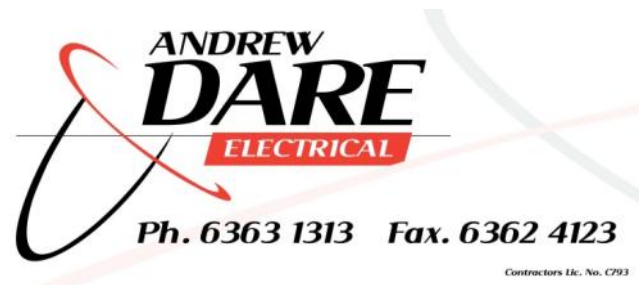


# Energy Monitoring in 10 Tasmanian Dairies

Funded by  
Dairy Australia  
and your  
dairy service  
levy



**NHP**



June 2012

# Disclaimer

- *Energy monitoring has not been undertaken previously in Tasmanian dairies. There were a lot of learnings.*
- *This presentation is a results summary only.*
- *No expenditure decisions should be made solely on the basis of the information presented here. Please consult professional advice first.*

## **10 dairies:**

- 7 rotary
- 2 herringbone
- 1 robotic box dairy

## **Two types of monitors:**

- Current Cost monitors with Go Lime Software (not billing class, cheaper).
- NHP industrial, billing class monitors with NHP software (billing class, more expensive).
- Both types must be wired in by electrician.

