TasDairy13

Dairy Processing Plant Conceptual Design

Presentation | November 2020

TasDairy13 Team

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On The 'Whey'

How would you like to turn $95M into $220M?

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On The "Whey"

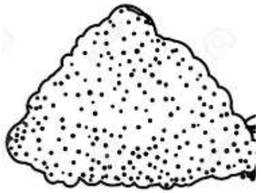
TasDairy13 Facility

Processing Capacity

100 000 L/day
$18M/yr

Product Portfolio

Cheddar Cheese
4400 tonnes/yr
$36M/yr



Lactose
7800 tonnes/yr
$15M/yr

Whey Protein Concentrate (WPC)
1900 tonnes/yr
$13M/yr

Whipping Cream
400 tonnes/year
$2M/yr

Waste Products
(Whey Cream & Casein Fines)
87 tonnes/yr
$109K/yr

Location

Smithton, Tasmania

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Agenda

Emma Selwood

1 Product & Location Selection

George Wang

2 Economics

Rakha Octavano

3 Technology & Optimisation

Ying Fei Low

6 Safety & Environment

Brintha Vijaya Kumar

7 Conclusion

Product Selection

CHEDDAR CHEESE - WPC - LACTOSE POWDER - WHIPPING CREAM

- Focus on one major product - **cheddar cheese** - to allow us to compete on the local and global market
- **Limited raw milk availability** in Tasmania: Over 80% of milk occupied by Saputo Dairy and Fonterra alone
- Economic viability enhanced by **yielding as much product from milk as possible**, whilst minimising the costs of transporting or disposing of waste products

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Market Evaluation

KEY ATTRACTIONS:

- Cheddar Cheese: Increasing demand trends and appealing revenue. Operating costs far lower than other major export products including SMP and WMP

- Whey Protein Concentrate: CAGR of 9.2% 2020-2025

- Lactose Powder: Wide range of uses and market value of $1910/ton

- Whipping Cream: CAGR of 8.1% 2020-2025, Low operating costs and initial capital expenditure

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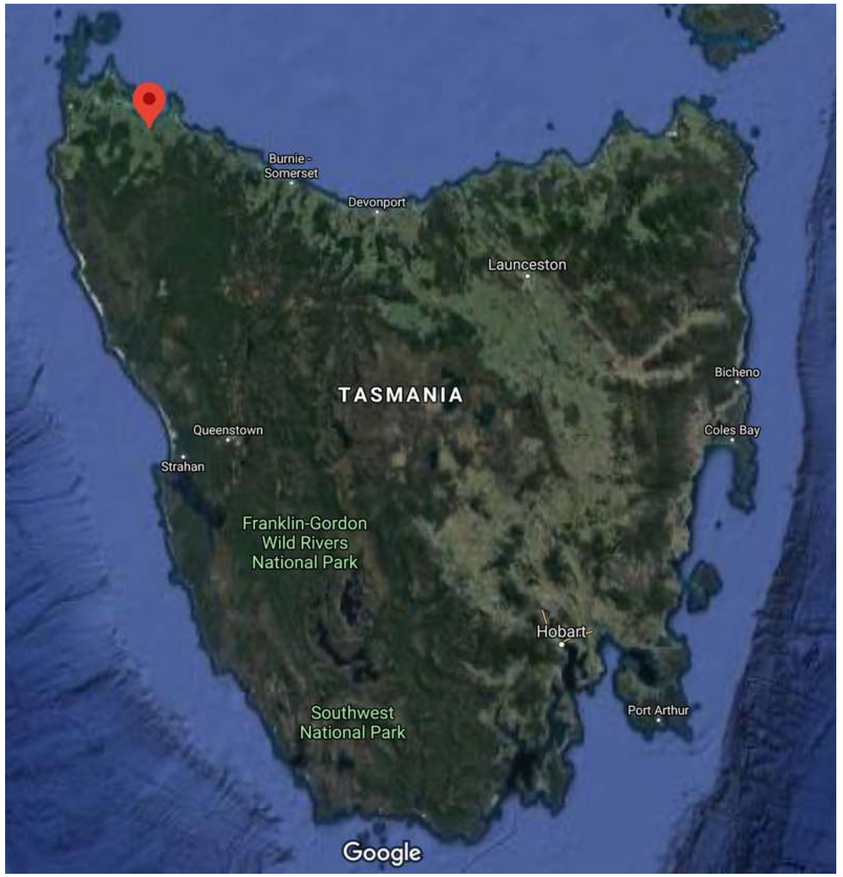
Geographical Location

