Biomass Energy in Horticulture

by: Sohum Gandhi

sohum@enriva.com.au

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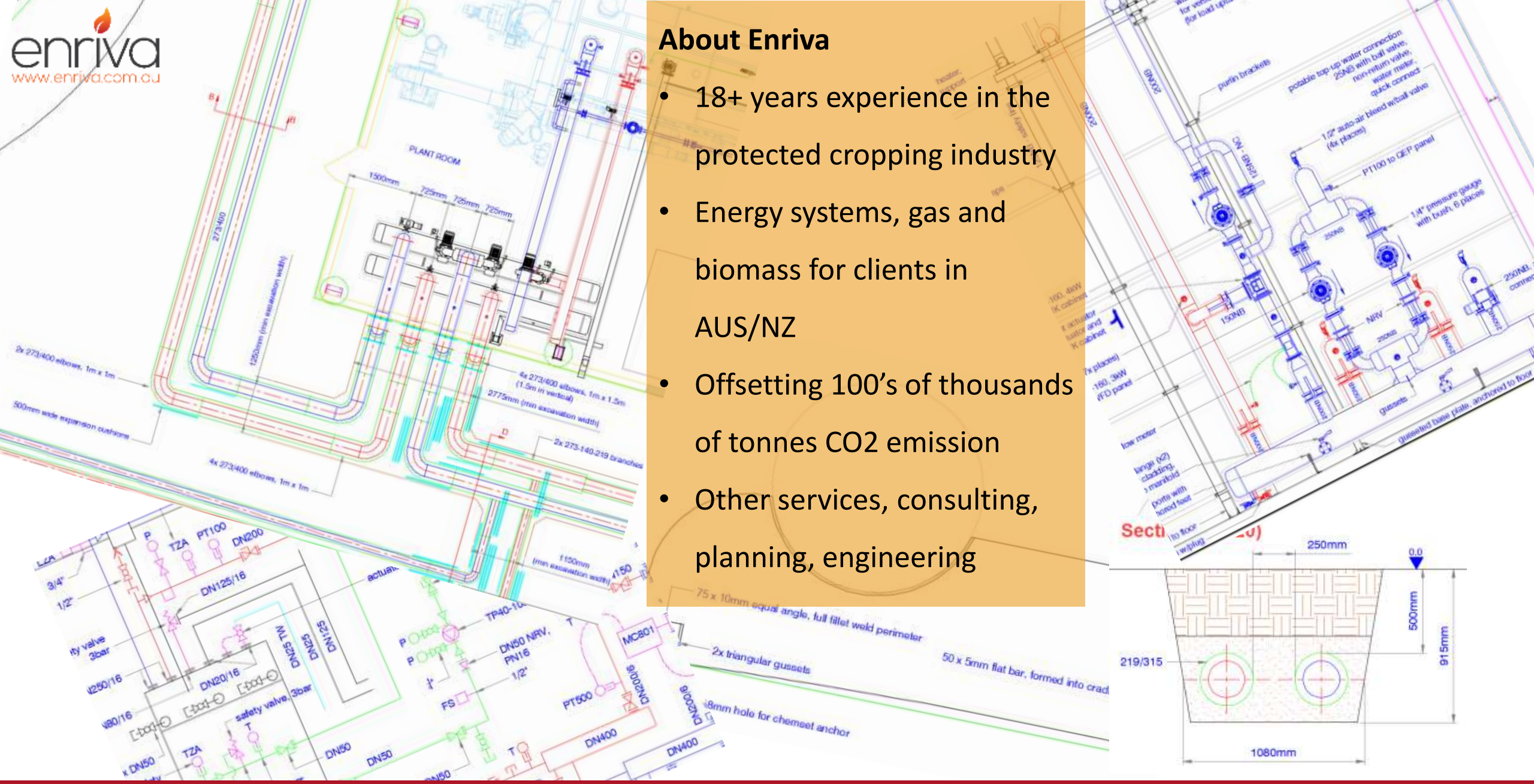
www.enriva.com.au

About Enriva

- 18+ years experience in the protected cropping industry
- Energy systems, gas and biomass for clients in AUS/NZ
- Offsetting 100’s of thousands of tonnes CO2 emission
- Other services, consulting, planning, engineering



