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n e t w o r k
Natural Refrigerants

07/06/18 - Johannesburg





Woolworths CO₂ Journey

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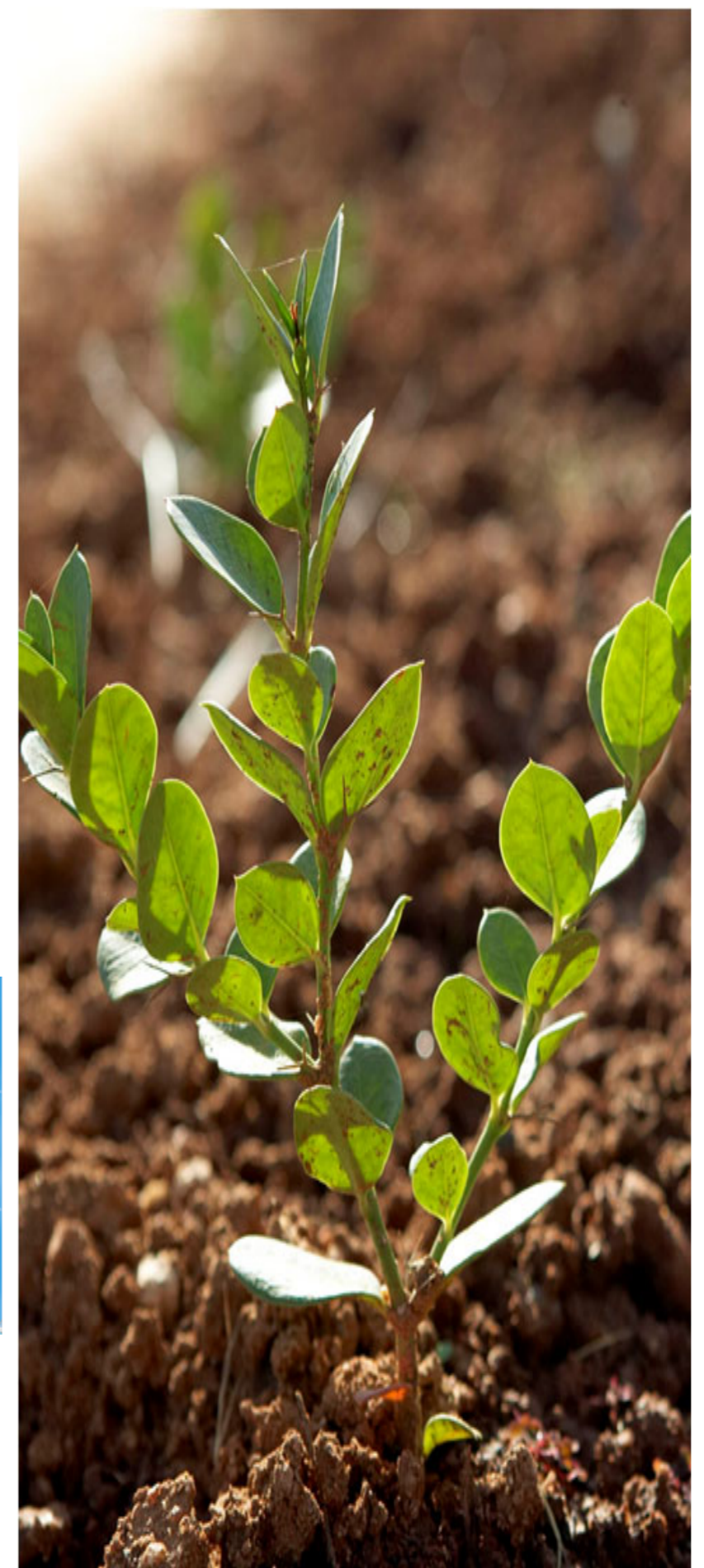


The Start

Why CO₂ ?