BASS HIGHWAY, SMITHTON, TASMANIA



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- Far north-west of Tasmania has the largest number of dairy farms
- Location on major highway provides ease of transport of materials to and from the facility
- Close proximity to the Port of Burnie
- Close to other dairy process facilities: potential sales channel for waste products

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Economic Analysis

Major assumptions made in Economic Analysis:

- **1-year** detailed design + **1-year** construction + **20-year** operational period
- Straight-line depreciation: **5%/annum** for 20 years
- Discount rate = **5%** → post-pandemic recovery
- First 2 years **80%** capacity & **90%** capacity thereafter
- All equity financing
- Effects of inflation negligible

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Economic Summary

Net Present Value (NPV)	Internal Rate of Return (IRR)	Payback Period (PP)	Annual Return on Investment (ROI)
$125 million	15.3%	7 years	27.2%

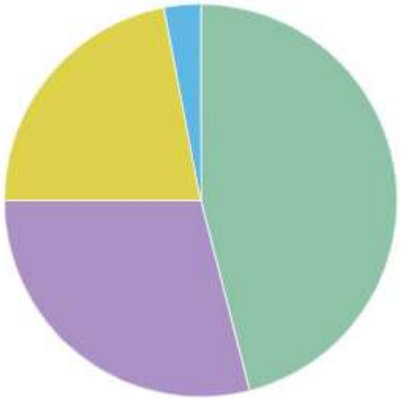
Total Capital Investment

$95 million

Fixed Capital Working Capital

Annual Sales Revenue

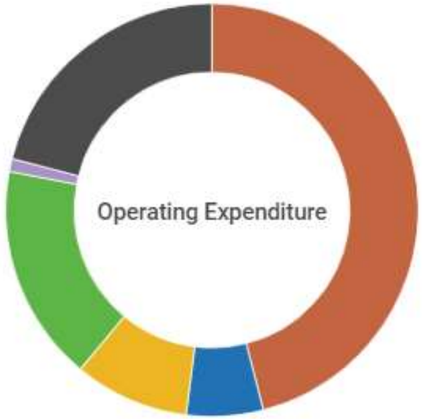
$65 million



Cheddar Cheese Lactose Powder WPC Whipping Cream

Annual Operating Costs

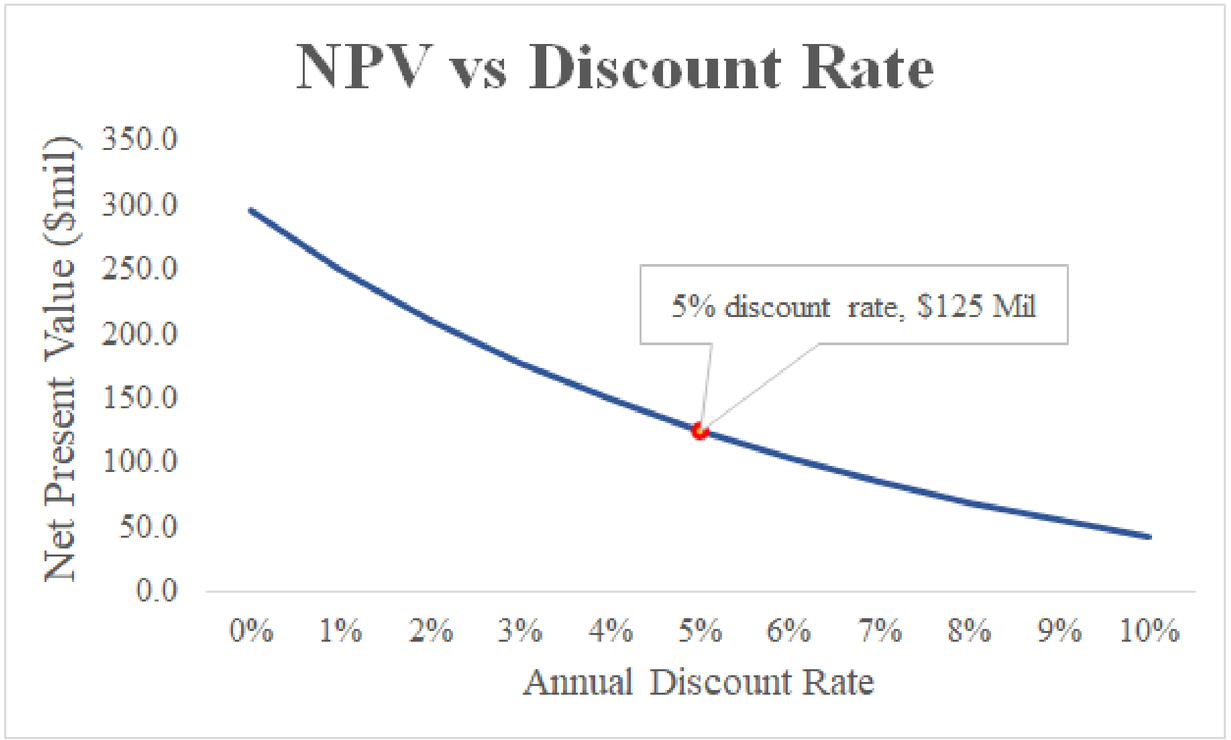
$39 million

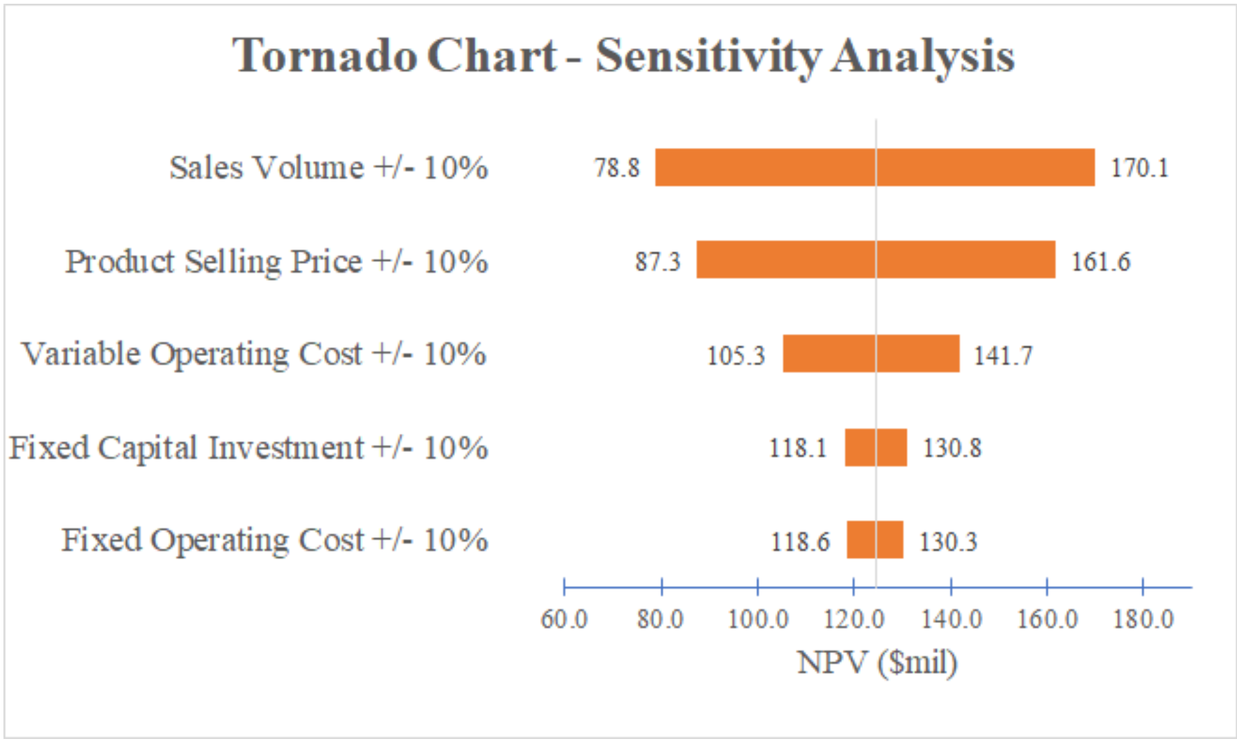


Raw Materials Non-manufacturing Costs Process Labour Utilities Packaging Non-labour Fixed Costs

