

# Clever ways to save energy & energy costs at the dairy

Wilandra Farms – Smart farm power day

February 2, 2023

[www.gabrielhakim.com.au](http://www.gabrielhakim.com.au)



## Energy at the dairy

Ann. Prod.	2.8 ML
Electricity tariff rates (ex GST)	
Peak	28.35 c/kWh
Off-Peak	15.19 c/kWh
Feed-in	5.00 c/kWh (2023 est.)



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Emissions  
tCO<sub>2</sub>-e

140

Energy use  
kWh

Water heating 25%

Cooling Milk 35%

Other 40%

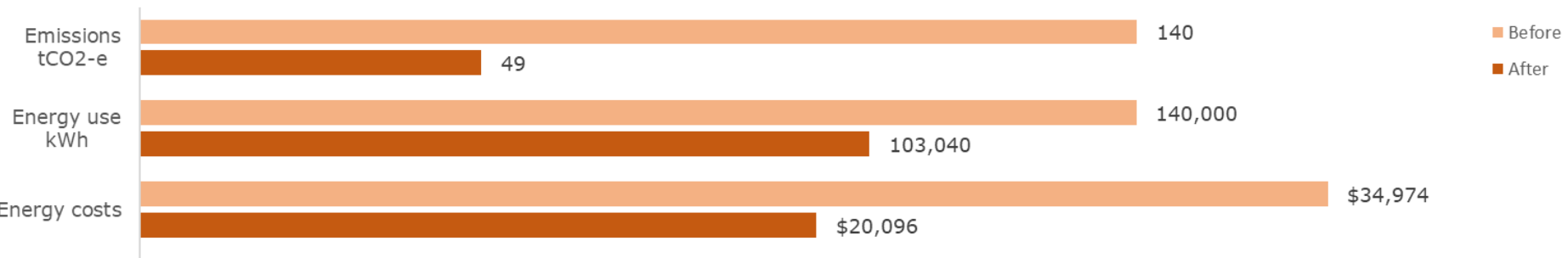
140,000

Energy costs

\$34,974

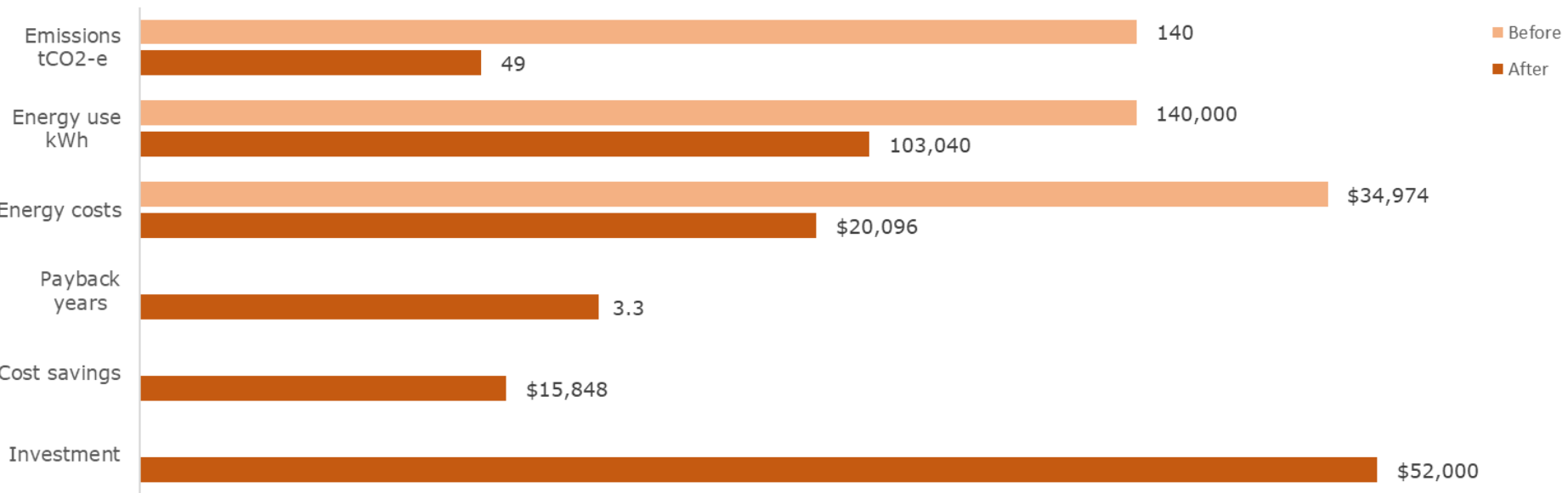
# The Possibilities

What's (conservatively) possible by getting Clever about energy at the dairy



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Where do we start?

