

# COVERED CROPPING SECTOR

## Reducing Energy Emissions: What's right for your greenhouse?

**DOUBLE-PANE**

**THERMAL SCREENS**

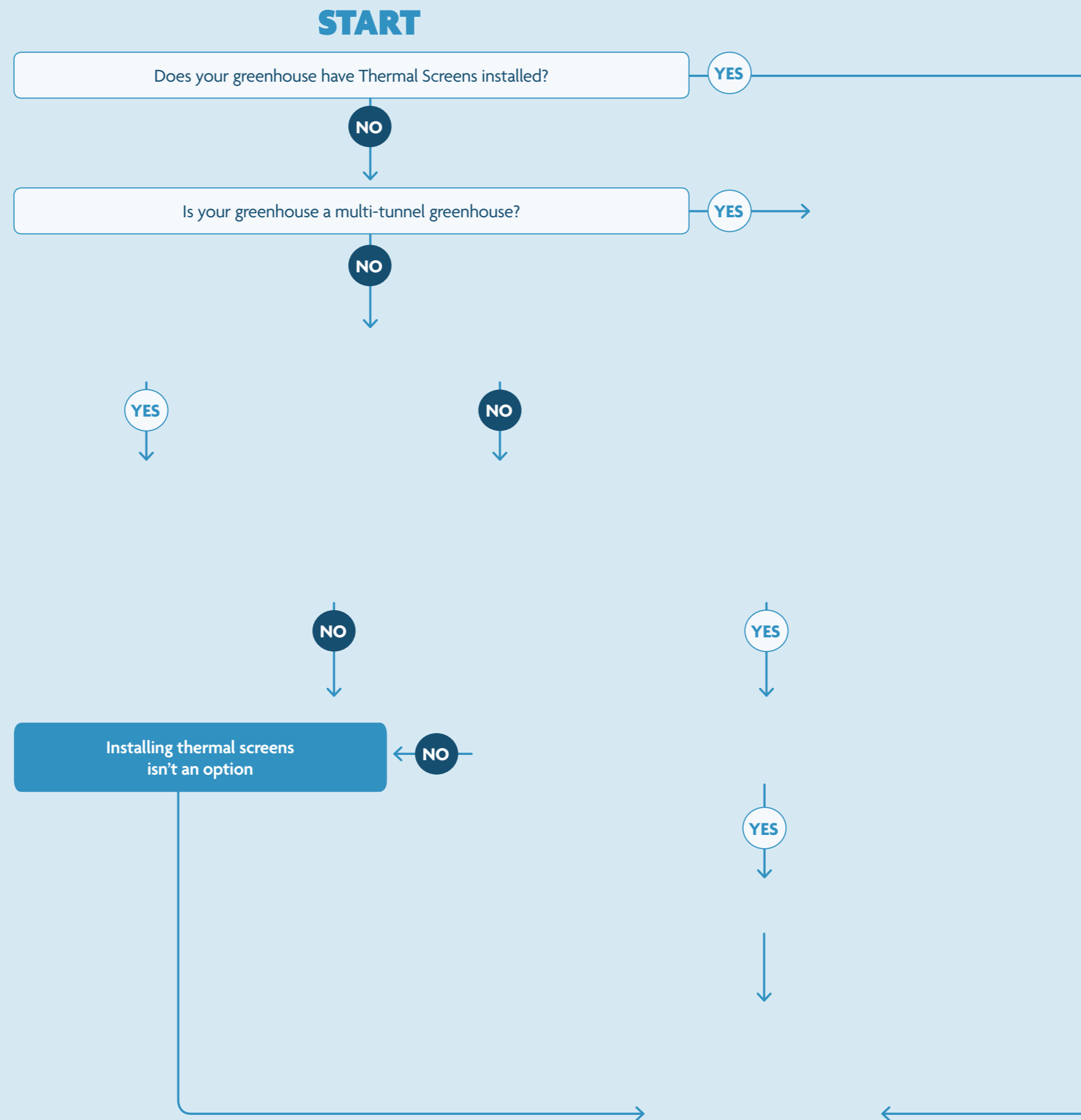
**DEHUMIDIFICATION**

Produced for TomatoesNZ, Vegetables NZ and EECA by Worley





# Are Thermal Screens right for your greenhouse?



## ADDITIONAL INFORMATION

- Energy savings depend on the type of screen – a supplier stated screen material energy saving may be 40-70%. Likely overall savings of 25-35% of the total annual heat energy input.
- Depending on the material selected, screens can also be used for shading.
- Co-benefits - can grow more resilient, stronger crop; less problems with rot and mould; increased growing season; stops condensation drips falling from the roof onto the plants.
- Important to get good advice on correct usage of screens. If screens are purchased through Ludvig Svensson free consulting advice can be obtained around how to maximise screen effectiveness.
- Thermal screens shouldn't cause a humidity issue if they are operated correctly.
- Different screen materials can be recommended based on the purpose and crop.
