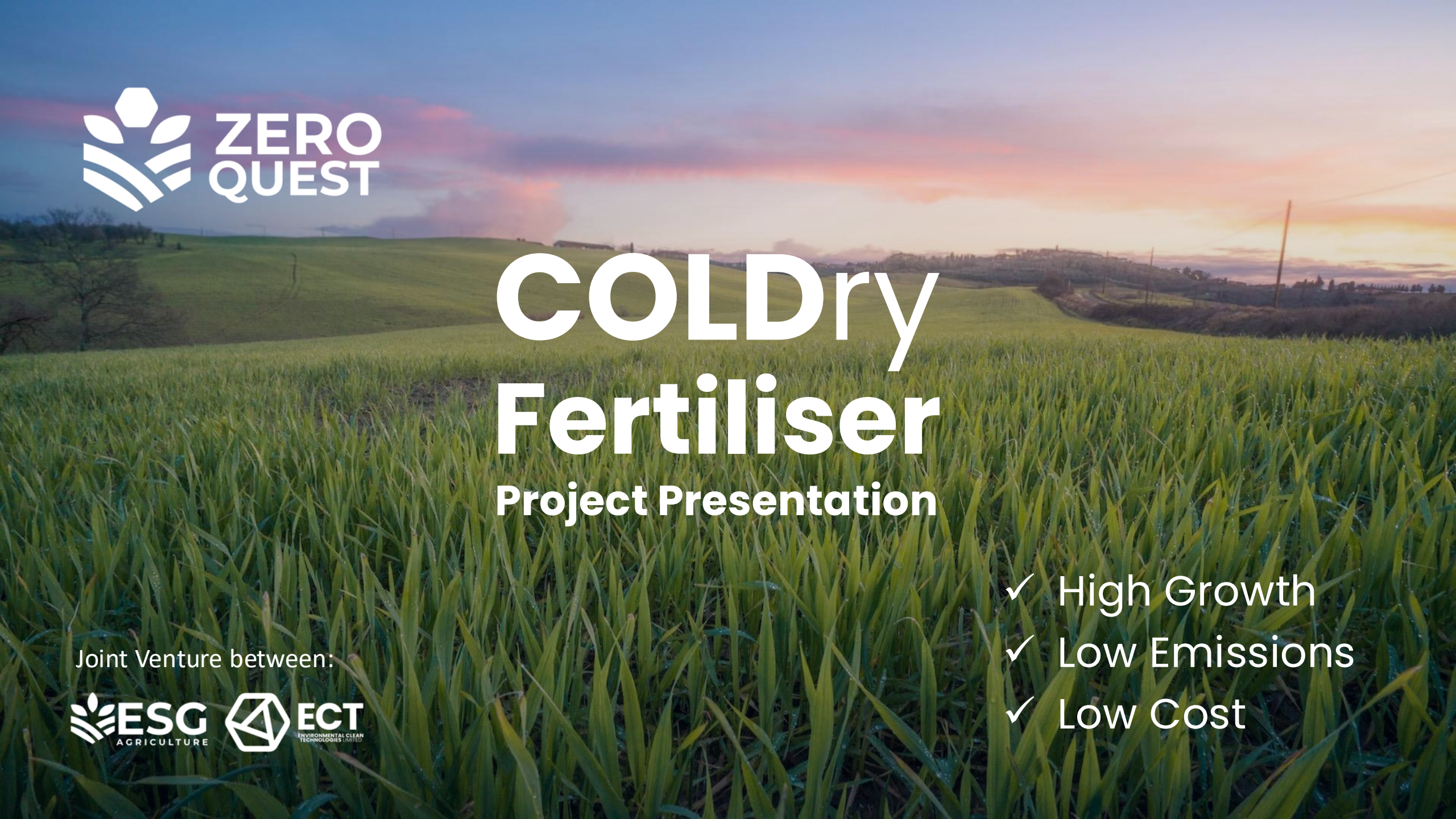
ZERO QUEST
COLDry
Fertiliser
Project Presentation
✓ High Growth
✓ Low Emissions
✓ Low Cost
Joint Venture between:
ESG AGRICULTURE
ECT ENVIRONMENTAL CLEAN TECHNOLOGIES LIMITED

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COLDry Fertiliser: What is it?