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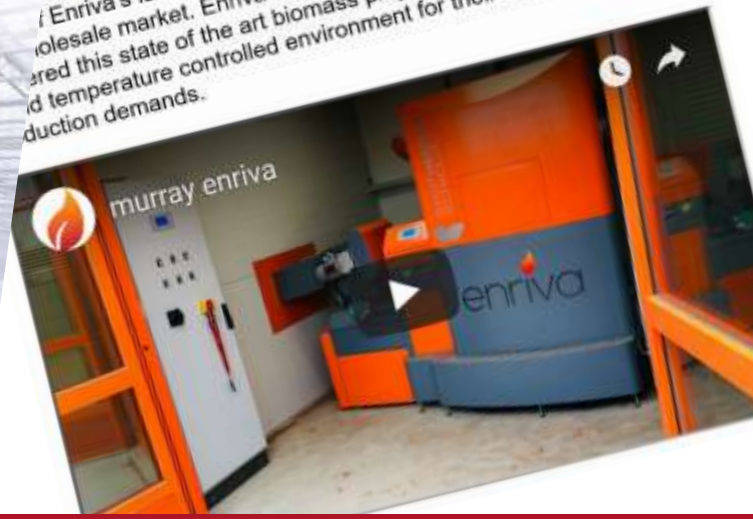
va Biohouse
deo: Turn-key bioenergy implementation
ed
on the Victorian side of the Murray River, this horticultural
Enriva's is a family run business growing food and plants for
olesale market. Enriva in conjunction with Smart Heating
ered this state of the art biomass project which provides a year
d temperature controlled environment for their ever expanding
duction demands.



WHY BIOMASS ?

Photosynthesis (The Renewability)

- Plant matter high in carbon
- Carbon absorbed from air through stomata, 400PPM
- Photosynthesis, sunlight driving the conversion of water and CO2 into carbohydrates and oxygen

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Energy Requirement

- Only one of many questions
- Crop dependent (ie. setpoint)
- Climate dependent (ie. temp profile)
- Technology dependent, screens, structure has a significant impact
- Peak load supply vs. load averaging
- MCR vs. nominal rating
- Economy of peak load supplementation

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More Considerations

- Heating expenditure
- Fuel and equipment selection
- Running costs and CO2 availability
- Informed analysis
- Profitability and sustainability

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THREE ENRIVA PROJECTS

1. JS Ewers, Nelson NZ
2. Van Wyk Flowers, Lyndhurst AUS
3. Chislett Farms, Kenly AUS

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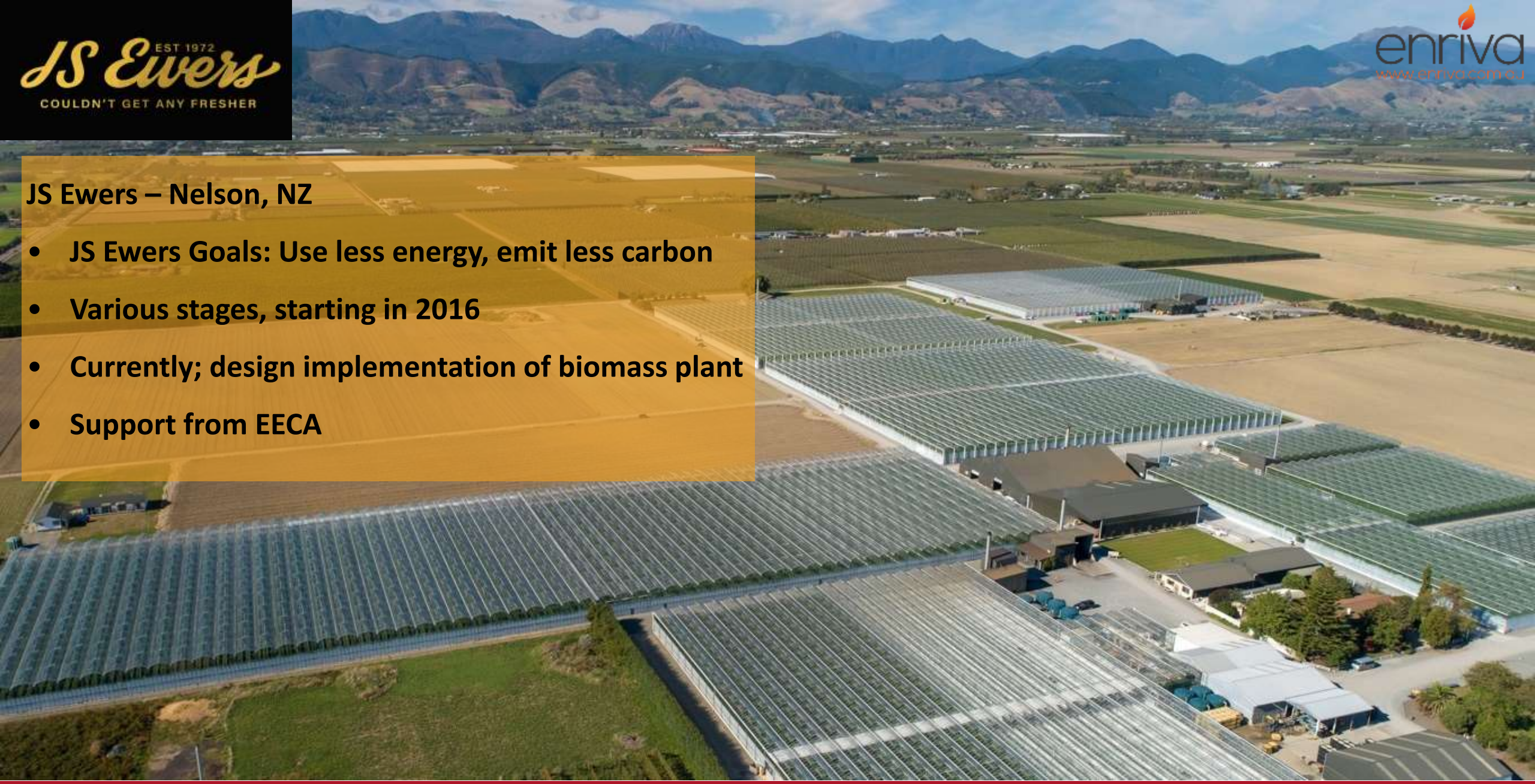