# Go Lime equipment being installed



# Go lime software programming



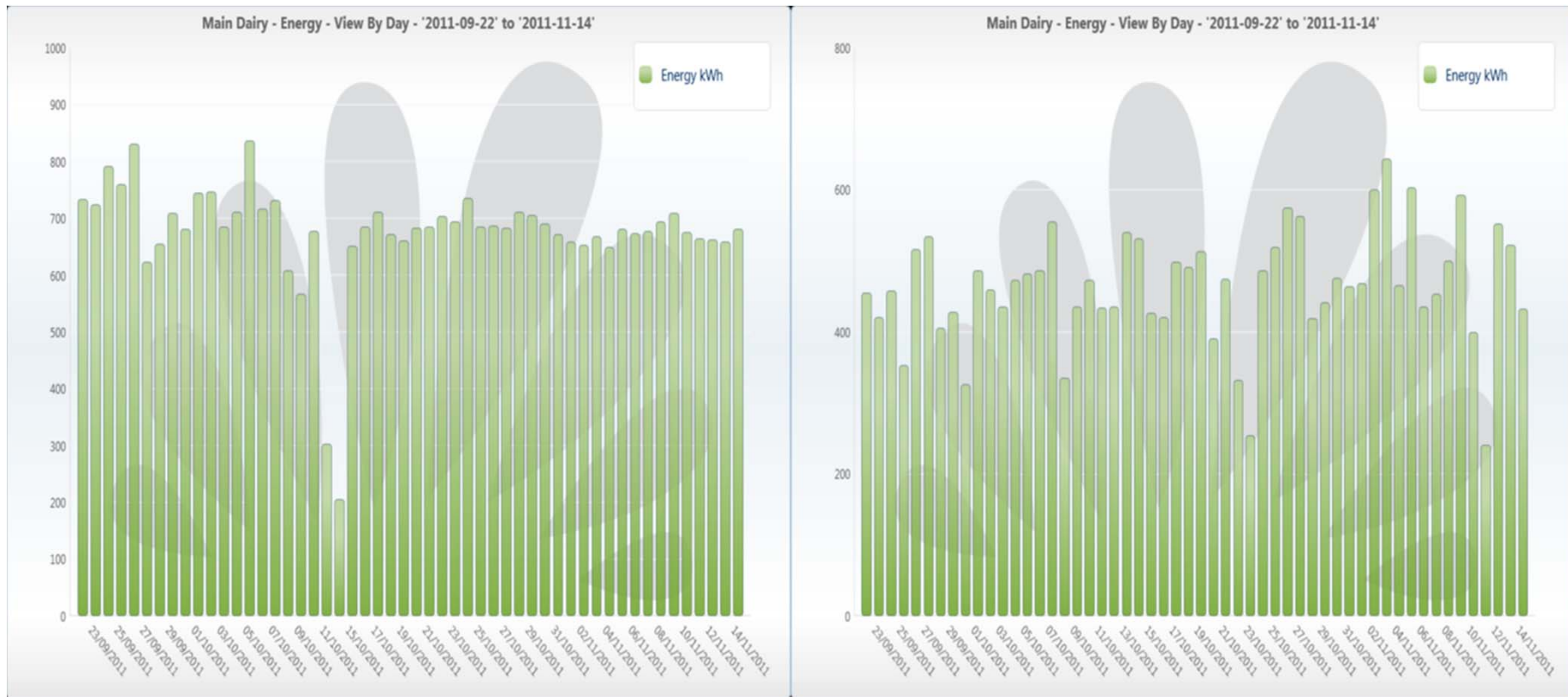
# NHP equipment installed on site



# Results (Go Lime)

kwh per day used in dairy

- Bennett rotary 56unit
