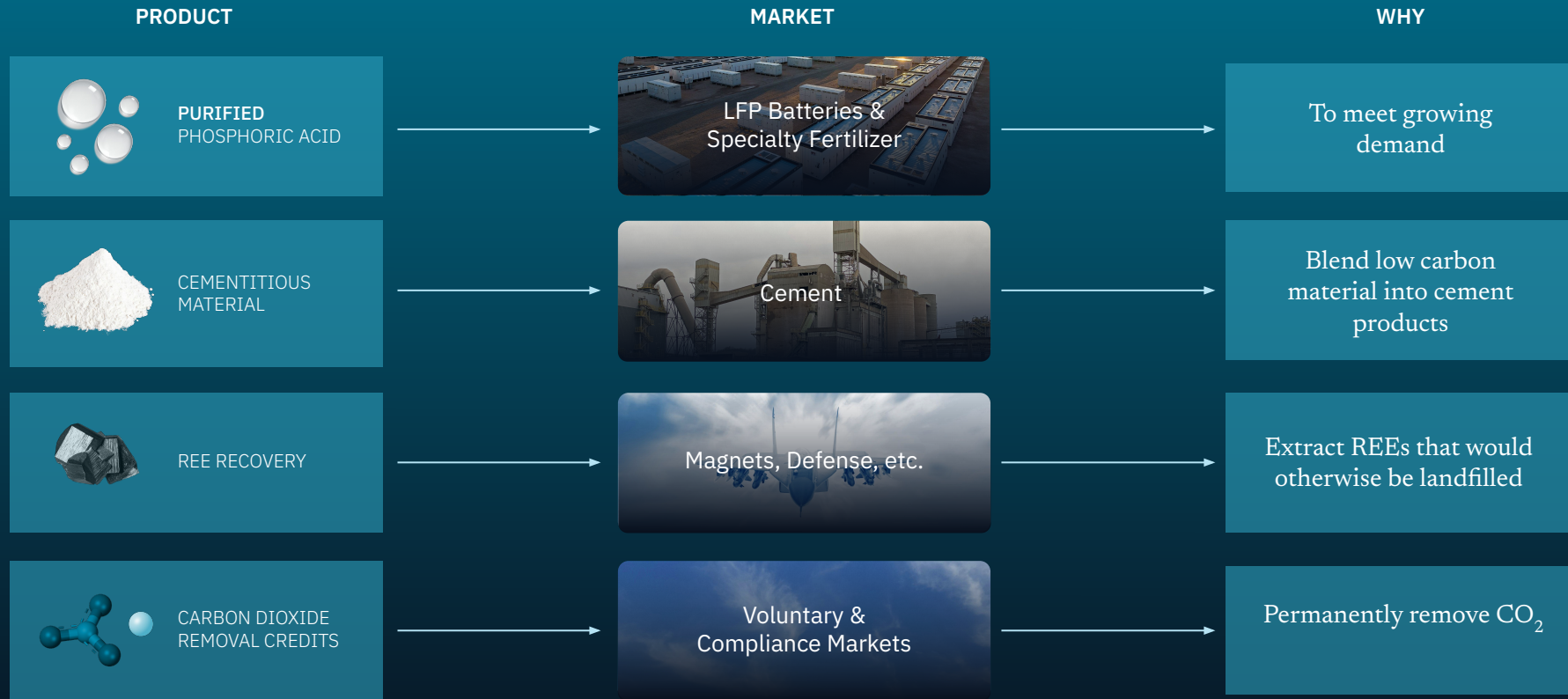
Appendix 2

Travertine vs Conventional Comparison

Phosphoric Acid Cost of Production			Travertine PPA V2 ELX	Conventional PPA
PPA Nameplate	T/yr		100,000	100,000
PPA Yield	%		80%	69%
Phosphate Rock	\$/T H3PO4 PPA		\$ 484	\$ 563
Sulfuric Acid	\$/T H3PO4 PPA		-	\$ 282
Electricity	\$/T H3PO4 PPA		\$ 332	\$ 21
Steam	\$/T H3PO4 PPA		-	\$ 53
Solvent	\$/T H3PO4 PPA		-	\$ 48
Gypsum management	\$/T H3PO4 PPA		-	\$ 175
Membranes	\$/T H3PO4 PPA		\$ 80	-
Other OPEX	\$/T H3PO4 PPA		\$ 237	\$ 106
Total OPEX	\$/T H3PO4 PPA		\$ 1,134	\$ 1,248
Depreciation	\$/T H3PO4 PPA		\$ 238	\$ 131
Total Cost of Production	\$/T H3PO4 PPA		\$ 1,371	\$ 1,379
Other Revenue	\$/T H3PO4 PPA		\$ 142	\$ -
Purified Phos Acid Revenue	\$/T H3PO4 PPA		\$ 1,800	\$ 1,800
Return Acid Revenue	\$/T H3PO4 PPA		\$ 100	\$ 174
Total Revenue	\$/T H3PO4 PPA		\$ 2,042	\$ 1,974
Margin			44%	37%

Basis of Conventional Plant Costs: Fox River PEA, Gilmour (2014). Electricity \$0.05/kWh. V1 (3000 mA/cm², 70% CE, 5.5V), V2 (3000 mA/cm², 80% CE, 3.1V), \$30/T gypsum storage, \$165/T for 67% BPL rock, CDR \$200/T