JS Ewers – Nelson, NZ

- JS Ewers Goals: Use less energy, emit less carbon
- Various stages, starting in 2016
- Currently; design implementation of biomass plant
- Support from EECA

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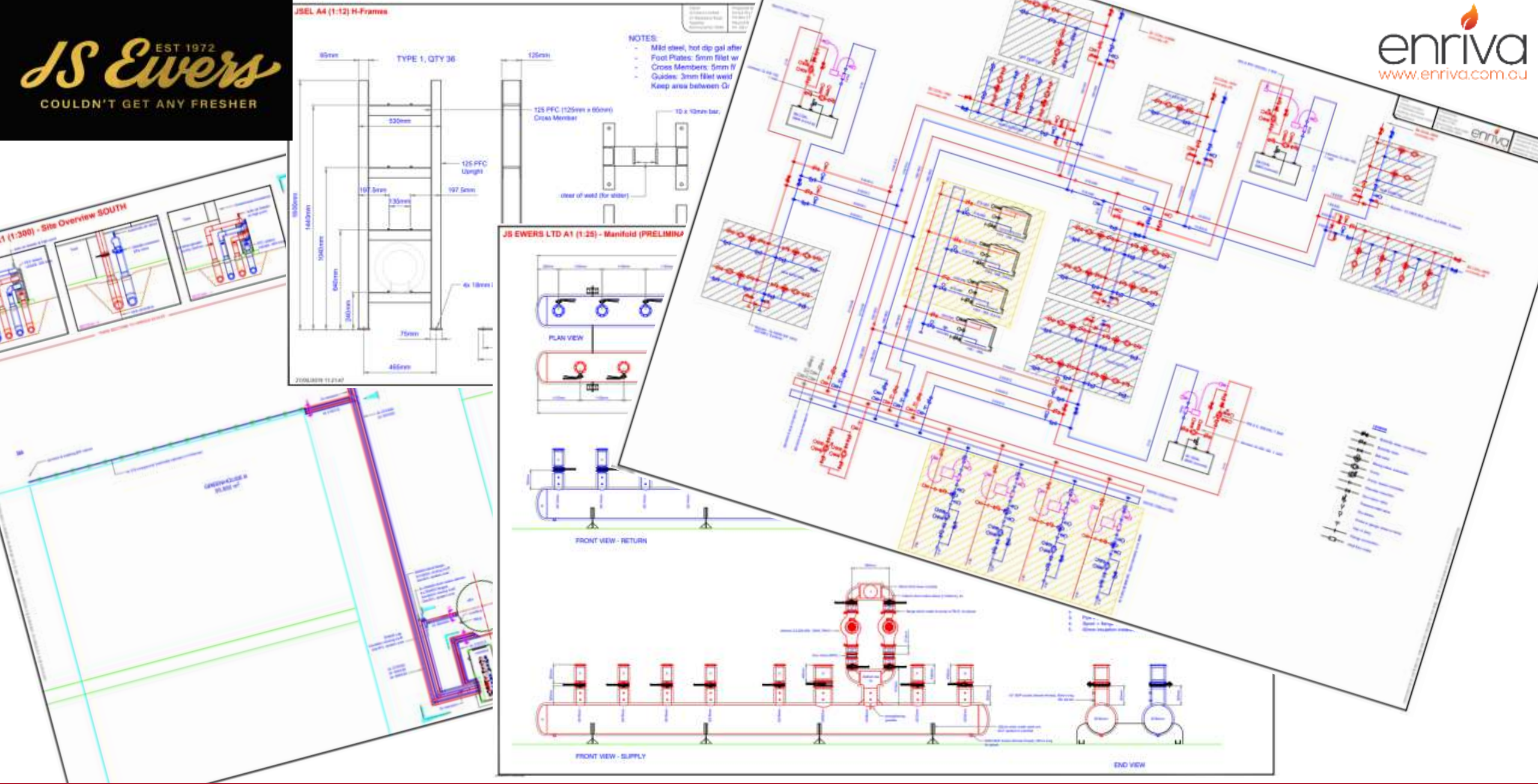