- Brock rotary 50unit

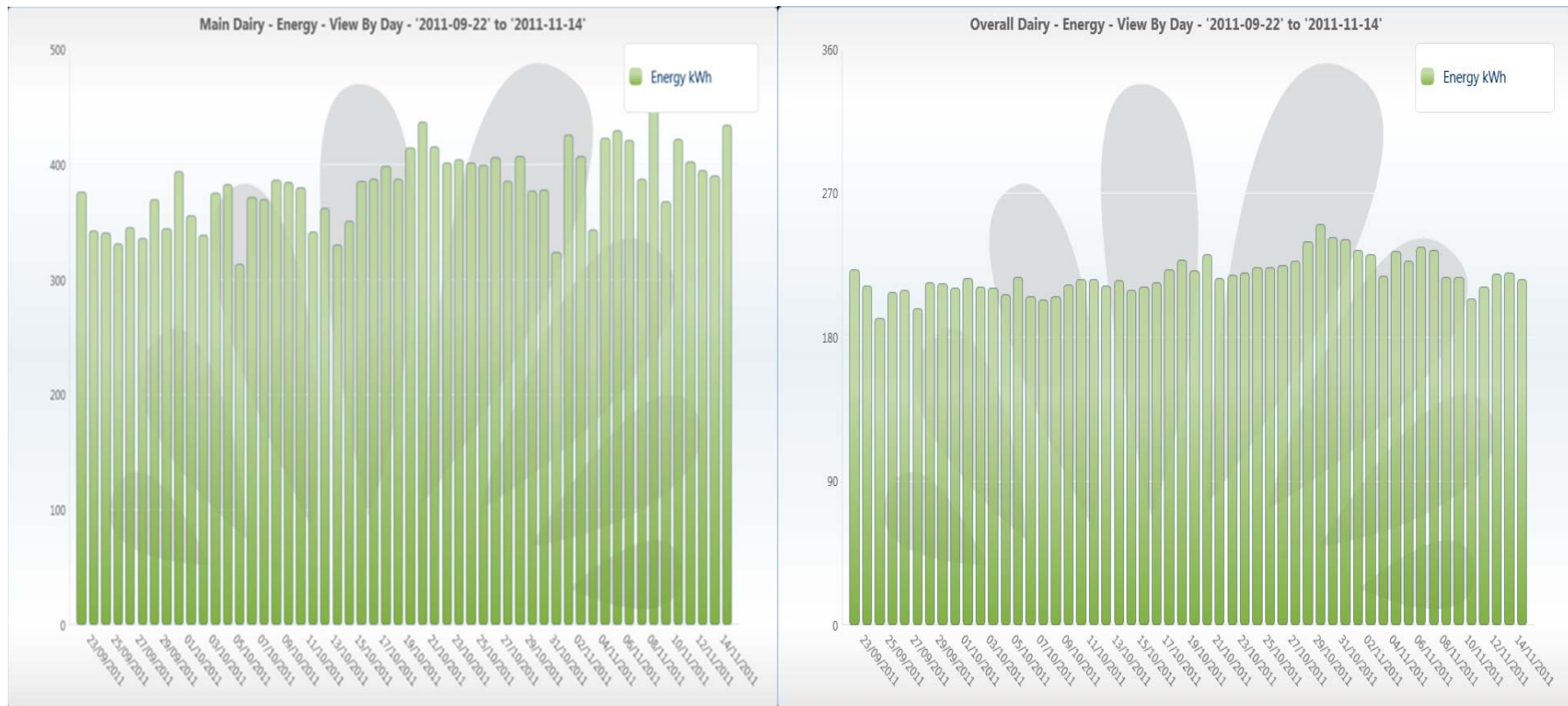




# Results (Go Lime)

kwh per day used in dairy

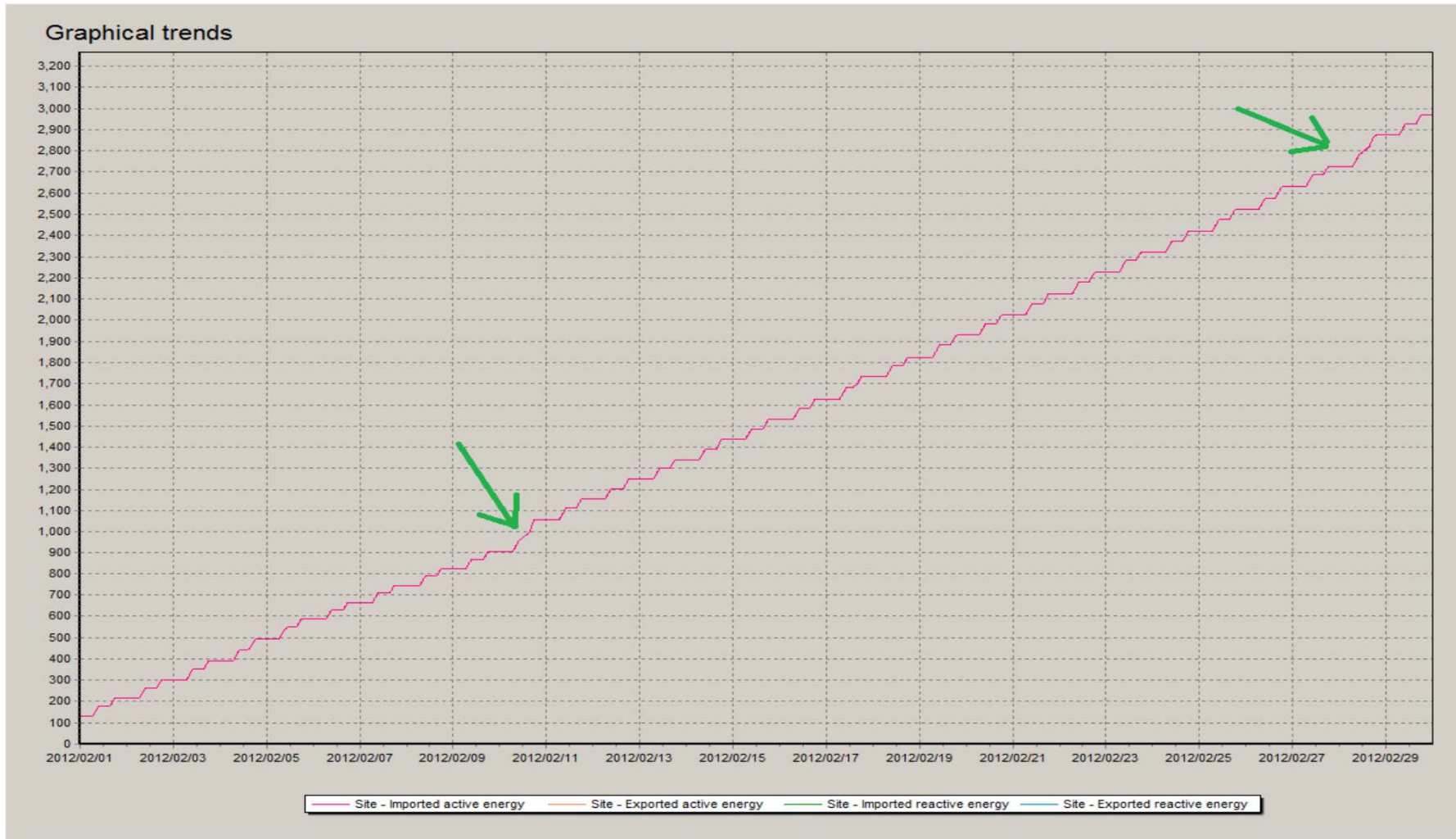
- Phelan rotary 50unit
- Hingston herringbone