Products



Plant Scale Up

	2025 DEMONSTRATION PLANT	2028 SMALL COMMERCIAL PPA PLANT	2029+ LARGE COMMERCIAL PPA PLANT
NAMEPLATE CAPACITY	Sulfuric: 125 T/yr CO2 Sequestered: 56 T/yr	PPA: 10,000 T/yr CO2 Sequestered: 7500 T/yr	PPA: 100 T/yr CO2 Sequestered: 75 T/yr
EST. PLANT REVENUE (Price x Production)	\$50k/yr	\$21M/yr >90% from PPA	\$208M/yr >90% from PPA
FINANCIALS	CAPEX: \$7M \$3.2M Grant \$7.5M Venture Debt  <i>*+ Pilot testing of PPA Production</i>	CAPEX: \$109M (+-50%) Potential Funding: FOAK Project Finance, Grants, Equity, Commercial Partners	CAPEX: \$500M (\$400-600M) Potential Funding: Equity, Bank Debt, Bonds, Project Financing, Grants/Incentives



Travertine JV

Small Commercial Plant

PLANT SPECIFICATION

TIC:

\$111M (+/-50%)

IRR EST:

~30%

POWER:

8 MW

OPEX:

\$XXM /yr

LAND:

6 Acres

Revenue:

\$53M /yr

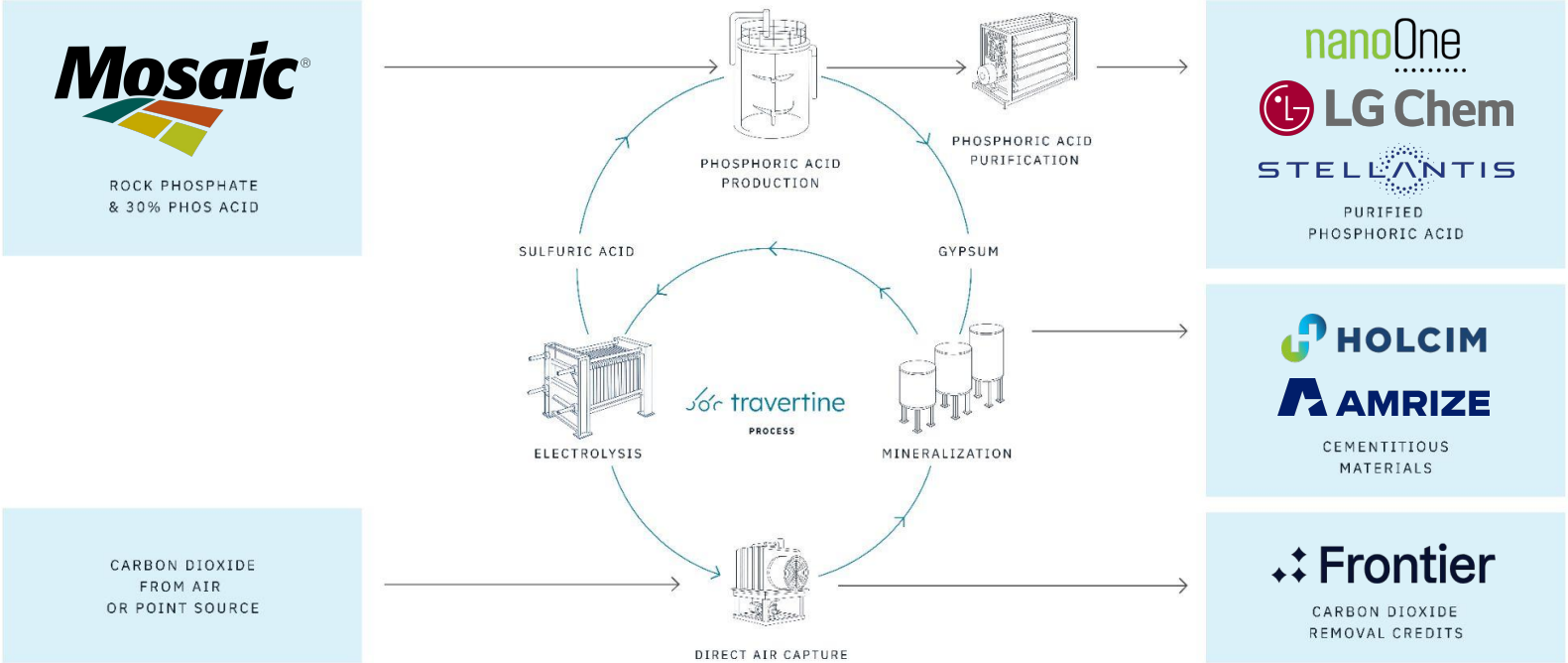
Inputs:

- 15kTa Rock P Ore
- 24 kTa Commodity Phosphoric Acid
- CO₂ from Air & Point Source