Yeah, but our farm is different.

What do we need to do?

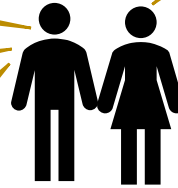
It's too expensive?

I'm not confident

They're all trying to sell me stuff?

I'm worried we'll make the wrong choice

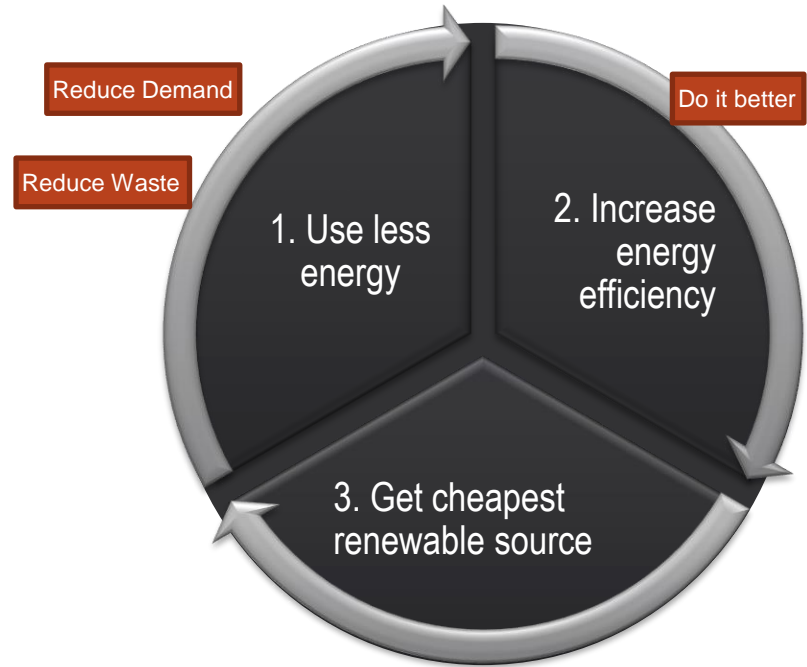
Who can we trust?



# Easy Steps

Hint: Do them in the right order and it will cost you less, and the savings will be bigger.

4. Monitor, fine-tune, go again.



# Reduce demand, Reduce waste

Reduce Demand

Reduce Waste

1. Use less energy

1. Revise/change the milking machine wash program
  - \$1,500 - \$2,700 per year saving
2. Pre-heat water
  - \$1,500 - \$3,200 per year saving
3. Don't overheat
  - Keep it under  $\sim 90^{\circ}\text{C}$
  - Boiling water costs  $> \$400$  per year
4. Stop leaks and insulate

If it ain't broke ...



Energy demand for water heating can be reduced by more than 60%!



# Do it Better

Dedicated plate cooler pump  
3.5 kW

Replace



Dedicated plate cooler pump  
0.55 kW

2. Increase  
energy  
efficiency

Investment (\$)	Savings (kWh p.a.)	Savings (\$ p.a.)	Payback (years)	Emissions saved (tCO <sub>2-e</sub> p.a.)
969	5,707	1,374	0.7	5.7