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Outcomes (thus far)

- Site integrated, ready for centralised biomass plant
- 5 coal plants decommissioned
- 20% annual energy reduction
- By late 2022 final coal plant to be shut down and system to be 100% carbon neutral

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Van Wyk Flowers – Lyndhurst, Australia

Long standing family business just outside of Melbourne

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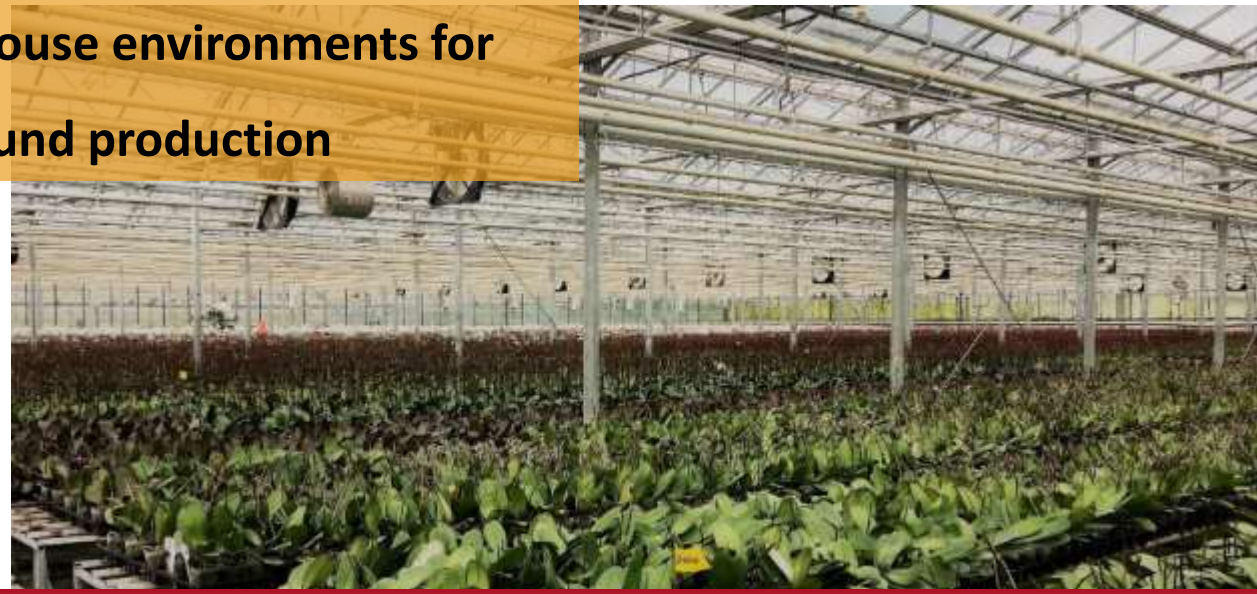
Van Wyk Flowers
Grower - Wholesaler - Florist

A wholesale grower

Specialising in many flower varieties

Grown in heated greenhouse environments for premium year round production



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2.5x increase in natural gas price

Replaced old technology

Invested in modern, renewable biomass plant

Kept business sustainable

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Plant Room Building

Required custom design

With under floor recesses

With large concrete fuel bunker for biomass storage

Live floor and sub surface structures

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Completion of concrete works in plant room