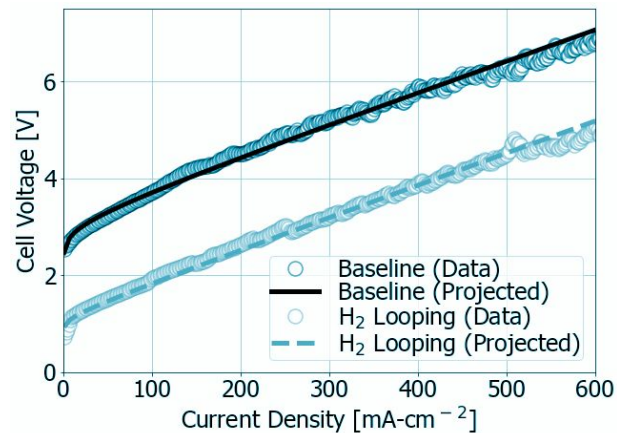
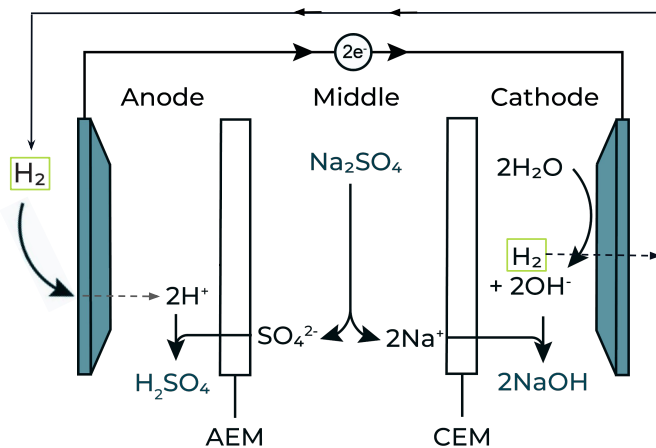
Products:

- 30kTa Purified Phosphoric Acid
- 11kT/yr Calcium Carbonate SCM
- 3.6 kT/yr Carbon Dioxide Removal & Point Source Capture (CO₂e)

Prospective Partners



Novel Half-Mea Cell for Electrode Depolarization

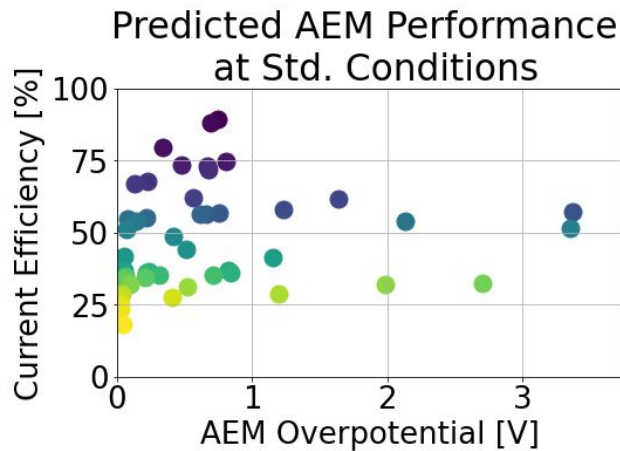


THERMODYNAMICS V_0 ↓ $2.25 \rightarrow 0.91$ V

ANODE KINETICS η_{Anode} ↓ $0.8 \rightarrow 0.15$ V

Energy intensity and cell voltage reduced with
H₂ Looping (@ 300 mA·cm⁻²):
5.1 → 3.3 V

Physics-Based Membrane Selection & Development

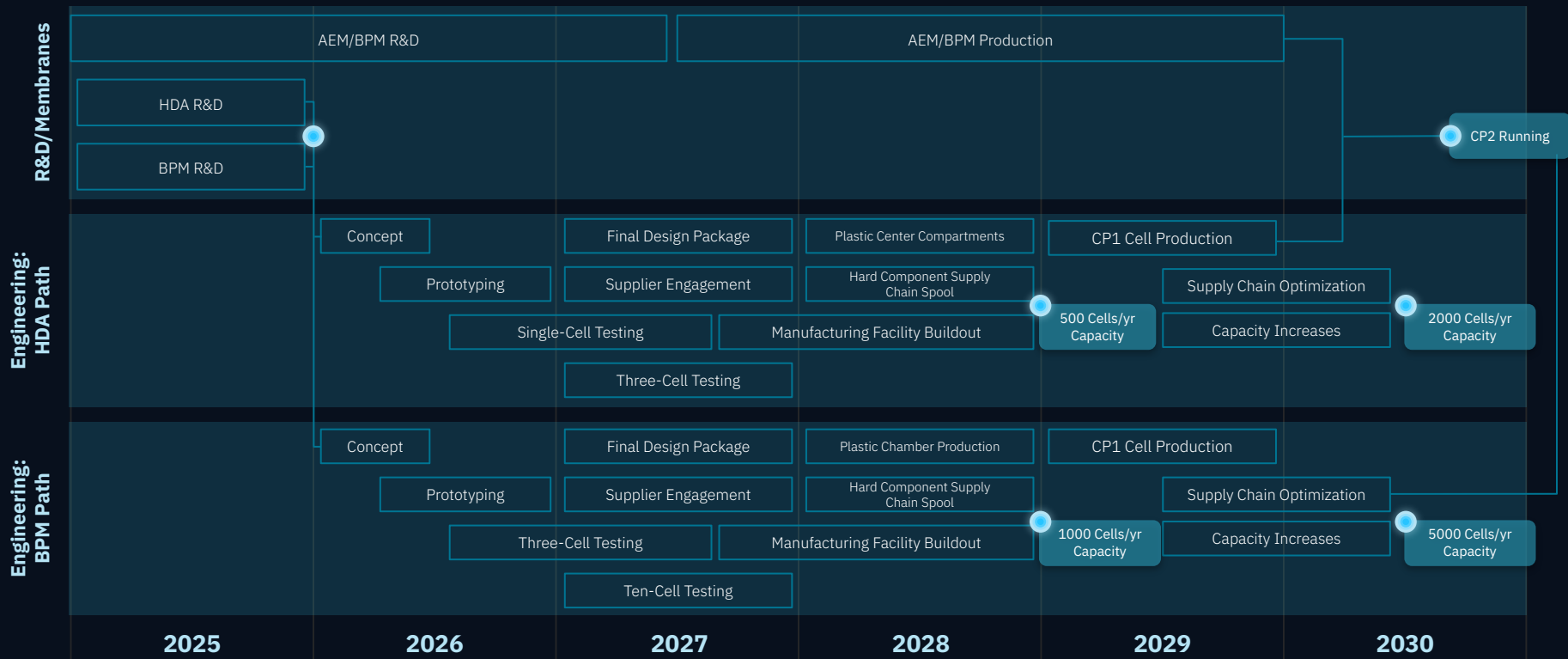


* = From Kamcev Group

** = From MFG. Reported AEM properties

We combine modeling, simulation, experimentation, and data processing to identify viable commercial membranes and advance next-generation AEM development.