- Good Business Journey
 - Energy Efficiency
 - Reduce Carbon Emissions

HCFC – R22	Ozone 	Greenhouse gas 
HFC – R404A	Ozone 	Greenhouse gas 
Natural Gases	Ozone 	Greenhouse gas 



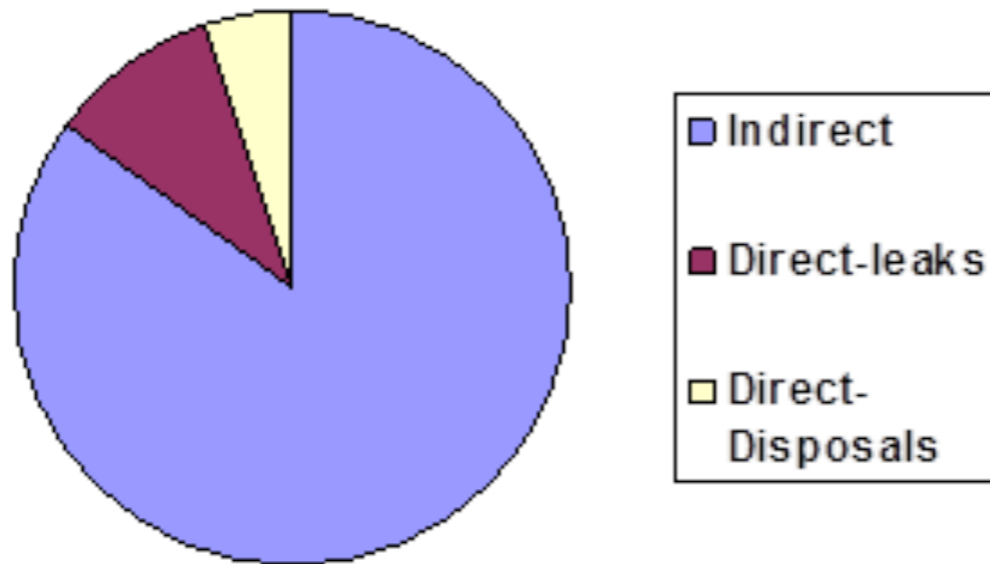
The Start

Why CO₂ ?