Steel anchors tied into the concrete,

imperative for the live floor loads

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Heat store foundation;

earthworks,

blinding concrete,

the final pour

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Van Wyk Flowers
Grower - Wholesaler - Florist

2ML heat store;

part of thermal design,

load buffering,

peak power delivery

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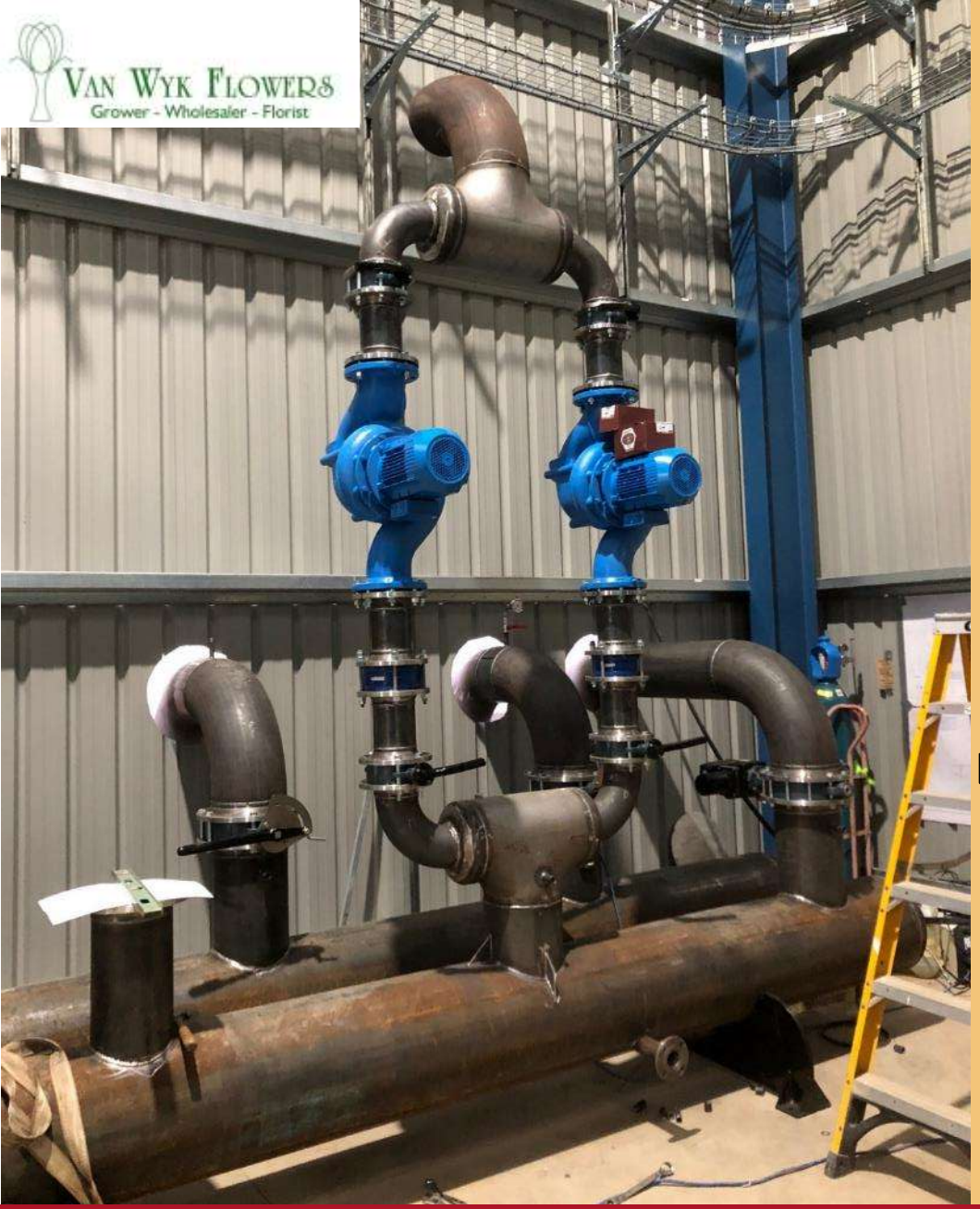

Hydraulics;

Plant Room

Pumps

Piping

Load Management

Optimised energy delivery

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Plant Install;

- **Advanced biomass plant**
- **Emissions control system**
- **Fuel handling system**

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Completed plant install

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Outcomes:

- **Turned off gas**
- **Under 4 year payback by using waste biomass**
- **Offsets 60,000 tonnes carbon emissions**

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BIOHOUSE PROJECT - Design, pre-build, disassembled, shipped, erected and commissioned

Nursery on the Murray, a long standing family business located on the Victorian side of the Murray River

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Chislett Farms

High quality food and plant production for the wholesale market

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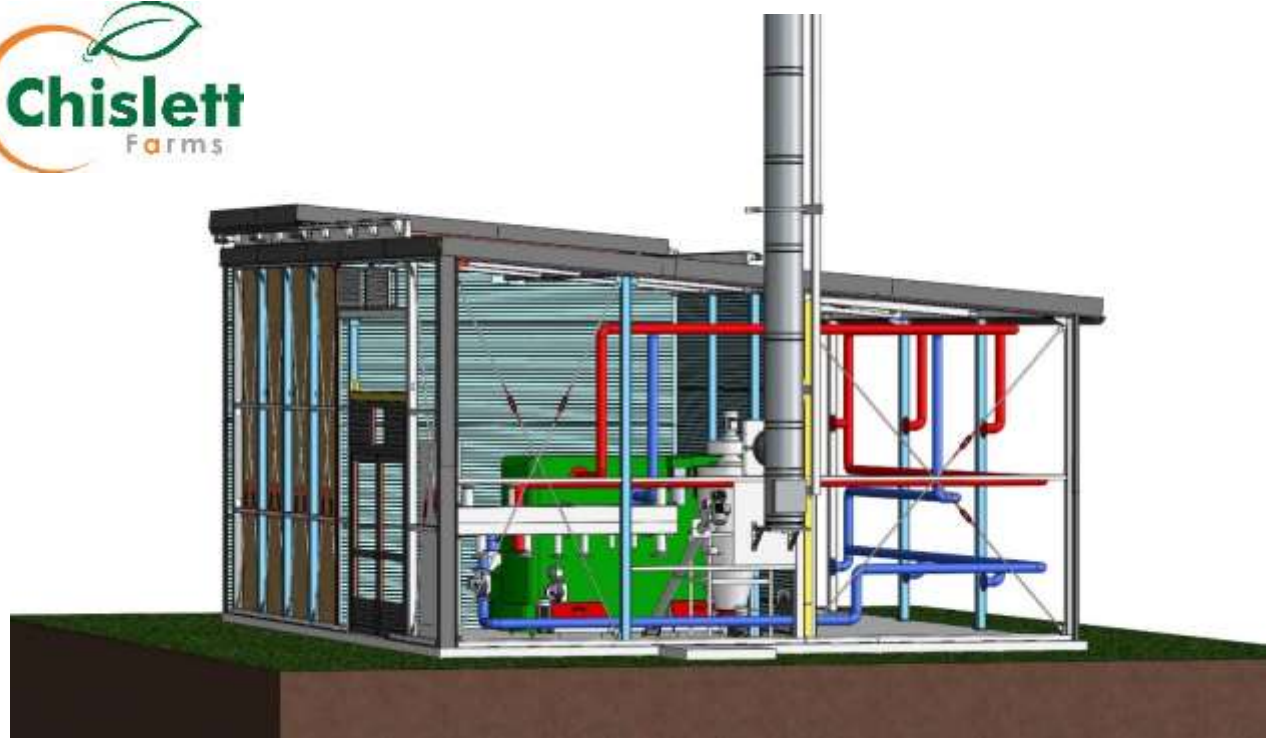

BIOHOUSE – All aspects are first designed and CAD modelled in 3D including the building, the mechanical plant, hydraulics, fuel storage and handling