Electrolyzer Roadmap: Internal V2 Manufacturing

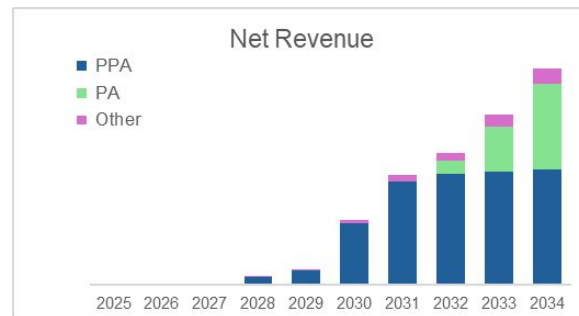
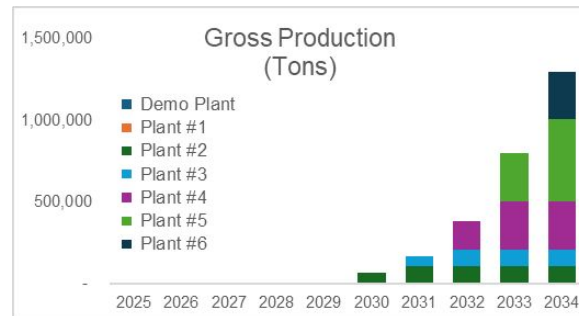


Business Model & **Optionality**

Business model is planned to evolve from:

OWN-OPERATE → JOINT VENTURES → LICENSING

- Allowing Travertine to manage the **capital efficiency** and **operational complexities**
- Travertine will partner with and/or JV with the industry leading phosphate and cement producers, US and international
- Production growth from **specialty PPA plants** and to **commodity PA plants**
- Technology innovations will **lower unit costs** and allow entry into **commodity markets**