Certified
Organic Lignite

Agricultural Urea

COLDry Process

COLDry Fertiliser

Spread Rates

Same as Urea

Wheat & Barley 200kg/Ha
Pasture 235kg/Ha
Corn & Cotton 300kg/Ha

Cost

20% Less

than Urea

Additional Benefits

- Improved yield
- Lower nitrogen loss
- Improved soil health
- Lower emissions

COLDry Process: Zero-emission drying

COLDry Fertiliser

Agricultural Urea

Organic Lignite

COLDry Process

- ✓ Simple
- ✓ Scalable
- ✓ Robust
- ✓ Low-temperature
- ✓ Low-cost
- ✓ Zero-emissions

1 Sizing & feed control

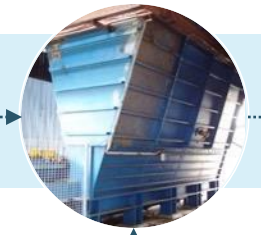
2 Shear & attrition

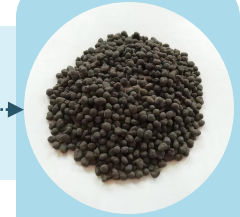
3 Extrude

4 Conditioning

5 Continuous Packed Bed Drying

6 COLDry Pellets





COLDry Fertiliser

Waste Heat

Fertiliser Market: Solving the problem

The Fertiliser Problem

- **Low Nitrogen Efficiency**:
  Only 30-50% of applied nitrogen is absorbed by plants; the rest is lost to the environment.
- **Environmental Impact**:
  Nitrogen emissions are 300x more potent than CO_2 (equiv. to 1.37t CO2 per tonne of urea). Fertiliser run-off causes algal blooms, harming aquatic life
- **Economic Burden**:
  Inefficient use increases cost. Price volatility impacts farm viability, food security and standard of living. International supply disruption affects 95% of Australia's urea.
- **Soil Health Degradation**:
  Decades of land-use intensification have altered the structure and function of vulnerable soils, requiring significant inputs (especially carbon) to maintain productivity.

Market Needs a Better Fertiliser

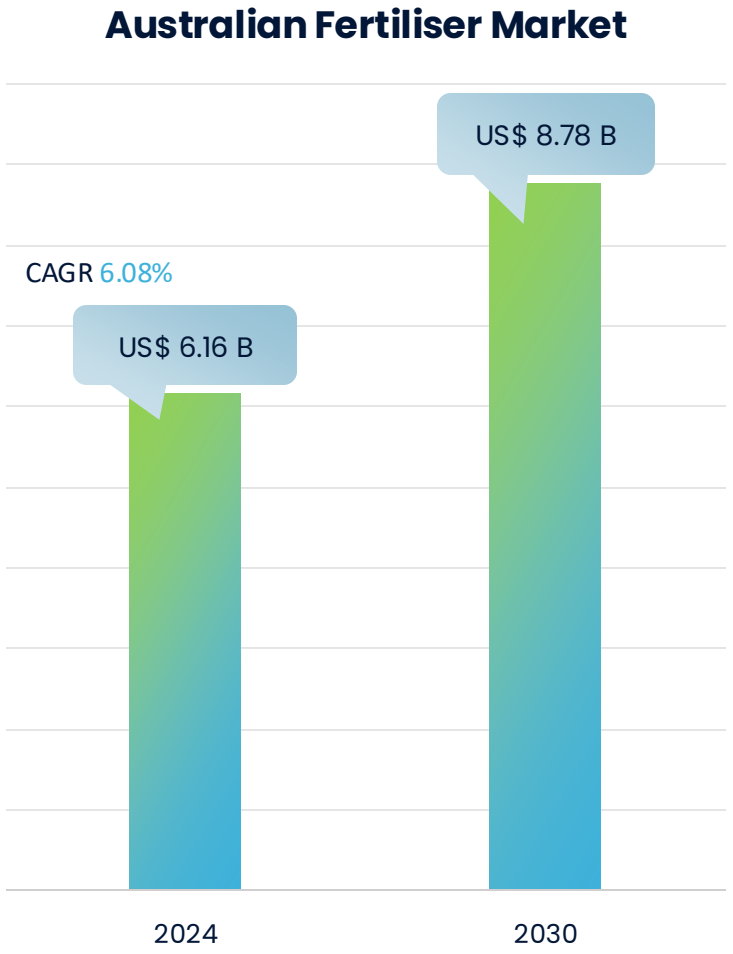
- **Cost-effective solutions**:
  Improvements without huge price increases
- **High yield & quality**:
  Maintain effectiveness to meet growing food demand.
- **Sustainability**:
  Improve soil health and reduce emissions.
- **Reliable supply**:
  Decouple from volatile international fertiliser markets.
- **Reduce barriers to practice change**:
  Compatibility with farming equipment and conventional processes and systems.