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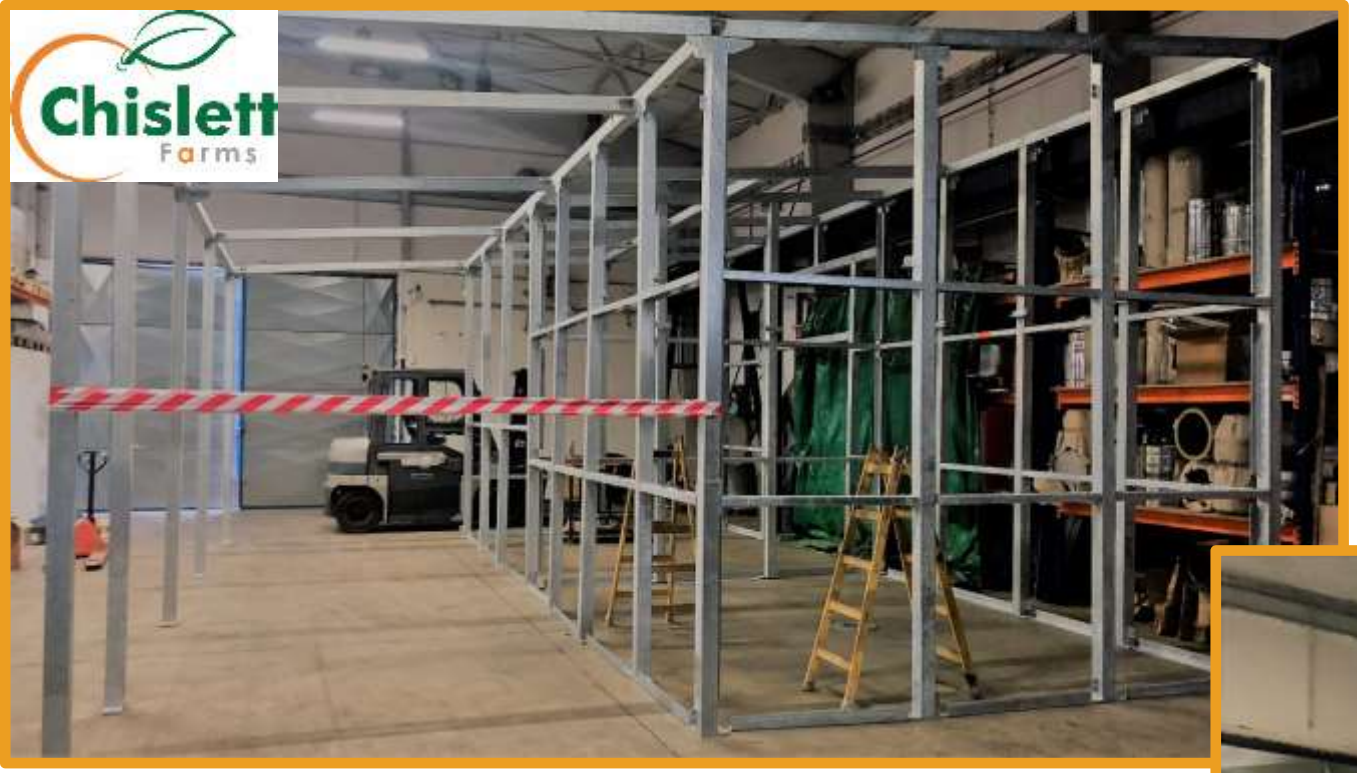

PRE-ASSEMBLY – Constructed in European facility prior to shipping

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SITE PREPARATION – The concrete floor is prepared at client site in Australia

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INTERNALS – Greenhouse hydraulics and bench heating elements are installed

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TRANSPORT – unassembled, packed, containerised, delivered and unloaded.

Europe to Australia. Factory to Farm

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INSTALLATION – the crew arrive and quickly re-construct the BIOHOUSE

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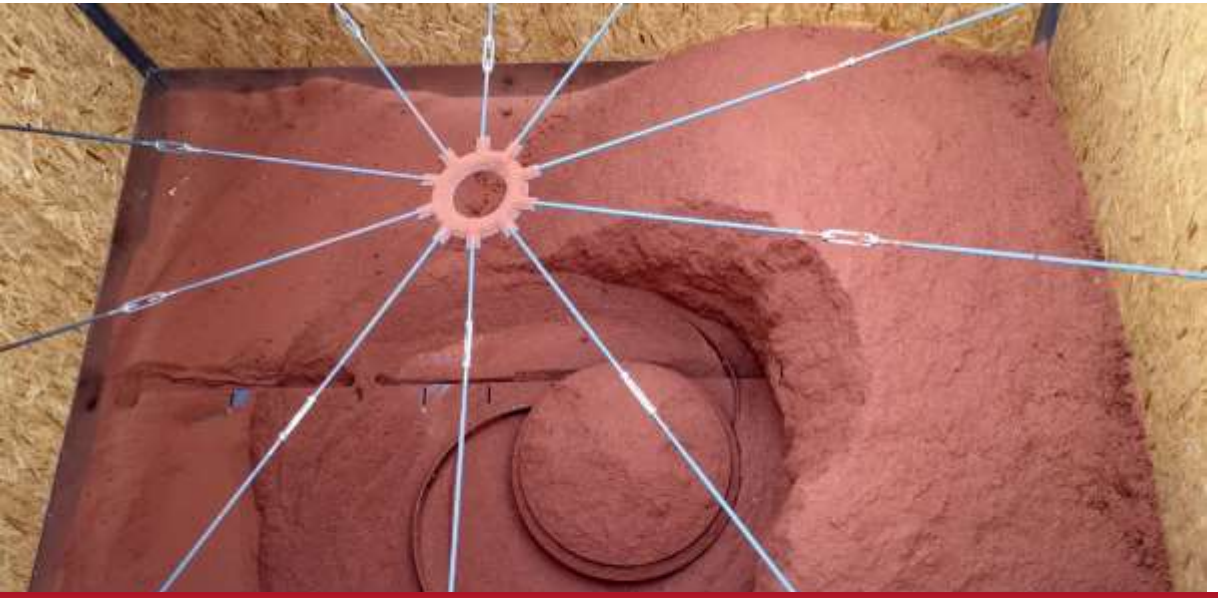
FUEL LOADING – Automatic roof hatch allows easy loading into fuel silo



