



ALTERNATIVE ENERGY MATERIALS

Revolutionizing Energy Storage with Green Ammonia

2 Problems, 1 Solution

Making green backup power affordable, sustainable, and long-duration

Problem: Two Critical Energy Challenges



Problem 1: Electric Grid Reliability

- Utility substations lack resilient backup
- Data centers need days/weeks of backup
- Backup technology limited to hours, but outages last days
 - Li-ion provides only 4-hour duration
 - Diesel generators = emissions + fuel logistics
- Renewable power curtailment



Problem 2: Fertilizer Crisis

- Excessive emissions: >1% global CO₂
- Excessive cost: \$750-\$1700 /ton
- Supply chain vulnerabilities
- Long-distance transportation costs

Solution: On-site Reversible Ammonia Production

One System. Two Revenue Streams. Zero Emissions.



For Utilities

100% cost savings
360-hour backup
Renewable portfolio



For Farmers

20% cost savings
Local production
Reliable supply

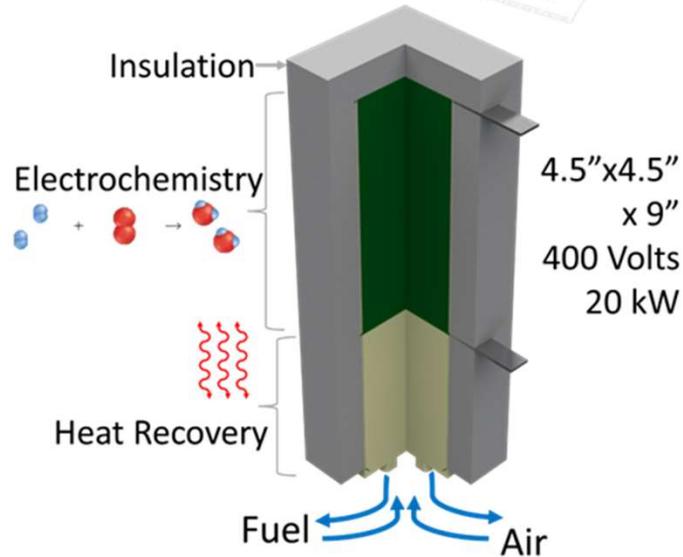
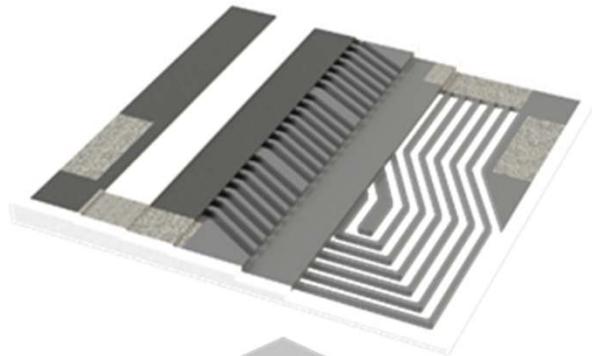


For Investors

80% Gross Margins
Dual revenue
Large follow-on markets

AEM's Technology Breakthrough

Reactor Miniaturization ~ 2,000 layers



Electric Power → NH₃ Synthesis → Storage →
Storage → Reversible Electric Power



70% Conversion Efficiency

Integrated electrochemistry & thermochemistry



Reversible Operation

On-demand distributed power



No Hydrogen Compression

Simple, modular design for rapid deployment



Patented Technology

Pressure-tolerant electrode (US 11,594,738 B2)

Ammonia Storage vs Li-Ion Batteries

Feature	AEM	Li-ion Batteries
Energy Density	4,300 Wh/L	200-400 Wh/L
Duration	Days to weeks (360+ hours)	1-4 hours
Lifespan	20 yr, 10,000 cycles	10 yr, 5,000 cycles
Safety	Non-flammable	Thermal runaway risk
Footprint (2.5MW/900MWh)	5,000 ft ²	30,000 ft ²
Total Cost	\$15M	\$42M
Materials	Earth Abundant Materials	Critical materials with mining challenges

Protected Innovation: Patented Technology

US Patent 11,594,738 B2: Pressure-Tolerant Electrode Technology

High-Pressure Electrolysis

Replace costly hydrogen compression with simple water pumps

Cost reduction + efficiency gain

Thermal Integration

Recover synthesis waste heat for steam production

70% total conversion efficiency

Reinforcing Synergy

Higher pressure means 2x channels & 2x activity = 4x power

Compact, scalable design

Operational Flexibility

95% less mass enables rapid cycling to follow renewables

Perfect for wind/solar integration

Multiple Industrial Use Cases



Grid-connected energy storage for critical power, renewable firming and fertilizer production