- Screens will require replacement every 10-12 years, though after 8 years reduced benefit is seen from screens because they will get dirty which limits their effectiveness.
- Obstructions (lights, fans, heating pipes) can make installation more difficult but can usually be worked around.
- Luxous type of screens are the type that are most often used for energy intensive crops as they maximise energy reduction and light transmission.
- Vege Fresh Growers talk about their experience of installing thermal screens: <https://youtu.be/5N4ueYJ8UGk?si=03wHHvFcU8OOLtag>

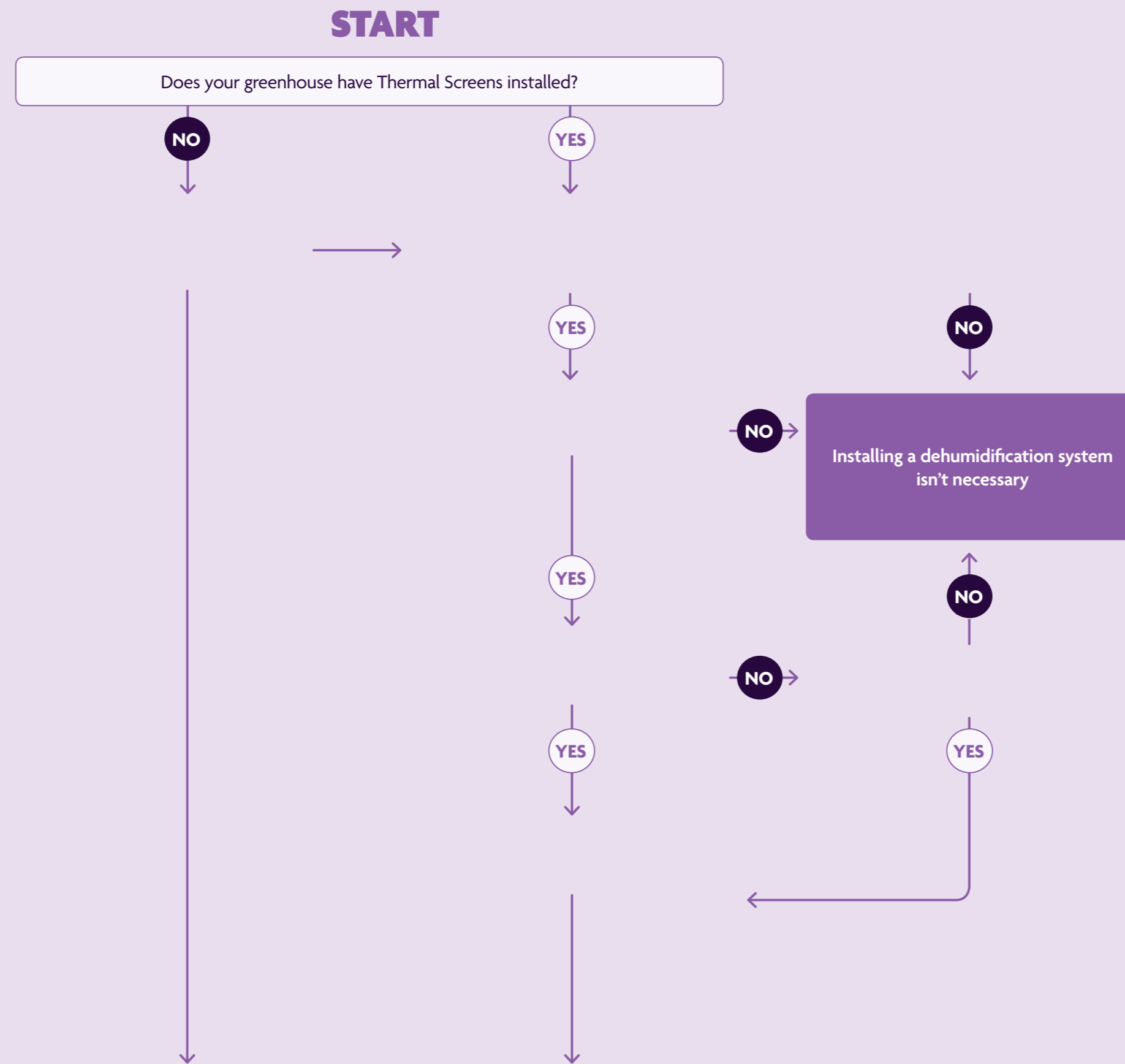
Site	Estimated Energy Savings	Location	Comments
Tomato & vegetable grower	12.5%	Tasman	Climate control adjustments required to manage screens effectively. If retrofitting, it's helpful to have no crops planted. Utilise supplier advice when choosing best type for your house and crop.
Tomato grower	25%	Christchurch	-2.5-3 year return on investment
Capsicum grower	35+%	Auckland	
Tomato grower	29%	Auckland	Noted difficulties with accurate screen control
Nursery	20%	Auckland	1ha
Capsicum grower	30%	Auckland	5ha