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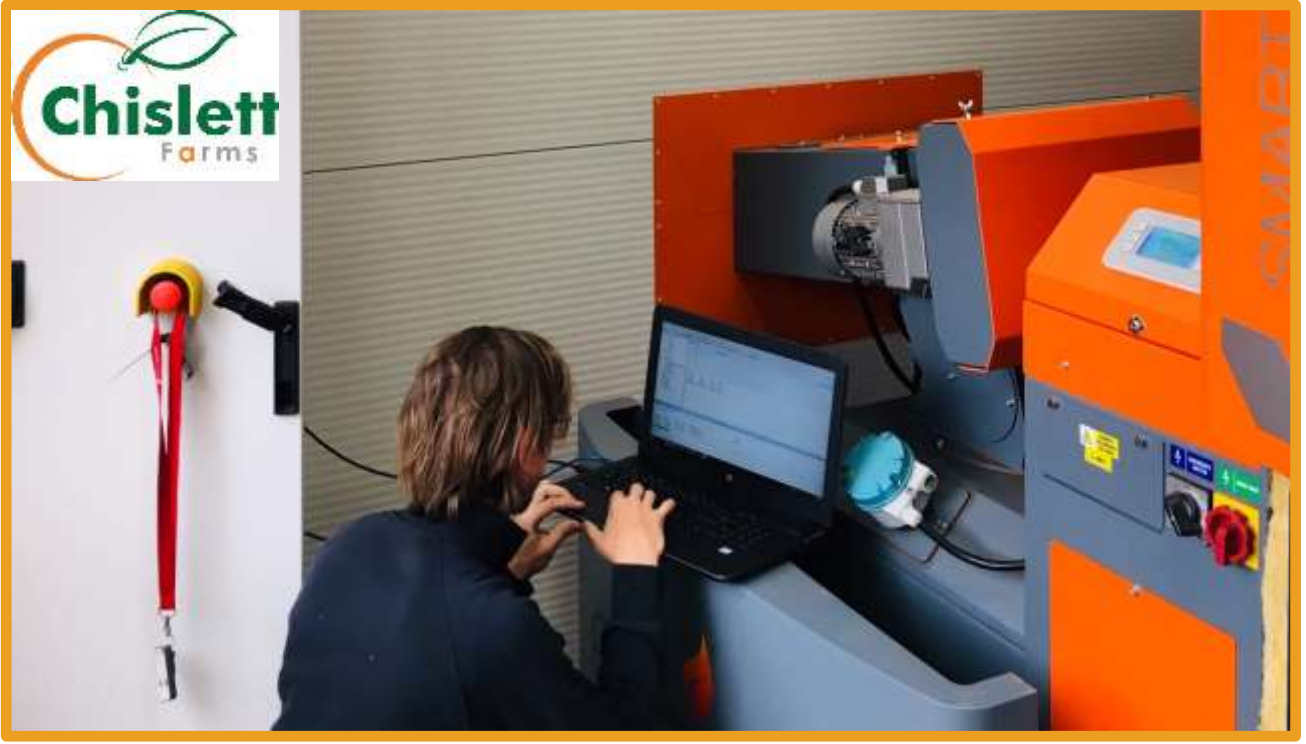

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HANDOVER– Tuning, client training, final commissioning, remote monitoring, and on going surveillance via 24hr internet link

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Project completed:

Small packaged biomass plant (<500kW)

Delivered integrated in building, hydraulics, electrical, fuel store, heat store

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