Travertine's **electrolyzer innovation**

Advanced Innovation Areas

ELECTROLYZER V1 - 2027

First Commercial Plant

PROTON (H⁺) BLOCKING AEM

+20% FE
7 V / 60% CE
0.62 kWh/mol
H₂SO₄

CENTER COMPARTMENT REDESIGN Reduced IED

+20% FE
7 V / 60% CE
0.62 kWh/mol
H₂SO₄

ELECTROLYZER V2 - 2029

Subsequent Commercial Plants

DEPOLARIZED ELECTRODES Reduced Overpotential

+20% FE
7 V / 60% CE
0.62 kWh/mol
H₂SO₄

ENHANCED AEM H⁺ blocking | Lower resistance

+20% FE
7 V / 60% CE
0.62 kWh/mol
H₂SO₄

IMPROVED PRODUCT ACID REMOVAL Reduced IED

+20% FE
7 V / 60% CE
0.62 kWh/mol
H₂SO₄

\$/T
H₂SO₄ + 2NaOH

\$255

\$200

\$146

\$120

\$113

Commercial **Traction**

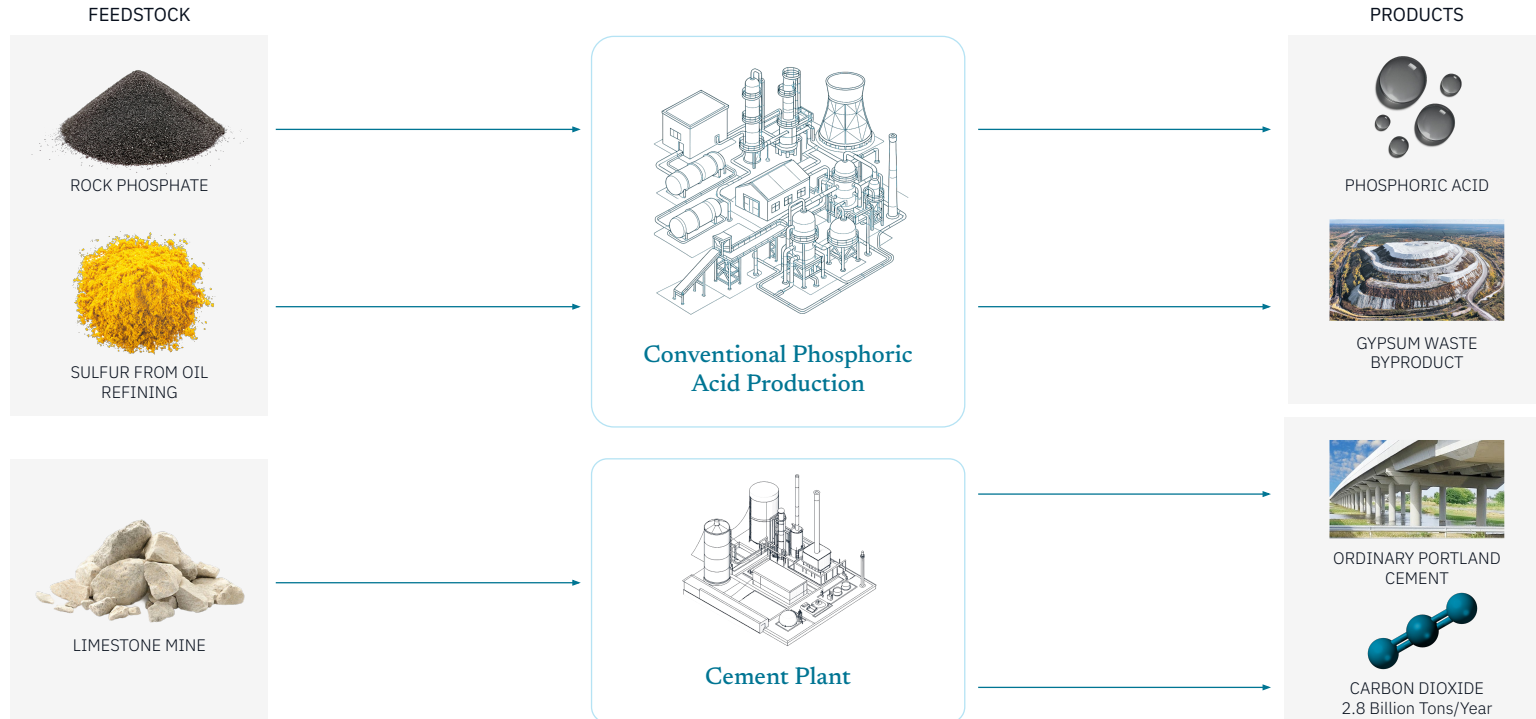
3 Years of Testwork with Customers

The BHP logo consists of the letters "BHP" in a bold, orange, sans-serif font.The Ioneer logo features the word "ioneer" in a lowercase, sans-serif font. The "i" is green, and the "oneer" is blue.The SABIN Metal Corporation logo features the word "SABIN" in a bold, yellow, sans-serif font, with "Metal Corporation" in a smaller, yellow, sans-serif font below it.The Lithium Americas logo features the word "Lithium" in a bold, black, sans-serif font, with "Americas" in a smaller, black, sans-serif font below it.The TALON METALS CORP logo features the word "TALON" in a large, blue, serif font, with "METALS CORP" in a smaller, blue, sans-serif font below it.

Supply and offtake agreements are in active discussion on specific projects

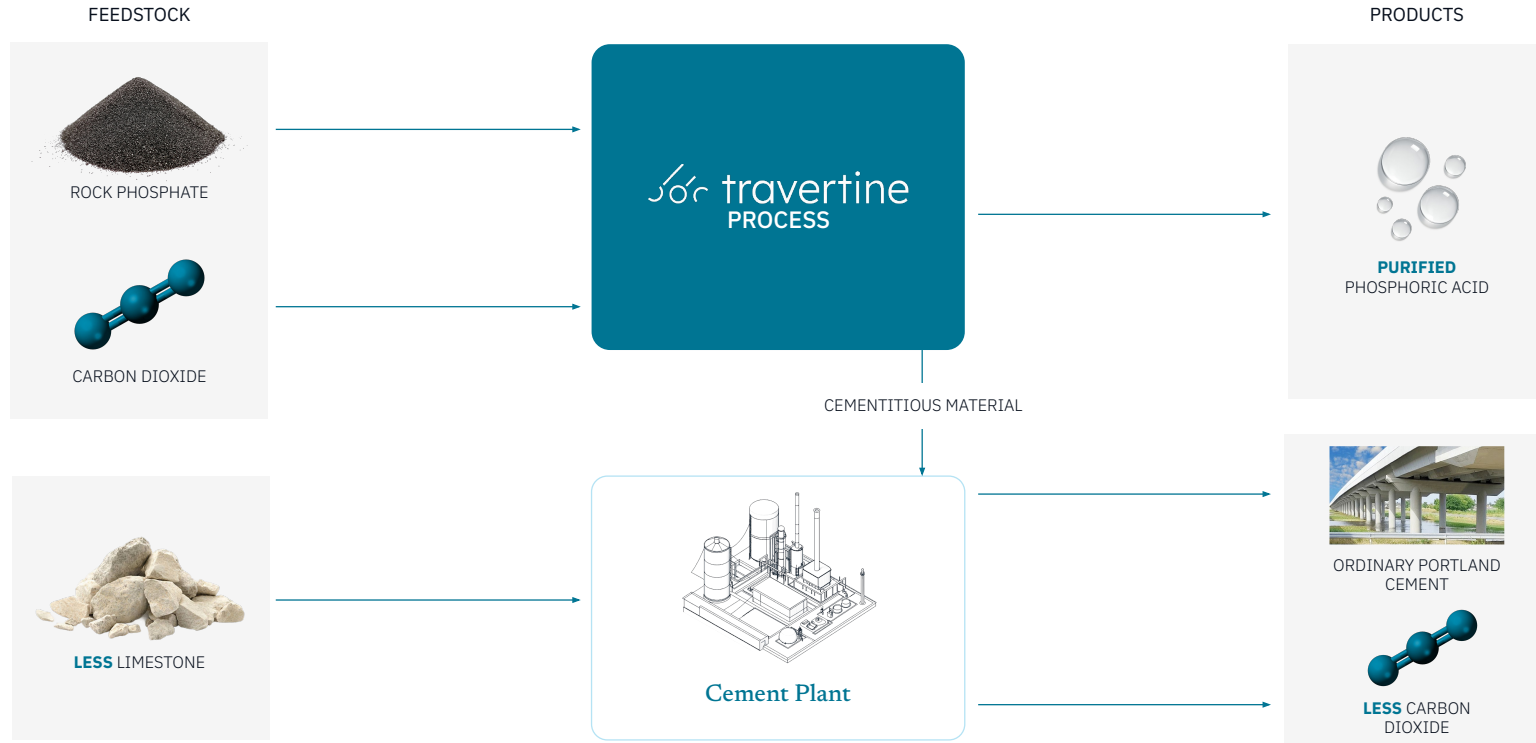
Conventional production **generates gigatons of waste**

A new U.S. phosphate plant has not been built since the 1970s because new waste facilities can't be permitted.