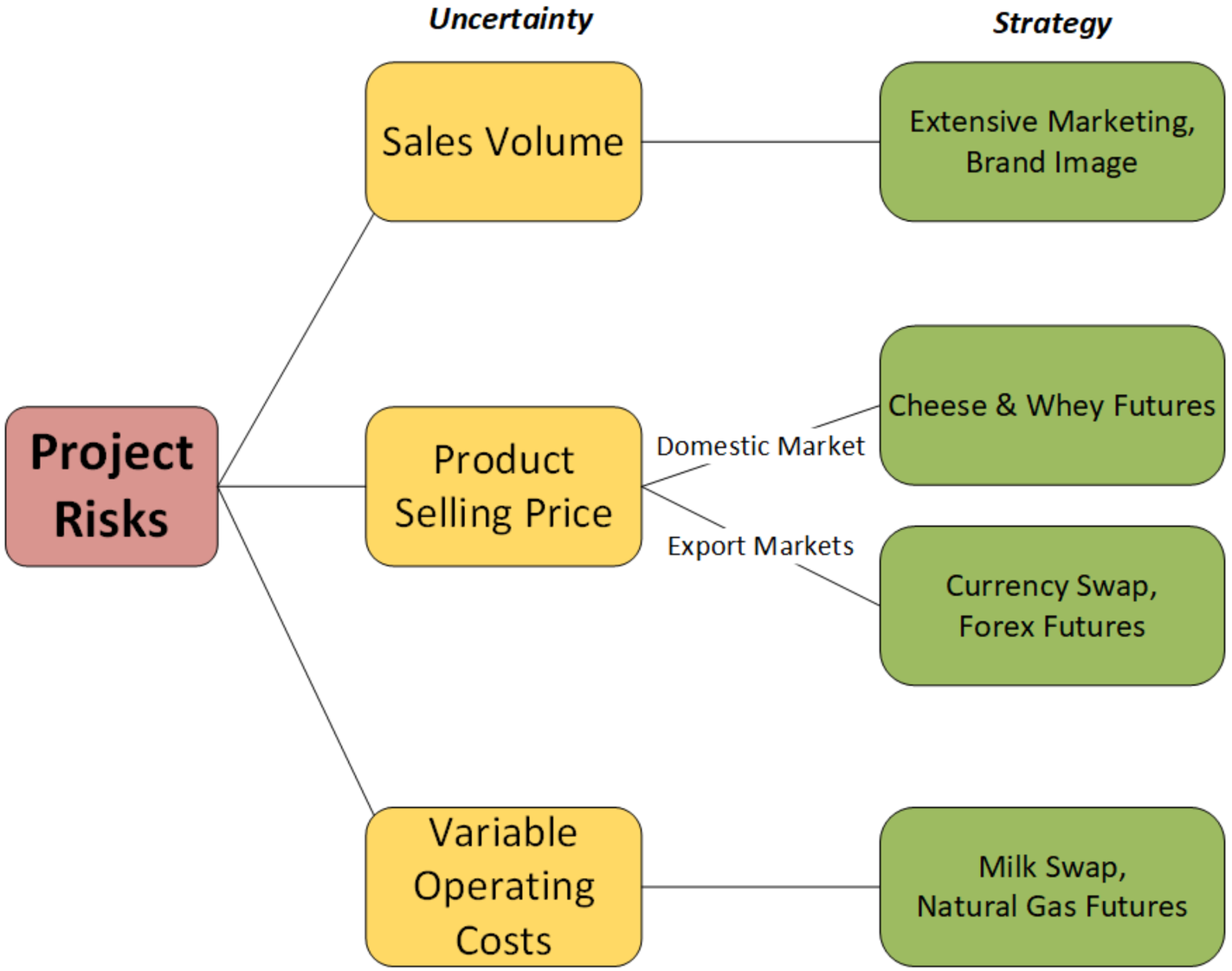
Sensitivity Analysis

Project NPV (base scenario): $125 Million





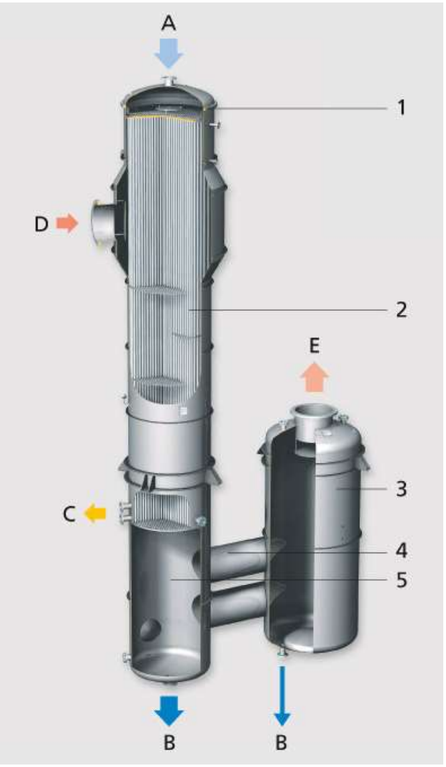
Financial Strategies



Technology Selection

Microfiltration Unit

Technology Type	Advantage
Microfiltration	• More efficient than Bactofugation • Possible to obtain preservative free whey and cheese
Crossflow Ultrafiltration (UF)	• Capable of reducing a large amount of fat content in whey protein concentrate • Used to produce fat-free WPC
Direct Standardisation Line	• Low cost • Low maintenance
Falling Film Evaporator	• High efficiency in concentrating product at a low temperature • Short residence time results in minimum scaling • Uniform distribution of liquid over the heating surfaces • Suitable for dairy products sensitive to heat treatment • Available for multiple-effect evaporation with recycle loops for energy efficiency • Contains little or no denatured protein after process



Falling Film Evaporator Unit

Water and Heat Integration

Water Integration

- CIP: Installed 10 satellite units and 1 set of centralised CIP tanks, reuse final rinse and cooling water as initial rinse
- Recovery of chilled water: Closed loop cooling water system
- Recovery of condensate: Closed loop boiler system
- Recycling of evaporator vapour: Recompress the vapour

Saving in boiler feedwater	= 81%
Saving in chilling system feedwater	= 90%
Saving in CIP water required	= 46%

Saving $2.2 Mil/yr

Heat Integration

- ΔT_min = 10 °C
- Minimum Hot Duty = 821 kW
- Minimum Cold Duty = 0.81 kW
- Thermal Energy Saving = 4900 kW