# Is Dehumidification an option for your greenhouse?



**SEE THERMAL SCREEN**    **SEE DOUBLE-PANE**



## ADDITIONAL INFORMATION

- Units can be ground mounted or suspended (depending on strength of greenhouse, space availability, irrigation by flooding, sufficient head height/truss height. Suspension can be more efficient as heat and humidity rise, exit water can be gravity run).
- Energy savings can be 30-50% of the total annual heat energy input.
- May need multiple units per greenhouse - number will depend on size, no. of plants, irrigation schedule, crop type, outdoor temps.
- Good air circulation is required - some units circulate the air themselves, others need external fans.
- Water removed from atmosphere can be re-used in irrigation (after filtration).
- Can result in an increase in production of 15-25%
- Other co-benefits include reduced diseases. Longer growing season.
- Different sized units can be specified depending on the requirements (26 - 1,100 L/day)
- Dehumidification generally runs at night when temperature drops and transpiration increases - can use cheaper power if on TOU meter
- Available electrical capacity: need approximately 6-10kW per 1,000m<sup>2</sup> (depends on required humidity levels, crops etc.).
- View a case study on use of dehumidifying units at Southern Belle greenhouses: <https://youtu.be/gZznlrpqSIE?si=zFLYHJp9lxZIHPXo>

## SOUTHERN BELLE

<b>Savings</b>	Thermal fuel use: 25% reduction
	Production Increase: 15% increase as a result of fungal disease reduction and CO <sub>2</sub> retention
	Payback: 3-4 years
<b>Number of units</b>	2 DG-12 Standard units, each requiring 10kW of electricity (DryGair)
<b>Capex</b>	\$120,000 for the entire installation (2018)
<b>Greenhouse size</b>	3000m <sup>2</sup> twin-skin plastic house
<b>Comments</b>	Most difficult part of installation was connecting the system to the climate control system. Southern belle are located in Matamata