- Good Business Journey

Energy Efficiency

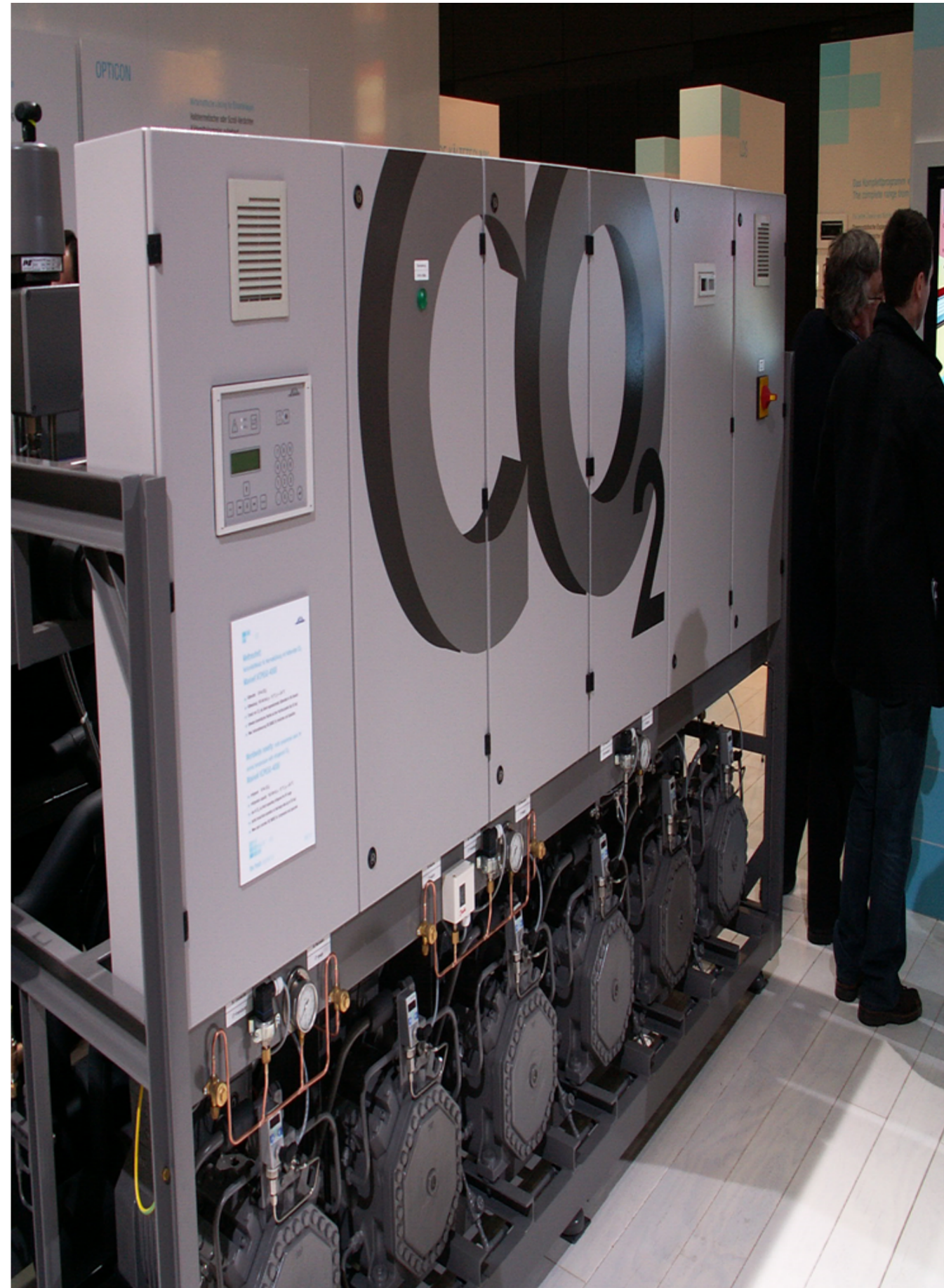
Reduce Carbon Emissions



The Start

Initial difficulties:

- Fear and Complexity
- Sourcing of components
- Cost of CO₂ +45%!
- Belt and Braces
- Skills Development



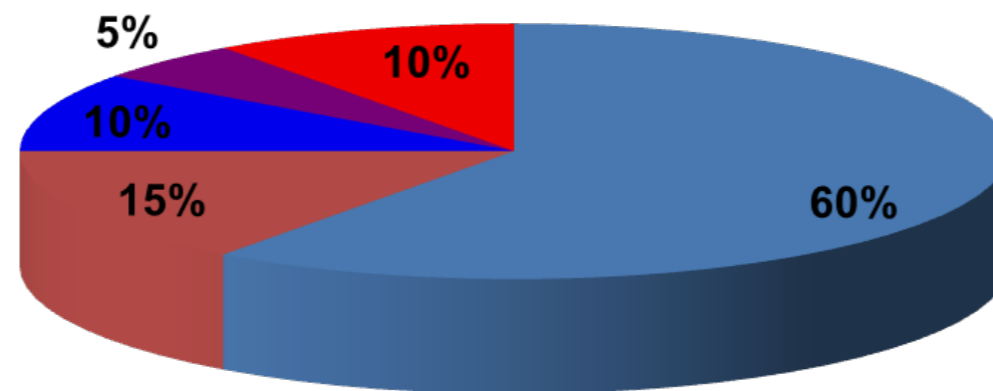
Current situation

Number of CO₂ stores:

- First sub critical CO₂ store opened Oct 2009 – 9 stores
- First trans critical CO₂ store opened Nov 2010 – 61 stores

Energy:

WW energy usage



■ Refrigeration ■ AC ■ Lifts, Escalators ■ Small Power ■ Lighting

Current situation

Energy savings:

1. Electronic expansion valves
 - 7% saving
2. Suction demand
 - 13% saving
3. Variable speed EC fans
 - 26% saving
4. Floating head pressures
 - 32% saving
5. Variable speed compressors
 - 45% saving
6. Eliminate defrost heating
 - 48% saving



Current situation

Energy savings:

- Metering on Line
- Automated Load Control
- Heat Reclaim
- LED Lighting
- Talking Door Alarms
- Staff Training and Awareness





Current situation

Energy savings:

Financial Year	kWh Reduction	% Savings Reported	Number of stores compared
2009/10 vs 2008/09	- 17,826,780	-7.63%	190
2010/11 vs 2009/10	- 19,862,873	-8.60%	201
2011/12 vs 2010/11	- 9,322,207	-3.80%	243
2012/13 vs 2011/12	- 7,868,432	-3.30%	254
2013/14 vs 2012/13	- 3,703,743	-1.63%	263
2014/15 vs 2013/14	- 1,648,723	-0.77%	250
2015/16 vs 2014/15	1,614,066	0.63%	310
2016/17 vs 2015/16	- 6,740,613	-2.48%	312

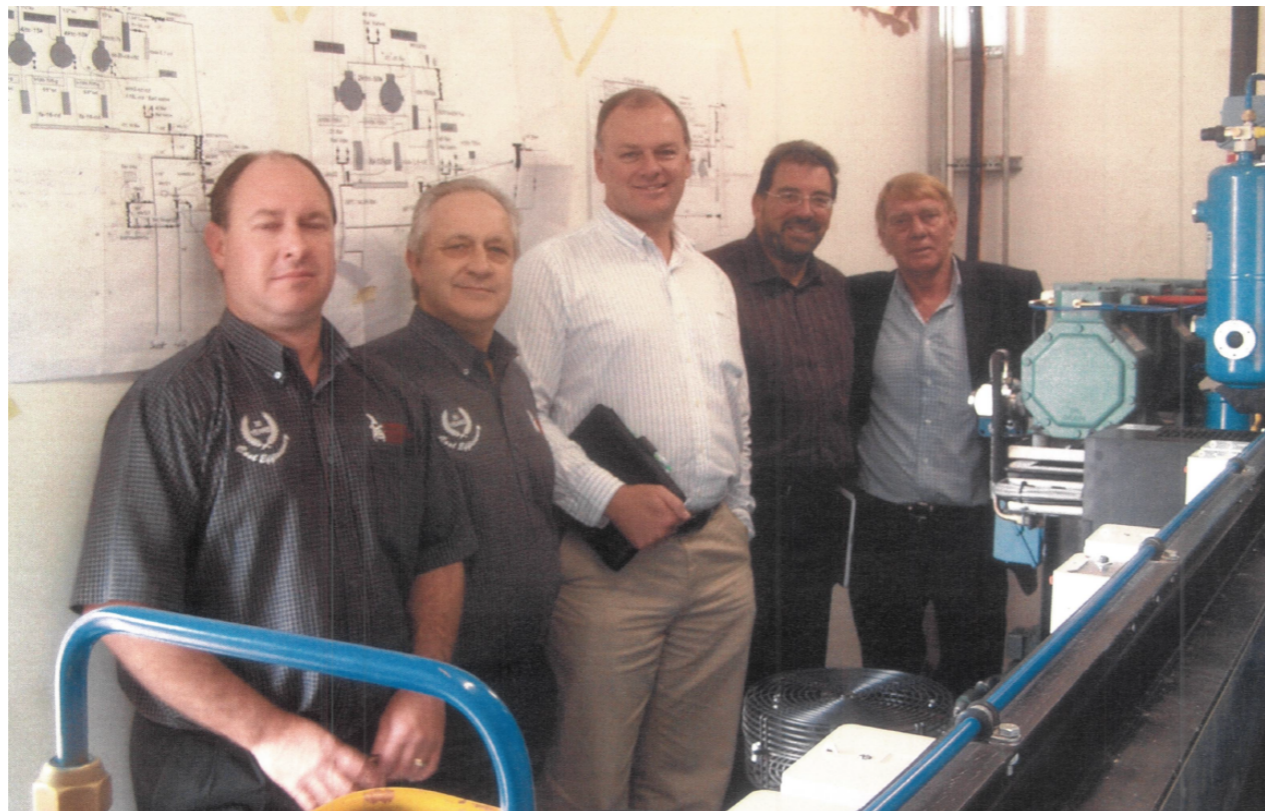
Experience with CO₂

- Reliable and Simple
- Technicians familiar with DX technology
- Sustainable and future proof
- Cost Neutral...almost
- Energy savings with parallel compression over a year
- Cross over point moves from 27°C to 38°C
- Works well in high ambient conditions
- Excellent heat reclaim opportunity
- HFC gas cost is spiralling



Future for Woolworths

- Committed to natural gases in stores and DC's
- Strive for cost neutral in smaller installations
- Water usage and storage
- Doors on refrigeration cases





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Thank you for listening.