# Do it Better

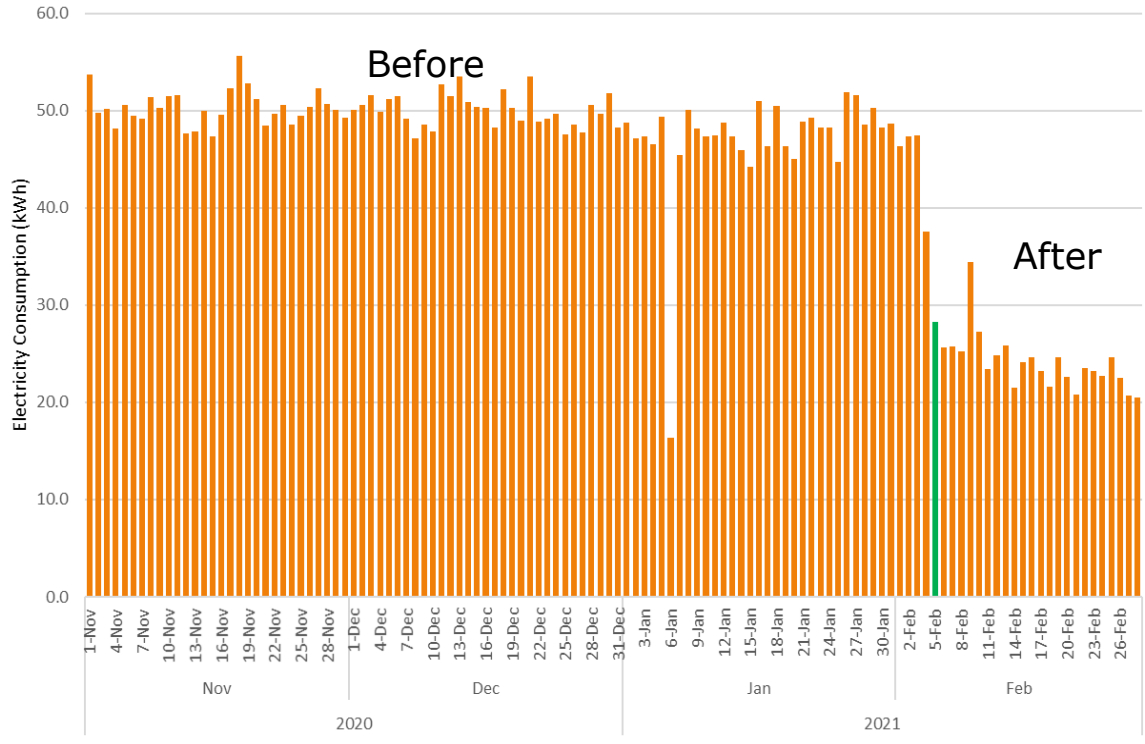
Do it better

2. Increase energy efficiency

### Daily Vacuum Pump Electricity Consumption

VSD on vacuum pump installed 4/2/2021

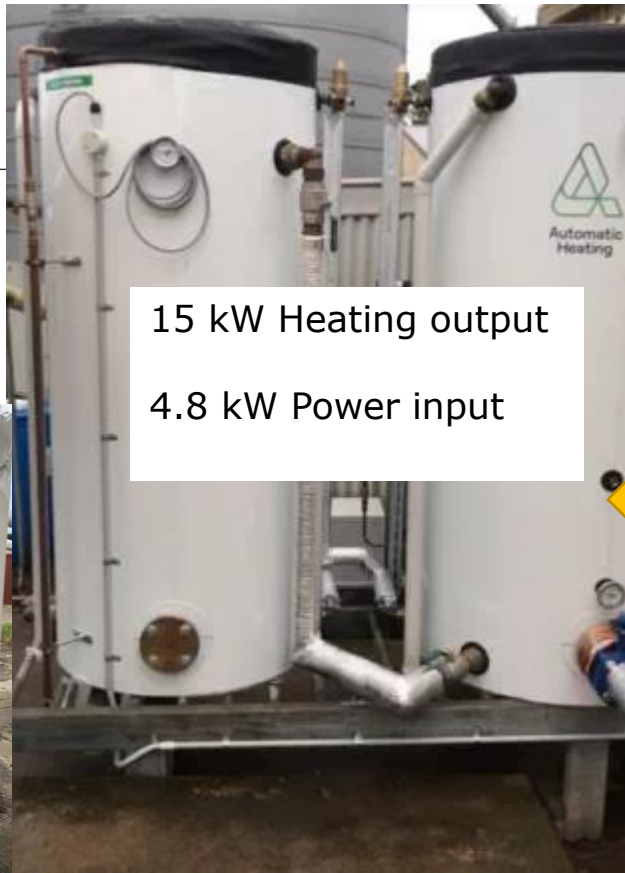
Av. Daily Consumption  
Prior to 5/2/21 48.9kWh  
From 5/2/21 24.2 kWh