Travertine creates **more value** **with less waste**

Our next-gen electrochemical process completely converts phosphate ore into essential products, maximizing value while eliminating waste.



Plant Scale Up

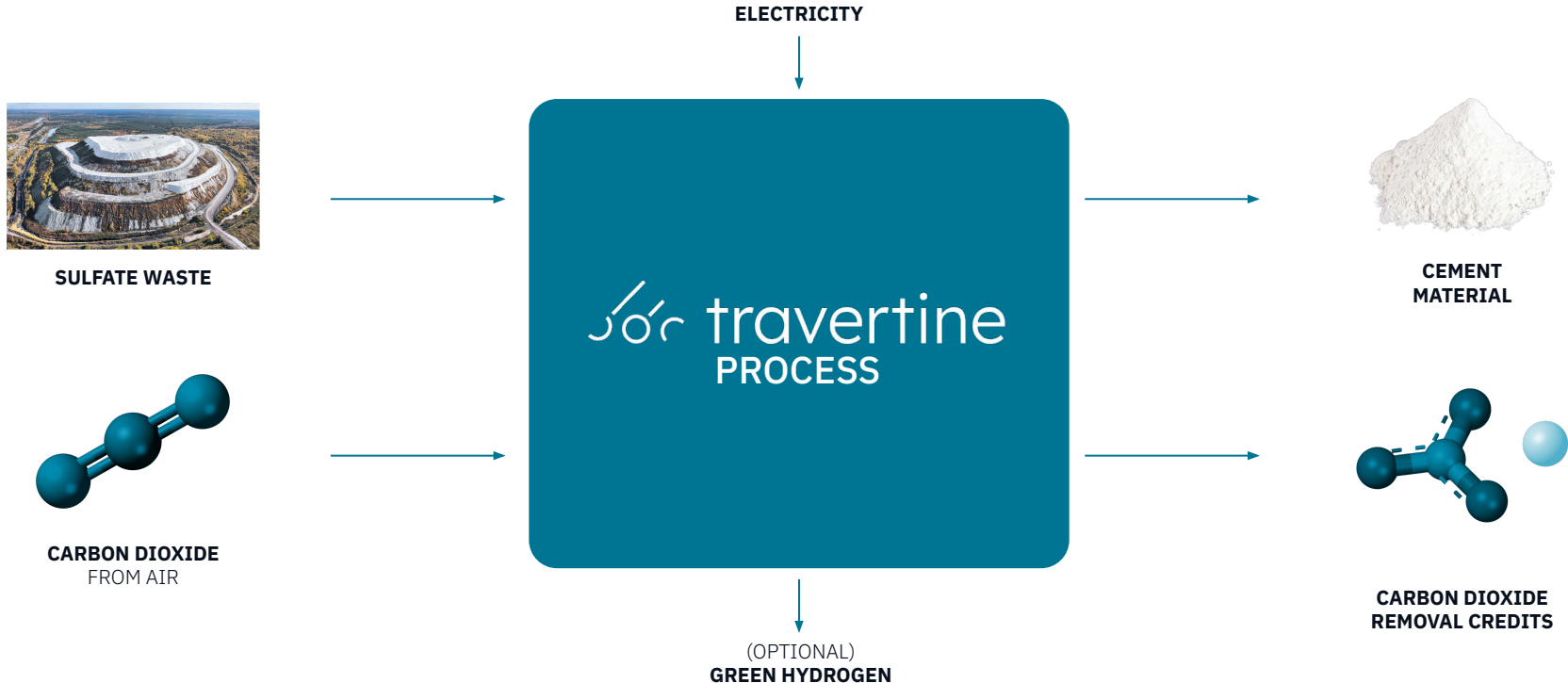
	2025 DEMONSTRATION PLANT	2028 SMALL COMMERCIAL PPA PLANT	2029+ LARGE COMMERCIAL PPA PLANT	2030+ LARGE COMMODITY PHOS ACID PLANT
NAMEPLATE CAPACITY	Sulfuric: 125 T/yr CO2 Sequestered: 56 T/yr	PPA: 10,000 T/yr CO2 Sequestered: 7500 T/yr	PPA: 100 kT/yr CO2 Sequestered: 75 kT/yr	PA: 500 kT/yr CO2 Sequestered: 375 T/yr
EST. PLANT REVENUE (Price x Production)	NA	\$21M/yr >90% from PPA	\$184M/yr >90% from PPA	\$575M/yr >90% from PA
FINANCIALS	CAPEX: \$7M \$3.2M Grant \$7.5M Venture Debt  <i>*+ Pilot testing of PPA Production</i>	CAPEX: \$109M (+-50%) IRR: 5-9% Potential Funding: FOAK Project Finance, Grants, Equity, Commercial Partners	CAPEX: \$500M (\$400-600M) IRR: ~30% Potential Funding: Equity, Bank Debt, Bonds, Project Financing OR Licensing	CAPEX: \$1.3B (\$700-1500M) IRR: ~27% Potential Funding: NA. Tech Licensing and Equipment Sales to Producers.