Saving in cold utility	= 99%
Saving in hot utility	= 67%

Saving $1.34 Mil/yr

TOTAL

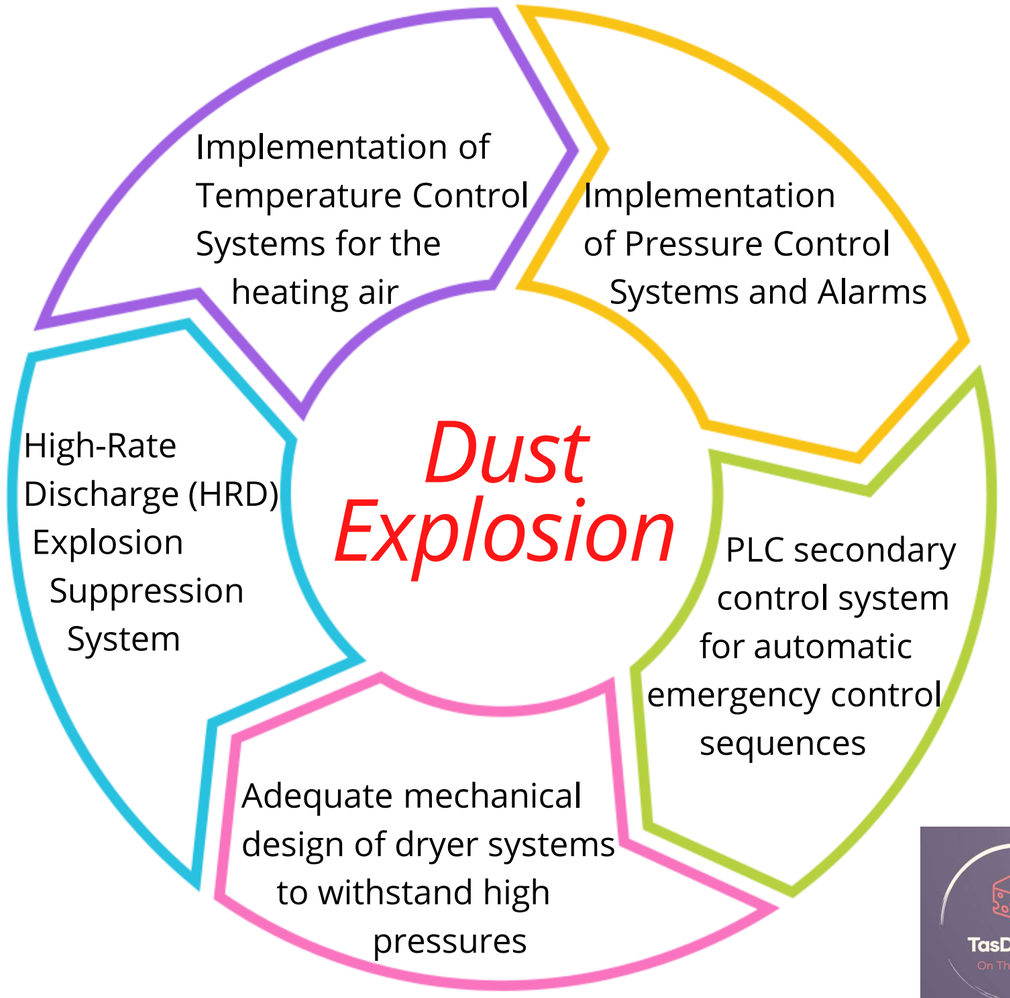
Saving **$3.54 Million/yr**

Safety & Hazard Evaluations

Inherent Safety

- *Generation of Low-Pressure Steam rather than High-Pressure Steam*
- *Utilization of Hot Water instead of Hot Oil as the heat transfer medium*
- *Installation of protective equipment (e.g. pressure relief valves)*
- *Adoption of CIP systems for process equipment cleaning*