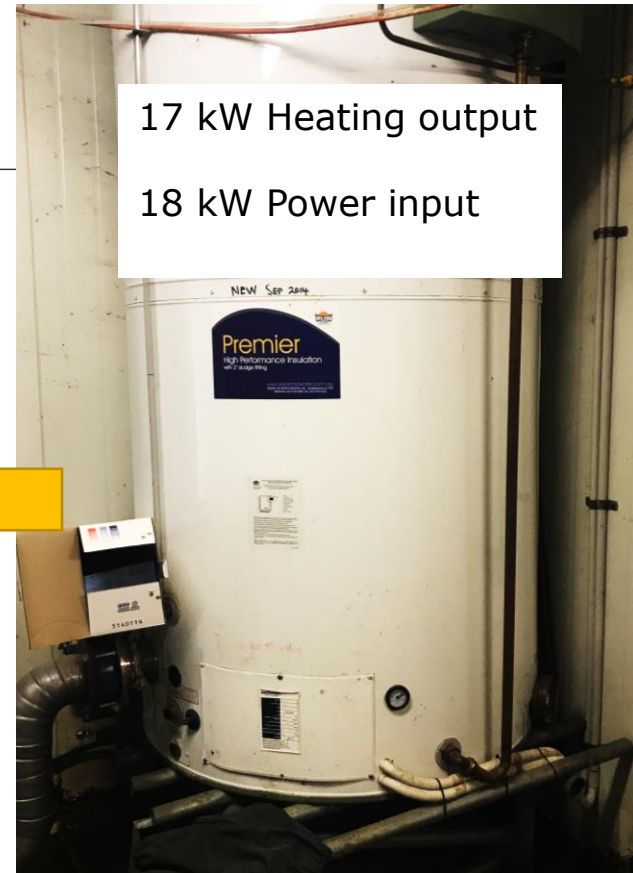
# Do it Better

Do it better

2. Increase energy efficiency



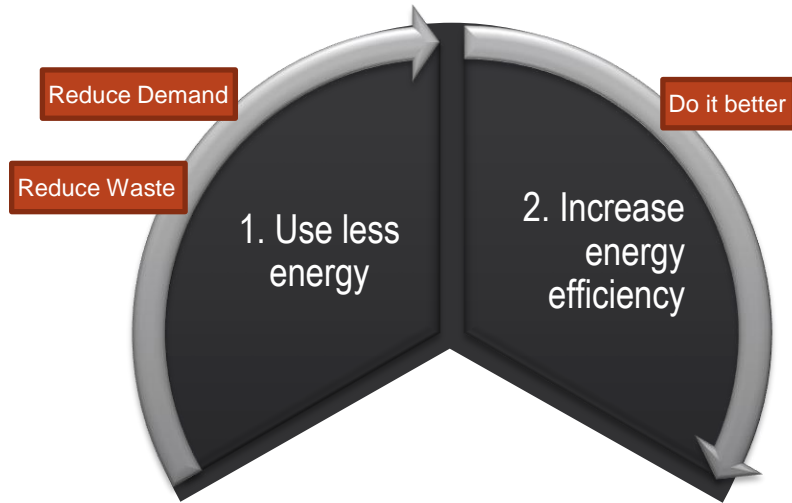
15 kW Heating output  
4.8 kW Power input