Plant Scale Up

	2025 DEMONSTRATION PLANT	2028 SMALL COMMERCIAL PPA PLANT	2029+ LARGE COMMERCIAL PPA PLANT	2030+ LARGE COMMODITY PHOS ACID PLANT
NAMEPLATE CAPACITY	Sulfuric: 180 T/yr CO2 Sequestered: 81 T/yr	PPA: 6,000 T/yr CO2 Sequestered: 4,500 T/yr	PPA: 100,000 T/yr CO2 Sequestered: 75,000 T/yr	PA: 500,000 T/yr CO2 Sequestered: 375,000 T/yr
EST. PLANT REVENUE	NA	\$20 M/yr >90% from PPA	\$185 M/yr >90% from PPA	\$575 M/yr >90% from PA
SCALING FACTOR	100x from In-House Pilot	60x from Demo	16x	5x

Travertine creates **more value** **with less waste**

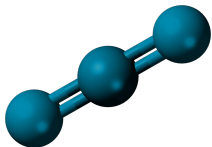
Our next-gen electrochemical process completely converts sulfate waste to essential products, maximizing value while eliminating waste.



Critical Element Extraction



SULFATE WASTE



**CARBON DIOXIDE
FROM AIR**

ELECTRICITY



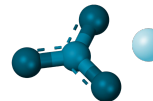
**GREEN HYDROGEN
(optional)**



SULFURIC ACID



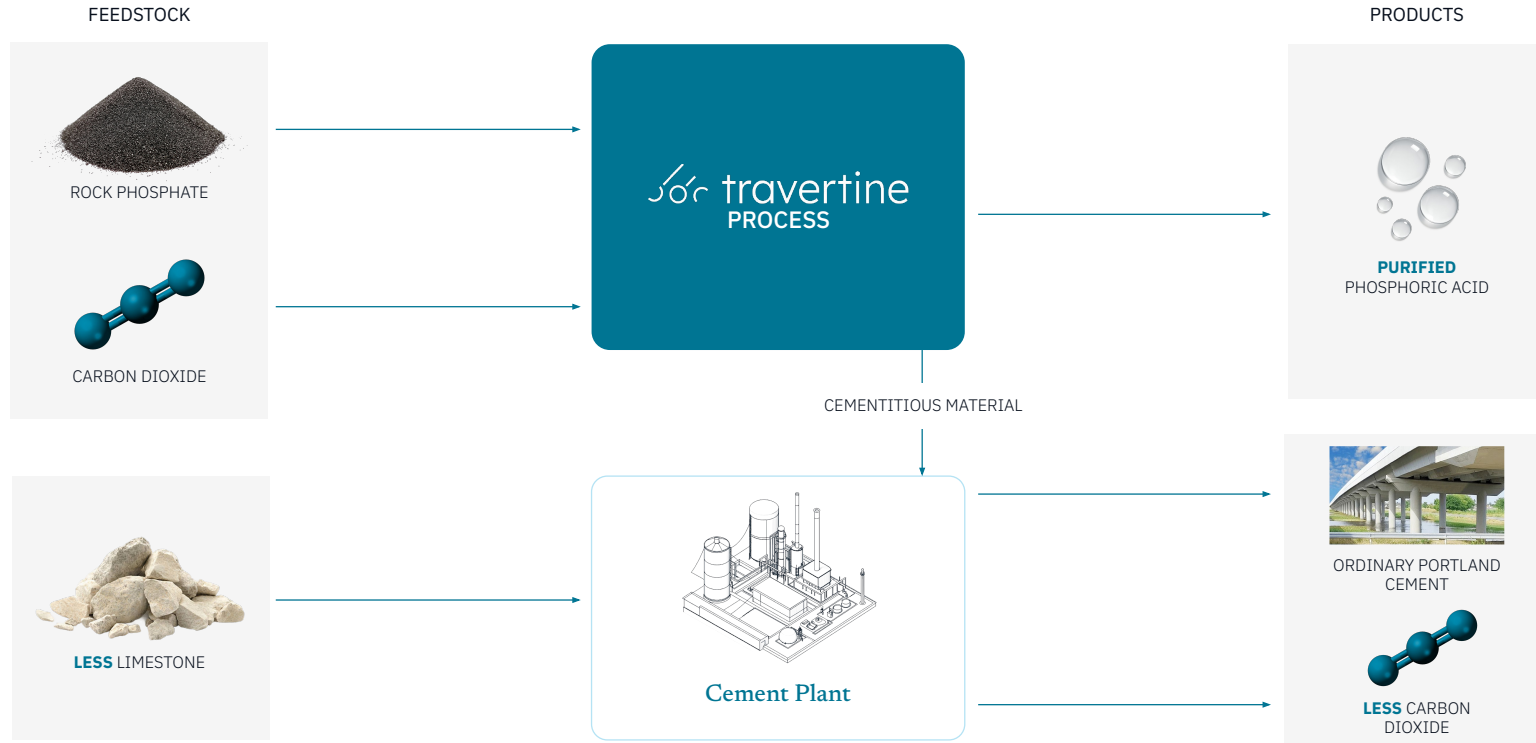
**CEMENTITIOUS
MATERIAL**



**CARBON DIOXIDE
REMOVAL CREDITS**

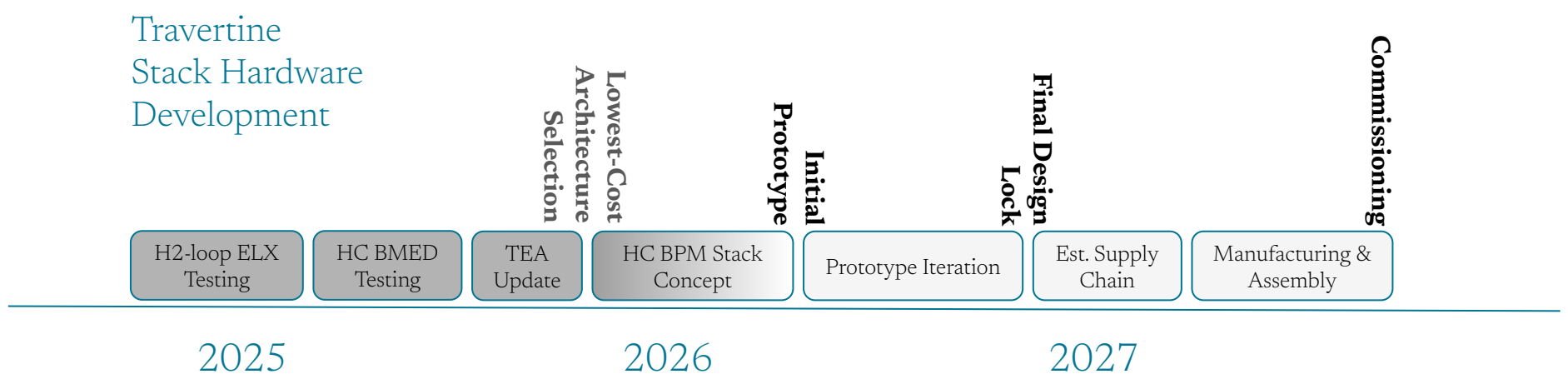
Travertine creates **more value** **with less waste**

Our next-gen electrochemical process completely converts phosphate ore into essential products, maximizing value while eliminating waste.



V2 Commercial Subsystem: Strategy

Develop In-House, HC BPM stack, in partnership with HC BPM Companies



Travertine Overview: Next-Generation Critical Minerals

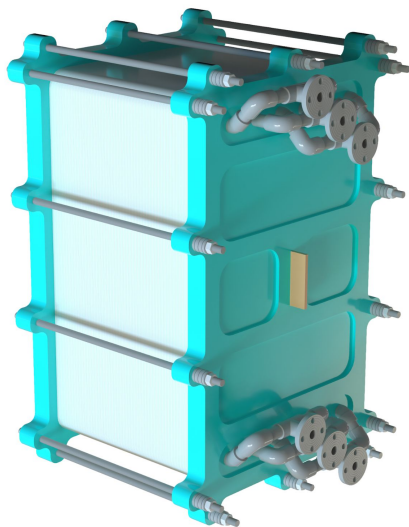
- **TECH:** Next-gen electrochemical process eliminates sulfate waste and sequesters carbon dioxide.
- **MARKET:** Addresses a growing, multi-billion dollar market for critical materials.
- **GO-TO-MARKET:** Proprietary process for battery-grade purified phosphoric acid (PPA) and cement materials.
- **COMMERCIAL READINESS:** Demonstration plant is operational with a small commercial plant targeted for 2028.
- **PROJECTS:** Signed MOUs are in place for Project Yellowstone, a 30k T/yr PPA plant.
