## AUSTRALIA A GATINO

## **OCCUPATION**





### Our experience with CO<sub>2</sub>

Foodstuffs North Island Limited



# AUSTRALIA ATNO



### What Initiated the Change?

- Introduction of the Emission Trading Scheme (ETS) in 2002 and its impact on high GWP refrigerants
  - Our refrigerant usage at the time was solely focused on R404a/ R507
  - to increase in cost by approx. \$100
- The proposed phase down of high GWP refrigerants in Europe
  - Concerns about the effect of the phase down on availability of R404a/ R507 for the New Zealand market
- Consideration of what a long-term solution, given what we expected to be available, could be?



• Indications were that carbon emission tax would be in the vicinity of NZ\$25/ tonne - this meant 1kg of R404a had the potential

• At the time there were no viable synthetic refrigerants to consider, as most of the refrigerants had a level of GWP









- comparing a R404a to CO<sub>2</sub> system.
- saving by using  $CO_2$  as an alternative to R404a.





• Based on the progress made by manufacturers, suppliers and installers in Europe, it appeared to be a viable long-term solution.

• Information supplied to us by our refrigeration installers indicated that there would be 10% power consumption reduction when

• Our refrigeration consultant calculated that through the 20 year life cycle of the a refrigeration system there would be a \$1m









### What have we done?

- Our initial installations were based around sub-critical CO<sub>2</sub>
- Introduction of fully trans critical CO<sub>2</sub> systems in 2012
- We now have:
  - 7 medium format stores that are trans critical  $CO_2$  and 5 that are sub-critical  $CO_2$
  - 12 large format stores that operate with  $CO_2$ , where 2 are pumped  $CO_2$  and 1 is sub-critical











### Milford New World.

Refrigeration Load Low Temperature 20Kw Medium Temperature 215Kw

### foodstuffs B







### Te Kuiti New World.

**Refrigeration Load** Low Temperature 20Kw Medium Temperature 190Kw

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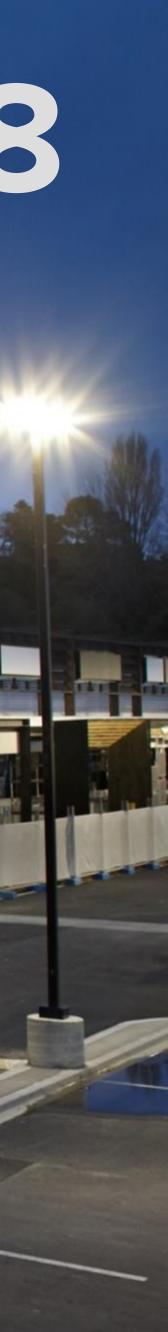
### Tauriko Pak n Save.

Refrigeration Load Low Temperature 60Kw Medium Temperature 370Kw

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SLA

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### Papakura New World.

**Refrigeration Load** Low Temperature 25Kw Medium Temperature 215Kw

### foodstuffs

at 8:15am

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### What have we found?

- cabinet's evaporator
- comparison to a synthetic system
- However, this is off-set by the efficiencies and low running cost of  $CO_2$  in comparison with synthetic refrigerants



• It's important, when undertaking refurbishments, either to fully replace the refrigerated cabinet, or, at a minimum, to replace the

• When installing refrigeration into a new build, the cost of CO<sub>2</sub> plant has now reached a point where it is almost cost neutral in

• There is a cost premium when installing  $CO_2$  systems into existing stores, mainly due to new pipework having to be installed.







### Where are we going?

- some examples of our initiatives:
  - More effective ways of heating the building with the waste heat.
  - Using waste heat to supply all hot water requirements in the store
  - ice heave in freezer room floors
- Investigating how we could use natural refrigerants in our retail space air-conditioning systems



• Historically we've used the waste heat from the CO<sub>2</sub> systems we've installed to supplement our hot water heating: below are

• On larger installations, using the waste heat for underfloor heating, where traditionally electric heaters were used, i.e. to stop





### What are our concerns?

- same level of risk applies to synthetic refrigerant use
- Education is an important element to increase the levels of understanding regarding this type of refrigerant



• There is a perception, when using CO<sub>2</sub>, that it is more dangerous to public health, because of the Health & Safety considerations that have to be taken into account regarding  $CO_2$  usage, compared with synthetic refrigerant usage. An example of this is: requirement to have leak detectors in the retail space and also in back of house refrigerated spaces. One could argue that the





#### Thankyou very much!