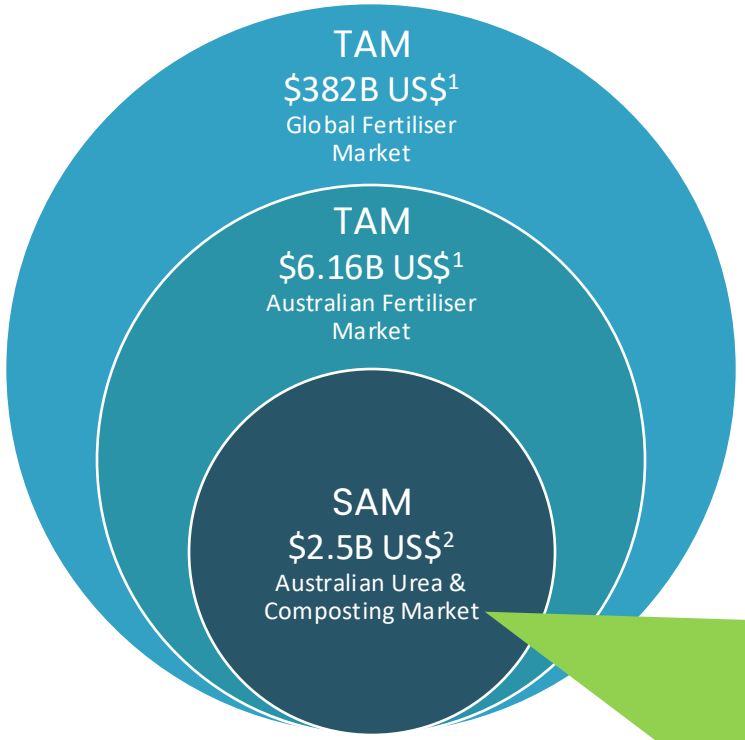
COLDry Fertiliser does all this!

Fertiliser Market: Size

Australian Market Size

- Valued at US$ 6.16 billion in 2024, with a projected CAGR of 6.08% (2024–2030).
- Driven by rising food demand, precision farming advancements, and sustainability trends.





TAM: Total Available Market

SAM: Serviceable Available Market

Targeting 10% of SAM

Sales

AU$416m

Volume

550ktpa

Plants

1 x 50ktpa
(Current Plant)

2 x 250ktpa
(Future Plant SA & Vic)

Source: (1) Mordor Intelligence Industry Reports (2) Expert Market Research Report & IMP Market Reports