Major Hazards & Control Measures

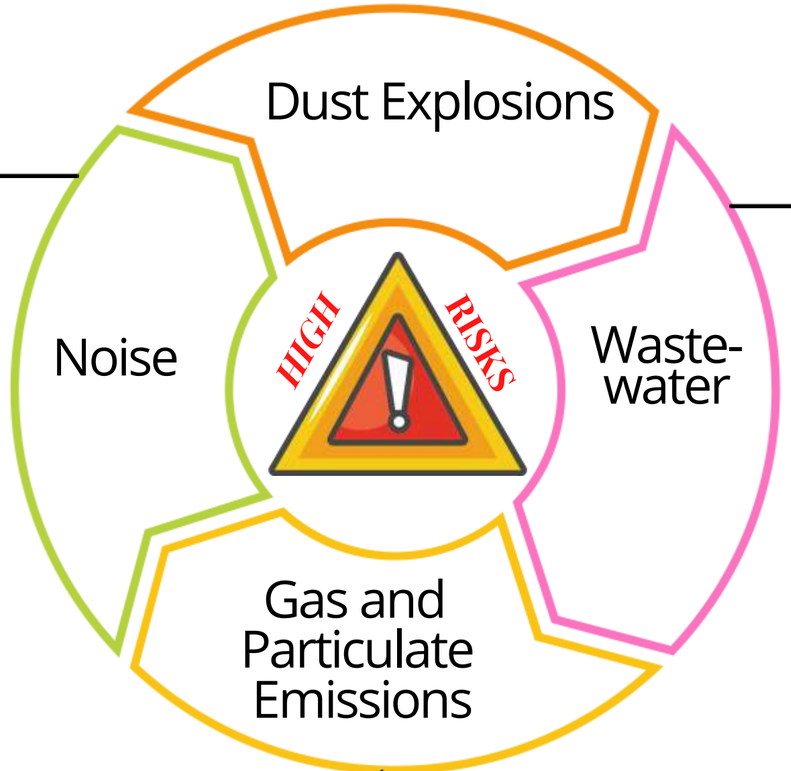


Environmental Impacts

Environmental Events

- Regular undertaking of noise monitoring level

- Placing the noise equipment inside acoustic enclosures/sound absorbing material



Approx. 82 tons of RO permeate is recovered/day for CIP rinse water use

- Encourage use of renewable biofuels sourced from Hydro Tasmania

- Increase product conversion efficiency

Policy & Legislations

Environmental Policy Statement

ENVIRONMENTAL POLICY STATEMENT
TASDAIRY13

ENVIRONMENTAL POLICY

TasDairy13 is a dairy manufacturing company offering wide range of quality dairy products with a production capacity of 100,000 L of milk per day. The location of the facility is set in Bass Highway, Smithton, Tasmania. TasDairy13 is committed to protecting natural resources, promoting environmental awareness and implementing sustainable business practices.

To achieve the goals of sustainability and reduction in environmental pollution, TasDairy13 is aimed to comply with pertinent environmental laws and legislations on a consistent basis to ensure full compliance of environmental management.

In efforts to mitigate the environmental impacts concerning our activities, products and services, we shall: -

- Minimize carbon dioxide emissions to the environment by 10% in 10 years from 2022.
- Encourage the practice of recycling and reusing of any waste materials by embracing waste minimization principles in the organization.
- Adopt a safer biofuels for heavy vehicles transportation by at least 40% by the year of 2030.
- Reduce the facility's energy usage by integrating renewable resources for sustainable energy generation.
- Provide environmental workshops to strengthen the organization's environmental stewardships.
- Establish and sustain the environmental management system by forming a R&D team dedicated to supervising and controlling environmental issues.
- Conduct regular internal audits of the manufacturing process in accordance with environmental standards.
- Conduct an annual review of the Environmental Policy to enhance the information transparency of sharing to the general public of interest.

This policy will be communicated to the staff, workers and suppliers and made available to the public through social media platforms.

Group 13

Group 13
TasDairy13
November 2020

Tasmanian Government

WorkSafe TASMANIA

WorkCover TASMANIA

✓ Work Health and Safety Act 2012

epa TASMANIA
ENVIRONMENT PROTECTION AUTHORITY

✓ Environment Protection Act 1973

✓ Environmental Management and Pollution Control Act 1994 (EMPCA)