# Results (NHP)

daily trends in kwh

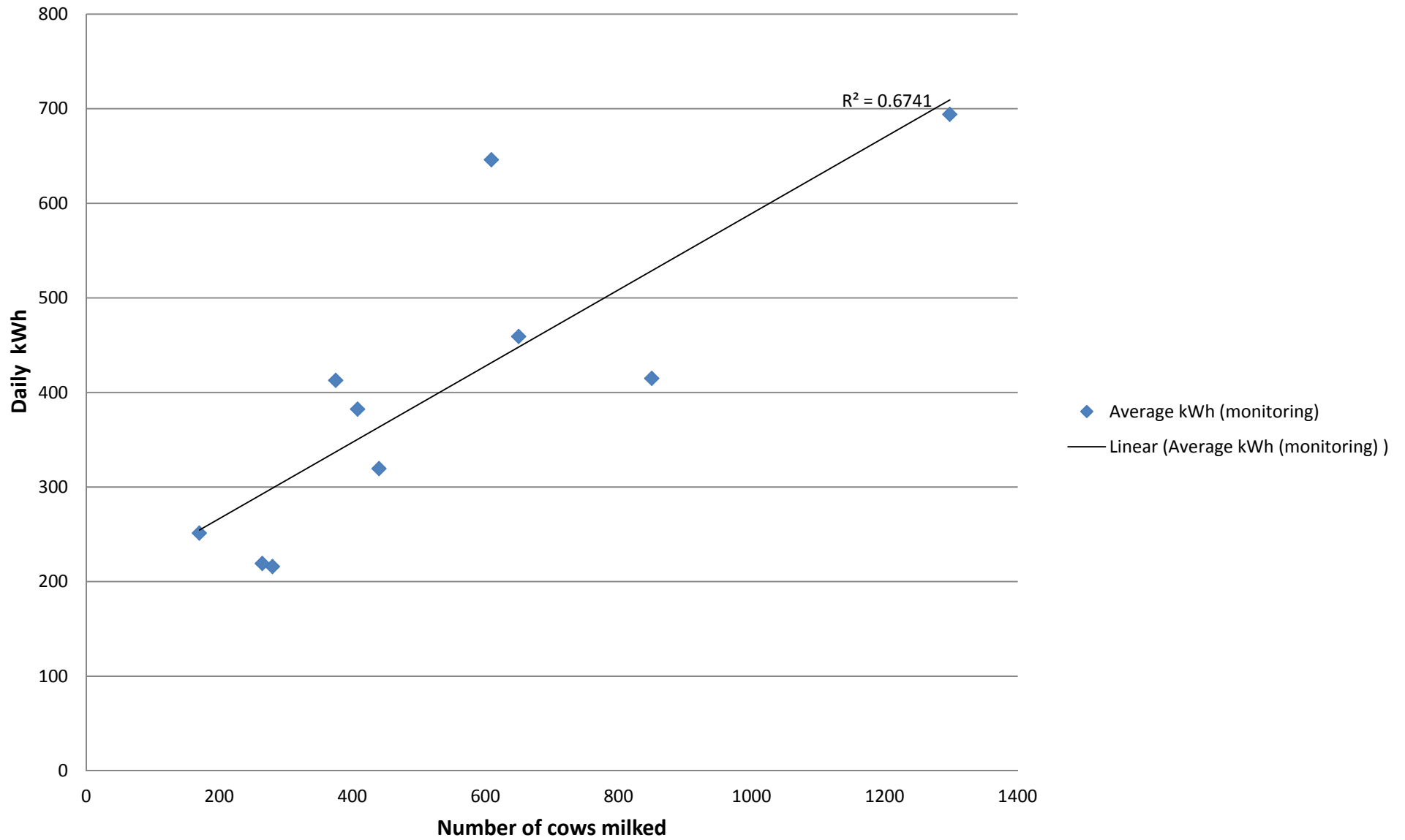


# Collated data across 10 dairies