COLDry Fertiliser: Value Proposition

Lower Cost & Higher Yield

Plant Growth Benefit

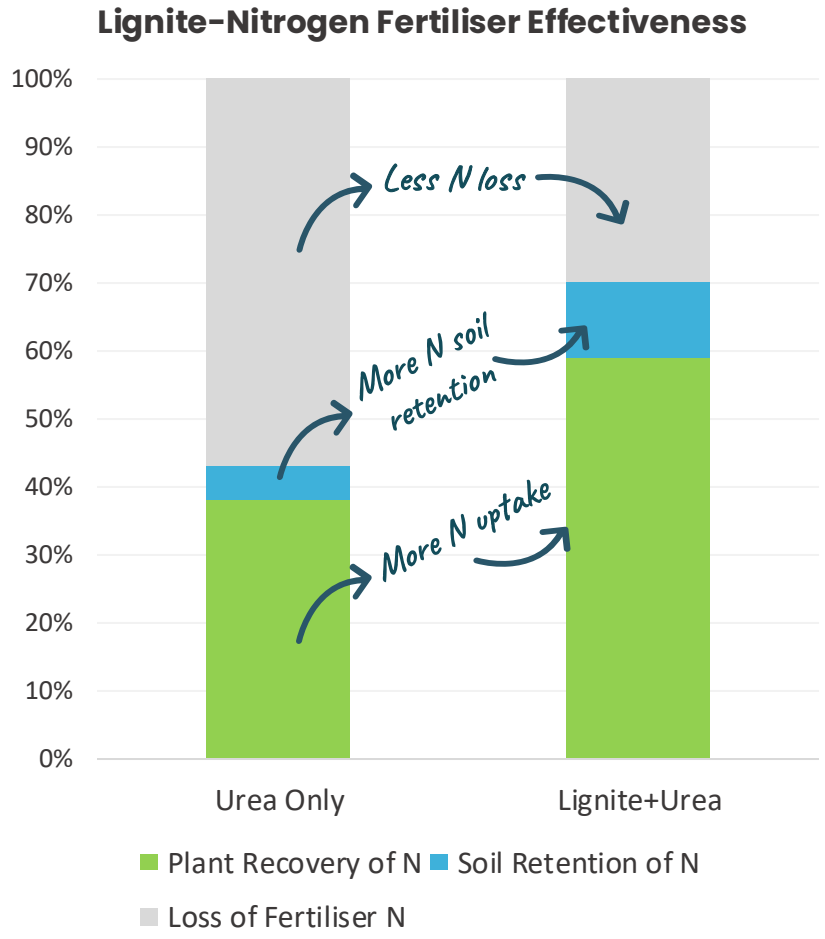
- 23% Crop Yield
- 21% Nitrogen Uptake

Environmental Benefit

- 64% NO_x Emissions
- 59% Nitrogen Leaching

=

Immediate & Future Financial Benefit



*Fate and recovery of nitrogen applied as slow release brown coal-urea in field microcosms: 15N tracer study - Environmental Science: Processes & Impacts (RSC Publishing)

COLDry Fertiliser: Value Proposition

Cost

Cost & Growth Effective

- **Competitive Pricing:** Priced below urea with no compromise on crop growth rates.
- **Price Cap Protection:** Shields farmers from international price fluctuations.
- **Enhanced Security:** Reduces reliance on imported fertilisers, boosting domestic stability.
- **Efficient Production**: New manufacturing technology lowers production costs.
- **Zero switching costs**: Seamless Integration. Compatible with existing spreading and logistical equipment, requiring no additional investment.

Environment

Reduced Emissions

- **Slow-release:** lowers both atmospheric and aquatic nitrogen emissions, contributing to a cleaner environment.
- **CO_2 Impact Reduction**: Lower urea demand decreases the carbon footprint associated with conventional urea production.
- **Enhanced Ecosystem Health**: Reduced nitrogen runoff helps protect local water bodies from pollution, supporting broader ecological sustainability.

UN SDG Alignment

Sustainable agriculture, environmental protection, and economic resilience.

COLDry Fertiliser: Value Proposition

Reliability

Technical Validation

- **Proven Efficacy**: Independent lab tests confirm nitrogen efficacy.
- **Validated Production Process**: Comprehensive blending, drying, and granulation testing ensures consistent product quality.
- **Stable Supply Chain**: Domestic manufacturing and reduced import reliance minimise potential supply disruptions.
- **Long-Term Performance**: Slow-release formula ensures sustained nutrient delivery, supporting consistent crop health and yield.

Sustainability

- **Soil Health Improvement**: Lignite organic carbon enriches soil.
- **Reduced Nitrogen Dependence**: Optimised nitrogen application reduces over-reliance on synthetic nitrogen sources, promoting sustainable farming practices.
- **Supports Regenerative Agriculture:** Compatible with soil regeneration goals by minimising chemical buildup and enhancing organic matter content.
- **Longevity in Soil Benefits**: The lignite component remains active in the soil over time, sustaining soil structure and microbial activity.