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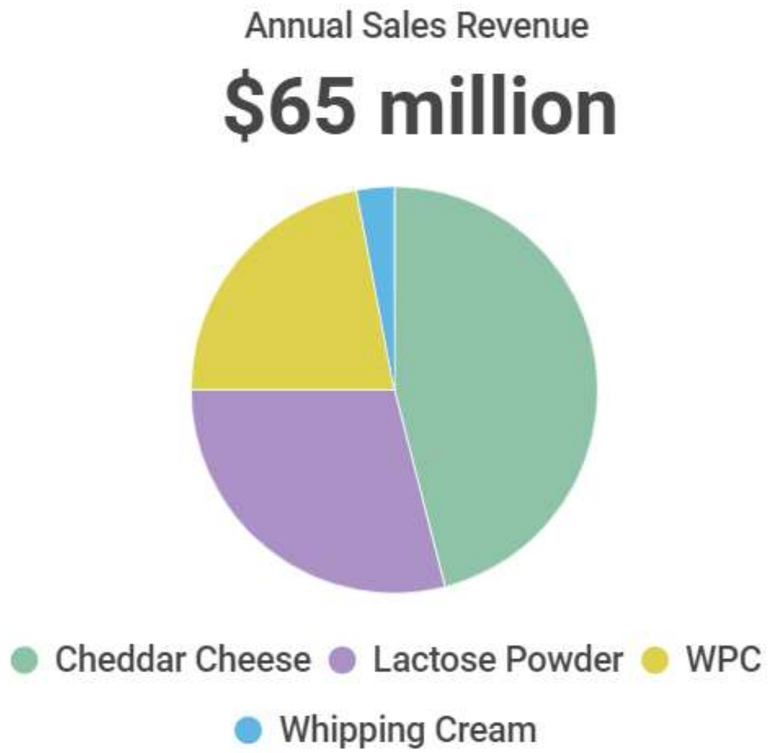
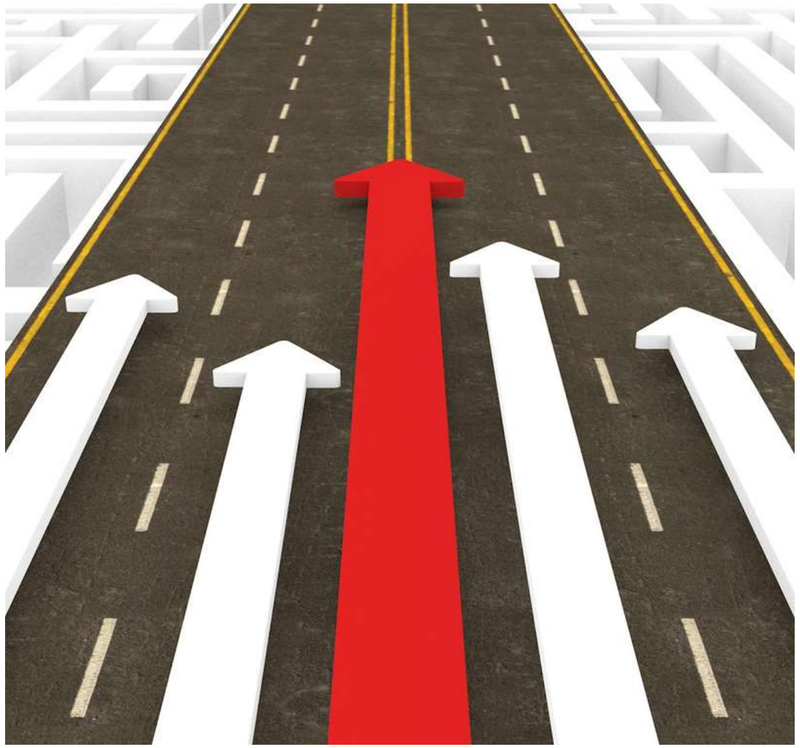
Why should you invest in us?

- Attractive annual revenue of **$65M** and an Internal Rate of return (IRR) of **15%**
- These figures make TasDairy13 a competitive investment





Why should you invest in us?

- **Strategic location:**
  - Dairy farms: potential feedstock
  - Bass highway: easy transportation of goods
  - Other dairy facilities: potential sales of waste products

Why should you invest in us?

- High quality products guaranteed

- Technology selection - cost & energy efficient

- Low environmental impact

Why should you invest in us?

Emma Selwood

George Wang

Rakha Octavano

A GREAT TEAM WORKING FOR YOU!

Ying Fei Low

Sam Landby

Brintha Vijaya Kumar

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Our takeaway from this journey

COMMUNICATION

COHESIVE TEAMWORK

BEING INQUISITIVE

Things we would do differently

- Communicate more with the industry advisors

Wrap up!

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Thank You!