17 kW Heating output  
18 kW Power input

# So far, so good

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## Now, look at pricing

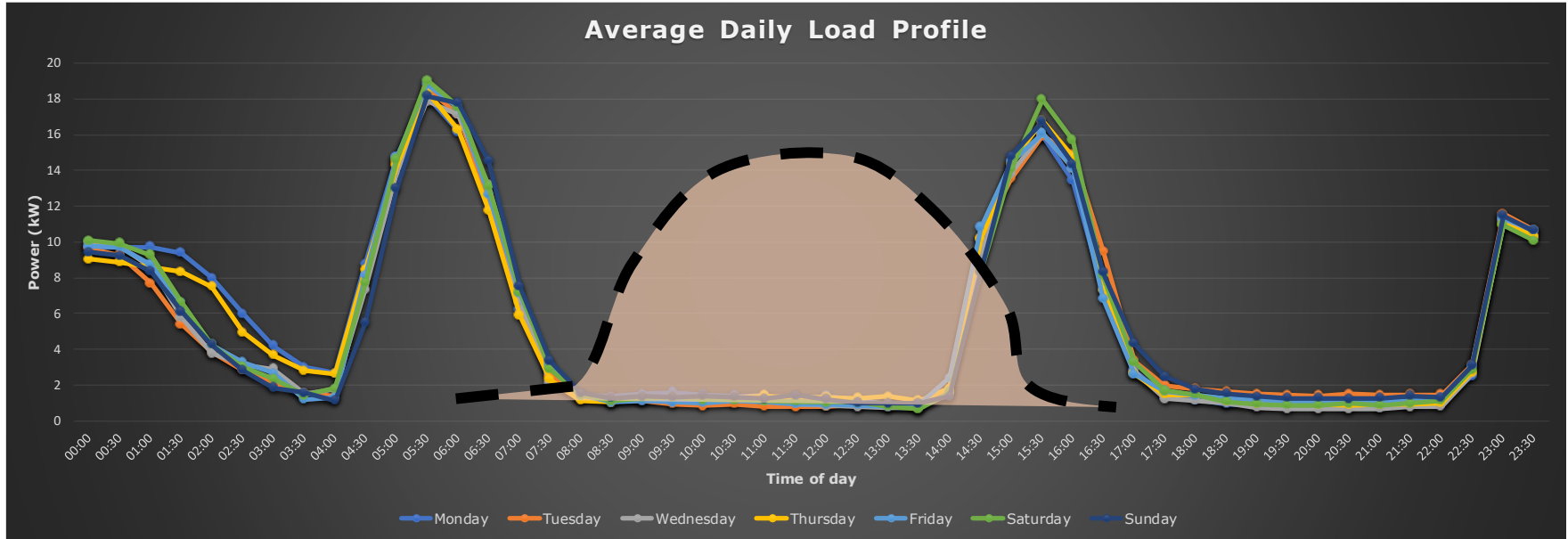
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Negotiating with retailers can achieve short-term cost savings.

But, it's a hit and miss affair.