Zero-emission Diesel fuel replacement for ships, trucks and trains

Opportunity to Scale

Total Addressable Market
\$600B/yr

Serviceable Available Market (US)
\$115B/yr

Serviceable Obtainable Market
\$1.3B/yr

Gen 1 System @
\$75M/yr

- Critical Power
- Ag Fertilizer
- Renewable Firming
- Heavy Transport

Go-To-Market Strategy: Eastern Washington



Eastern Washington as Launch Market

- Stable, recurring agricultural off-take at-scale
- Renewable energy rich
- Capacity constrained grid
- Utility demand for 360+ hour reliability at 100+ substations
- Utilities motivated by renewable compliance criteria



263,000 tons

ammonia fertilizer demand



\$200M+

fertilizer market



320 MW, 2 TWh

surplus renewable energy



600k tons

Potential CO₂ avoidance

Unit Economics: Path to Profitability

Production Cost

Washington Wholesale Energy:
\$40/MWh 6500 hr/yr

$\$40 \times 7.5 \text{ MWh/ton} = \$300/\text{ton}$

Revenue Streams

Wholesale Anhydrous Ammonia:
\$400-600/ton

Backup Power: \$125 - \$400 per MWh

Annual Utility Backup Operating Profile

Ammonia off-take: 6,500 hrs/yr ~ 2,000 tons @ \$500

Ammonia stockpiling: 850 hrs/yr ~ 300 ton on-site

Backup power: 500 hrs/yr ~ 1200 MWh at >\$250/MWh

**\$1.3M/yr
revenue**

Development Roadmap

Validation

2026-2027

- Brick Manufacturing Optimization
- Brick Performance Testing
- “Brick House” BoP Design

Pilot

2028-2029

- Integrated System Validation
- 1st Utility Scale Field Deployment
- Lean Manufacturing Development

Production

2030+

- 50+ Systems/yr Production Capacity
- Widespread Utility Deployment
- Market expansion into Heavy Transport

Proven Leadership



Dr. Dustin McLarty

Chief Technology Officer

- 18 yrs Solid-Oxide Tech • 25+ papers
- 1000+ citations • \$4M+ grants
- Tenured Professor • Fulbright Fellow
- Former US National Team and Pro Triathlete



Christopher E. Wood

Chief Executive Officer

- 30+ yrs operator/investor
- Lean/TPS expert
- 30+ yrs key roll in startup ramps
- Wheat Farm with 1000t NH₃/yr

World-Class Advisory Team



Bill Fuglevand

Former CTO of CarbonQuest and founder of Avista Labs, inventor on 20+ patents specializing in hydrogen, CO₂ capture, and renewable energy innovation.



John Gibson

Chief R&D Engineer at Avista Utilities, leading grid innovation initiatives including DMS automation, energy storage, microgrids, and Spokane's net-zero eco-district development.



David Peterson

Former Electrolysis Team Lead and Hydrogen Production Program Manager, Hydrogen and Fuel Cell Technologies Office, U.S. Department of Energy



Jack Brouwer

Director of the Clean Energy Institute at the University of California, Irvine and Chancellor's Fellow of Mechanical and Aerospace, Civil and Environmental, and Chemical and Biomolecular Engineering

Why Invest in AEM?



Market Leadership

First-mover in distributed green ammonia production + storage



Protected Technology

Patented pressure-tolerant electrodes with demonstrated advantages



Dual Revenue Streams

Equipment sales & ammonia off-take



Sustainability Leader

Enable zero-carbon agriculture and grid infrastructure



Infrastructure-Grade

20-year assets with utility backing and guaranteed returns



Massive TAM

\$600B total market with clear path to cash-flow positive \$200M+/yr

Financial Summary & Investment Ask

	FY 2023	FY 2024	FY 2025
Revenue	\$560K	\$1.07M	\$660K
Gross Profit	(\$230K)	(\$19K)	(\$30K)
EBITDA	(\$230K)	(\$19K)	(\$30K)

**Capital Structure
(No dilution to date)**

2-3 Investment Rounds = limited future dilution

2026-27: \$13M (Design Validation)

2028-29: \$20M (10+ Units/yr)

2030-31: Zero (100+ Units/yr scale)

	FY 2026	FY 2027	FY 2028
Labor	\$2.3M	\$4.2M	\$5.1M
Materials	\$1.2M	\$2.9M	\$3.4M
Facilities	\$0.9M	\$1.5M	\$1.9M

FY 2026 Milestones

Demonstrate 4m²/hr printing capacity

Fabricate brick exceeding 5,000cm²/L

Measure performance exceeding 500mA/cm²

Production >5kg ammonia per day

Join Us in Scaling Storage Beyond Batteries

10-20x

Energy density vs. Li-ion

\$15M

vs. \$42M for batteries

20 years

Asset lifespan

Zero

Carbon emissions

Contact Us

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