Soil Health Assessment
Australia Extensive Land Use Zones

"Decades of land-use intensification have altered the structure and function of vulnerable soils, requiring significant inputs to maintain productivity." DCCEEW

COLDry Fertiliser: Independent Validation

Fate and Recovery of Nitrogen Applied as Slow Release Brown Coal-Urea in Field Microcosms: 15N Tracer Study

Biplob K. Saha, ORCID logo Michael T. Rose, Lukas Van Zwieten, Vanessa N. L. Wong, Terry J. Rosed and Antonio F. Patti

The over-use of synthetic nitrogen (N) fertilisers for crop production can cause environmental pollution through leaching and gaseous losses, resulting in low N use efficiency (NUE). Previous work has shown that brown coal (BC) combined with urea can slow down the fertiliser-N release to better synchronise soil N supply with crop N demand. The study aimed to evaluate the impact of granulated BC-urea (BCU)... Link

Hybrid Brown Coal-Urea Fertiliser Reduces Nitrogen Loss Compared to Urea Alone

Biplob K. Saha, Michael T. Rose, Vanessa Wong, Timothy R. Cavagnaro, Antonio F. Patti

Synthetic nitrogen (N) fertilisers, such as urea, are susceptible to rapid dissipation from soil. More gradual release of mineral N from fertiliser may reduce the off-site movement of mineral N, thereby enhancing N supply to crops and minimising negative off-site impacts. These findings support the hypothesis that BC is suitable for developing slow release N fertilisers... Link

Lignite-urea Fertiliser

- Slow release
- Increased crop yield
- Increased nitrogen uptake
- Lower nitrogen emissions

COLDry Fertiliser

- **Independent** testing
- Nitrogen **stability**
- Added soil carbon
- Added organic sulphur

Key Outcomes

Manufacturer

Near Zero Loss of Nitrogen

- Low-temperature COLDry process
- <1% loss of nitrogen during manufacturing
- Solves a costly manufacturing problem

Farmer

Added Soil Carbon

- Enhanced water retention
- Increased organic matter
- Improves drought tolerance
- Microbial activity enhancement

Sulphur Bonus

- Improved crop yield
- Enhanced disease resistance
- Improved nutrient use
- Balances other nutrients

COLDry Fertiliser: The Manufacturing Edge

Challenges

Blending
Divergent properties

Lignite: high moisture, porous
Urea: dry, crystalline

Moisture = clumping
Reactivity = Uneven Release

Drying
Nitrogen **decomposition**

Conventional drying temperatures cause urea to break down, forming biuret, which impedes plant N uptake and protein synthesis.

Cost & Scalability

High-cost conventional drying is not suitable and not scalable.

COLDry Fertiliser Solution

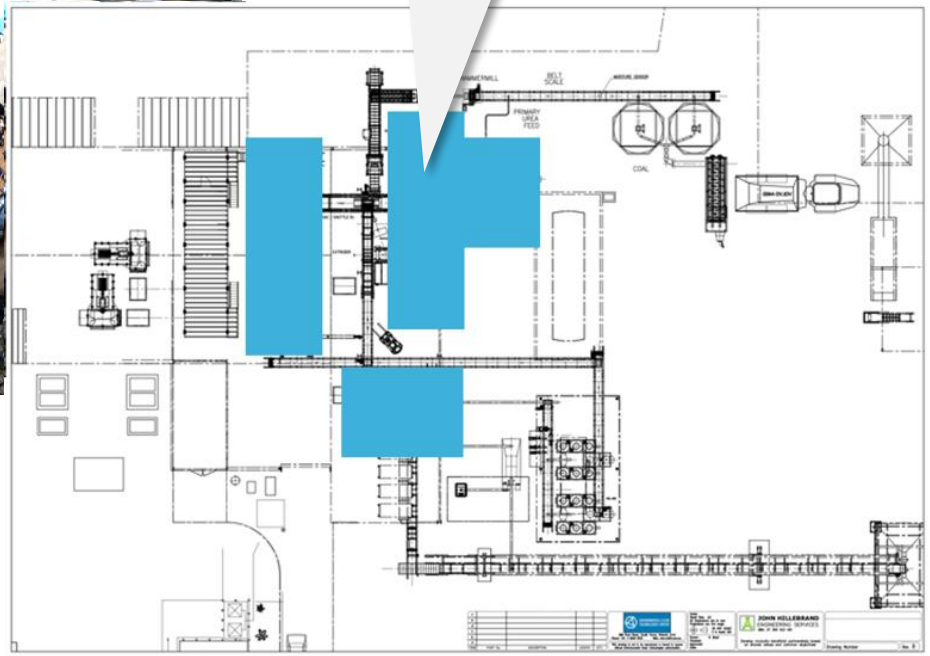
- Uniform **Blending** ✓
- Patented Low-temperature <40°C **Drying** ✓
- Energy & Cost Advantage ✓
- **Scalable** Drying ✓
- Deployable **NOW** ✓

COLDry Fertiliser Plant: Project Overview

- **Demonstration Phase**
  Up to 30,000 tonnes per annum
- **Commercial Phase**
  Targeting 30,000 to 50,000 tonnes per annum
- **Optimisation Phase**
  Steady-state production of 50,000 tonnes per annum +

Building on the existing COLDry demonstration plant at JBD Industrial Park, Maddingley.