- **STRATEGIC LINK TO KINGDOM:** Paid testwork ongoing with major phosphate producer in Saudi Arabia



Company Summary

- Spun out of UC Berkeley in **2022**
- Now **38** employees
- **22,000** sf world-class critical minerals **RD&D and pilot facility** in Colorado, USA
- Demo **nameplate 180Tpa** sulfuric acid (100% basis)
- **Recipient of grants** including US Department of Energy - ARPA-E

Our industry-leading salt-splitting stack is the **missing link in the sulfur-free value chain.**



STACK METRICS

- **0.15 kWh/mol** H_2SO_4
- Up to **350 mA/cm²**
- **80+% CE** at **>1.5 M** H_2SO_4
and **>2 M** NaOH
- **Modular** design with DFM
optimization for cost

← **Lowest energy consumption** for concentrated acid and base

← Highest current & power density for **lowest CAPEX + OPEX + footprint**

← **High concentration + low impurity** for critical mineral extraction

Travertine was founded in 2022 out of **UC Berkeley** & has **rapidly scaled** from the lab to Demo.

2022-24

Laboratory Pilot
Boulder, CO

Validated process for lithium,
phosphate, nickel



2025

Core Process Pilot
Ontario, NY

Derisked scale up with
commercial equipment



2026-28

Phosphate Pilot
Ontario, NY Bolt-On

Series B+ qualification,
Complete commercial FEED

2029

Small Commercial
Louisiana

Commercial-scale stack
modules, NPV positive plant



2030+

Commercial
Louisiana, Florida, Arizona
etc.
License Core Process and
Phosphate Process
technology to majors



Gross Margins of Travertine Plants are 1.5x conventional.

	Conventional Purified Phos Acid (\$/T PPA)	Travertine Purified Phos Acid (\$/T PPA)	Significance
Total Revenue	\$1,915	\$2,050	Higher revenue from sale of co-product
Total OPEX	\$1,138	\$753	Lower OPEX (no sulfur input & no gypsum management cost)
Capital Cost (15% ROI)	\$ 433	\$ 847	TIC cost-down effort in-progress
Total Cost of Production	\$1,571	\$1,599	
Net Profit	\$344	\$450	
Gross Margin	41%	64%	Industry-leading gross margin

Travertine electrochemically **recycles sulfuric acid** & produces **low-carbon cement co-products**.