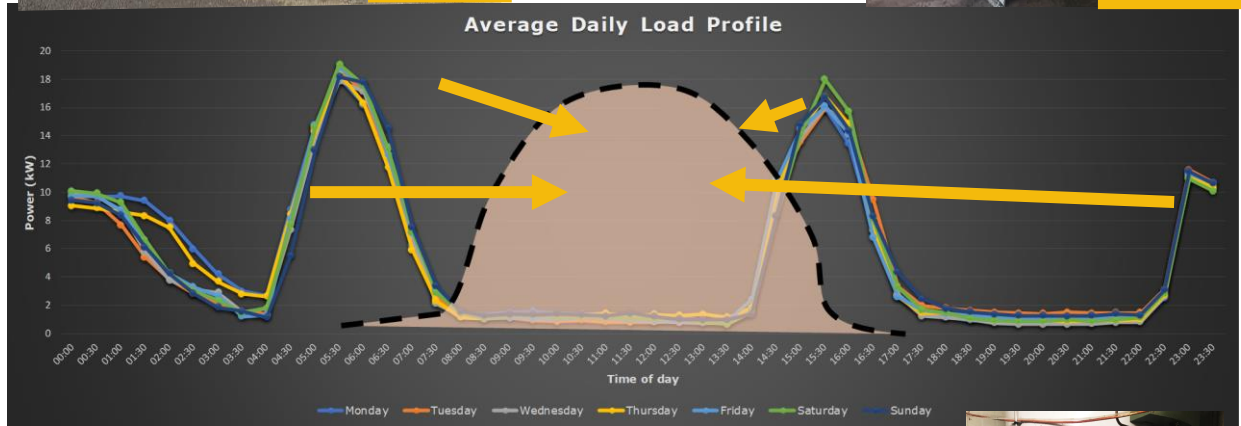
# Solar PV alone is not a fix



3. Get cheapest renewable source



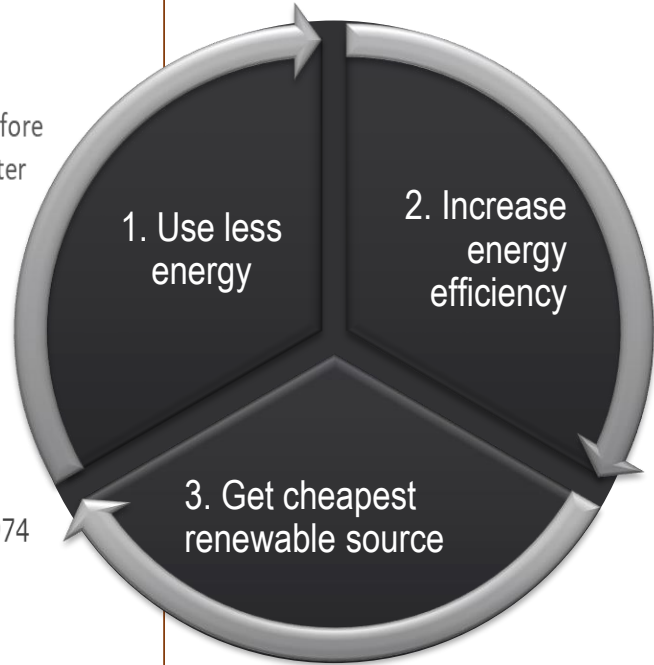
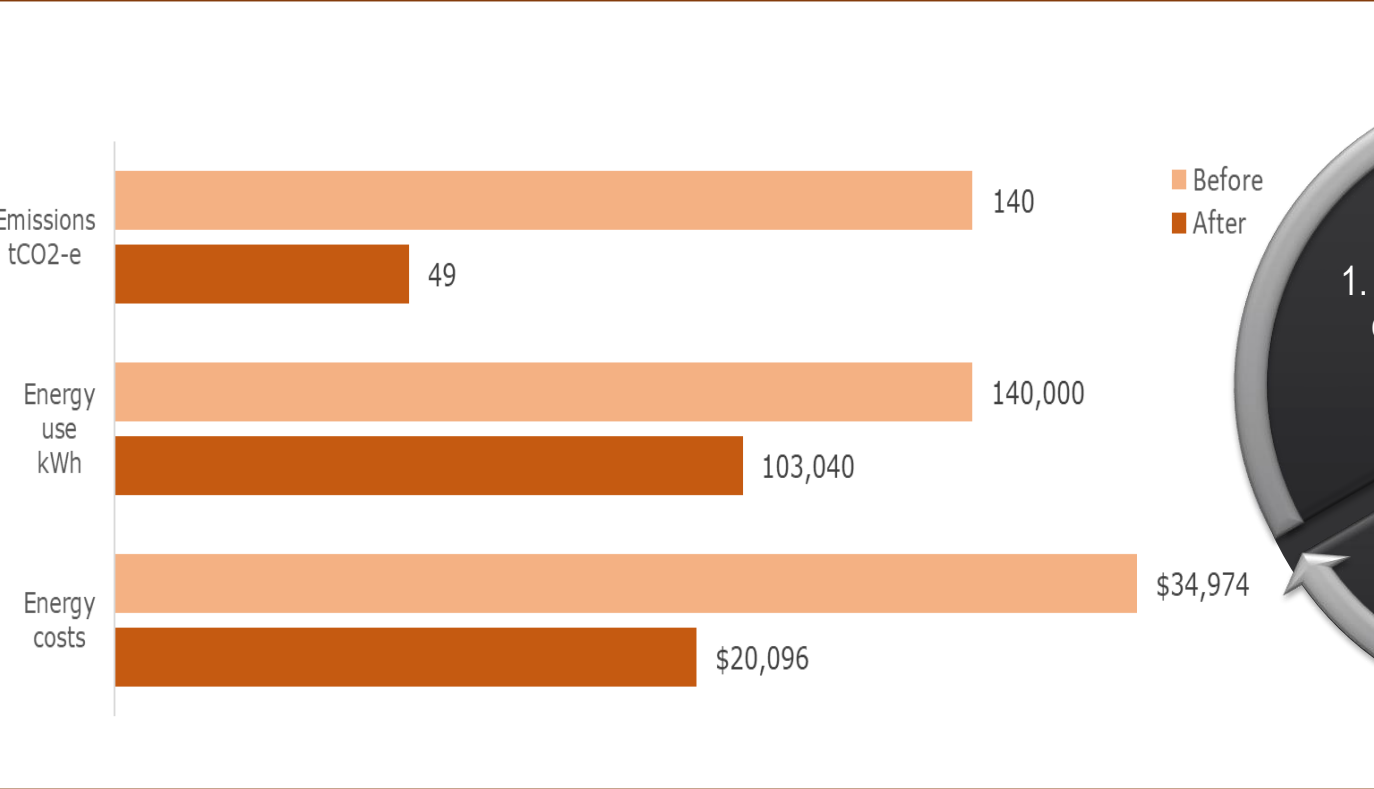
Cooling milk



Heating water



# Turning what's possible into what's in practice





# Thanks

**More information?**

**Contact Gabriel Hakim 0407 358 399**

[www.gabrielhakim.com.au](http://www.gabrielhakim.com.au)