Under Patent Review



Zero Quest: Market Penetration Strategy

Phase 1
Penetrate & Prove

Phase 2
Expand & Disrupt

Q4 CY24 | Q1 CY25 | Q2 CY25 | Q3 CY25 | Q4 CY25 | Q1 CY26 | Q2 CY26 | Q3 CY26

Target Market

- **Phase 1**: Focus on large-scale farmers and agribusinesses initially.
- **Phase 2:** Explore export markets leveraging ESG's international connections.

Launch	• Field trials commence with large-scale farmers in Q1 2025, leveraging strong partner relationships.
Commercial Goal	• Trials expected to convert into bankable off-take agreements ahead of commercial roll-out (target: Q1 2026).
Capacity Utilisation	• Initial plant output is projected to meet ~2% of SOM in target markets, driving early market share gains.
Proven Formula	• The product mirrors chemistry from successful past trials, ensuring reliability and rapid scalability.

Scale Up	• Target 5-10x plant size • Re-design to incorporate learning & optimisation from Phase 1 to
Expand	• Target 2+ potential projects across SA and Vic (250ktpa each) • Pursue overseas opportunities
Profitability	• Target 100%+ GP margin growth • Enhanced design and economies of size and scale
Disrupt	• Deliver the worlds first net zero fertiliser that is cost competitive with conventional fertilisers

Zero Quest: Leveraging Partner Expertise

Technology & Production

Sam Rizzo
Non-executive Director
BA (Urban and Regional), Grad Dip (Honours) in Urban and Regional Town Planning

20 years major project experience including renewable energy.

John Tranfield
CEO
B.Eng-Phys-Math, MBA, GAICD, PMP, CPEng, WSET I II, H_2 Researcher

20+ years engineering experience handling high-profile projects.

*ECT specialises in the **development** and **commercialisation** of **innovative** technologies across the **energy** and **resources** sectors.*

*Backed by a team with **deep industry experience** in delivering complex, large-scale projects from concept to execution.*

Sales & Marketing

Ben Pevreall
Co-Founder and Director
B.Eng MAICD certified chair

Senior Agribusiness executive with over 20 years' experience in manufacturing and market development

Mark Scanlon
Co-Founder and Director

Director at Next Rural, Australia's leading succession planning organisation for Rural Families.

*ESG Agriculture brings proven expertise in **agribusiness**, **manufacturing**, and **market development**. With a strong focus on **commercial outcomes**, ESG leverages deep industry networks and insights to drive **market adoption** and **growth** across the **agricultural sector**.*

Zero Quest: The team to deliver the project

Board

- TBA — Chair
- Sam Rizzo — Director
- Mark Scanlon — Director
- Martin Hill — Co Sec (Retiring)

Management

- Glenn Fozard — CEO (Interim)
- Grant Thornton — Accounting & Tax
- Cornwalls LAW + MORE — Legal

Engineering & Plant

- John Tranfield — Project Manager

Agriculture

- Ben Pevreall — Project Manager
- Mark Scanlon — Farm Sales

COLDry Fertiliser Project: Towards FID

- ✓ **Comprehensive Design Package**
  Ready for EPC tendering to ensure seamless execution.
- ✓ **Robust Tax Strategy**
  Providing investors with strong fallback options to mitigate economic risks.
- ✓ **Experienced Delivery Team**
  Proven track record in successfully executing similar projects.
- ✓ **Offtake Agreements**
  Demonstrating market demand and farmer commitment to purchase via field trials.
  Announcement of foundation and offshore customers.
- ✓ **Committed Supply Agreements**
  Ensuring consistent availability of lignite, land, and urea to meet production targets.

  Insurance, technology licencing and equipment purchases.
- ✓ **Regulatory Compliance**
  All statutory and government approvals in place for smooth operations.

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