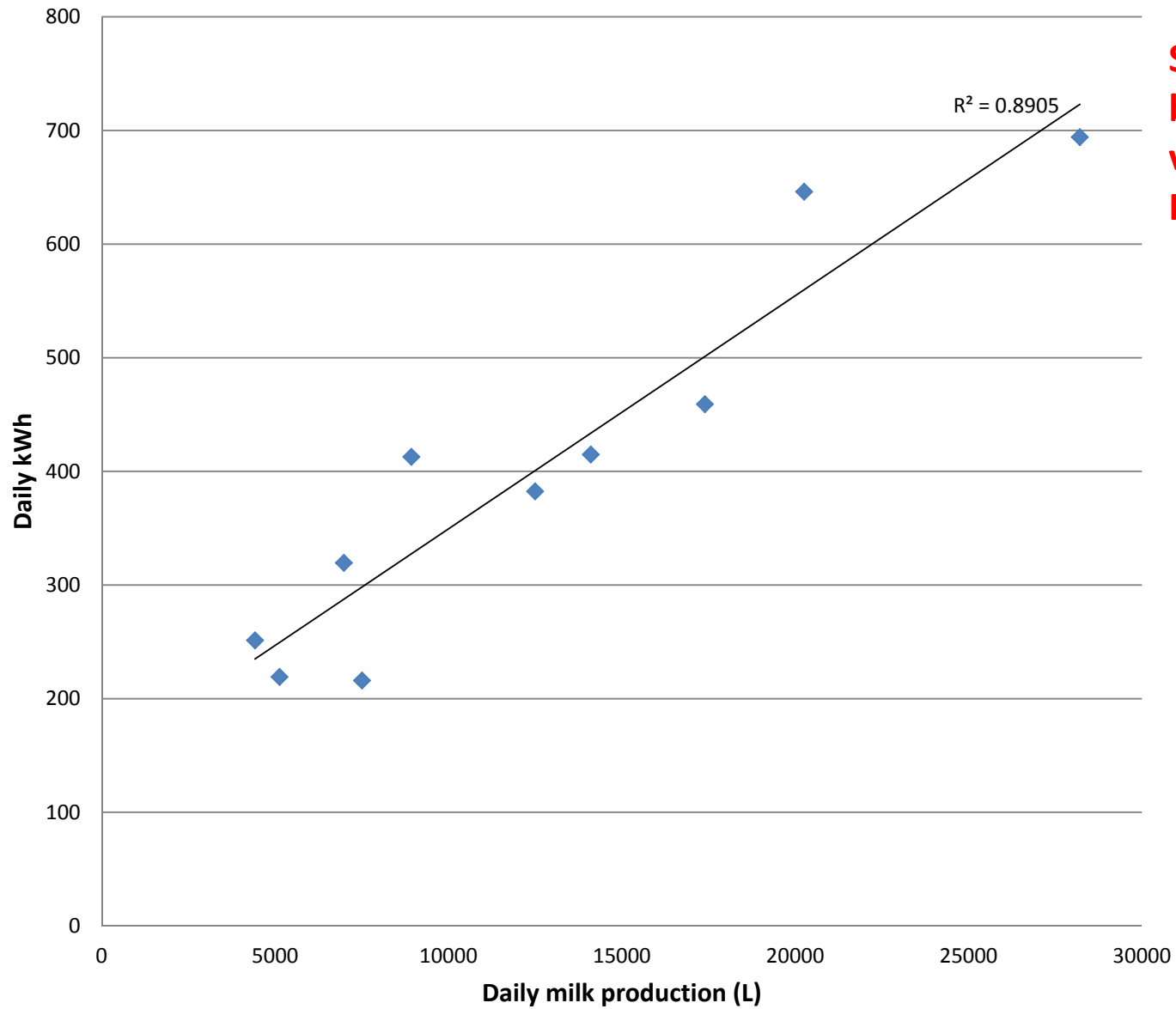
Data from:

- Energy monitoring
- Power bills

# Daily kWh vs cows milked



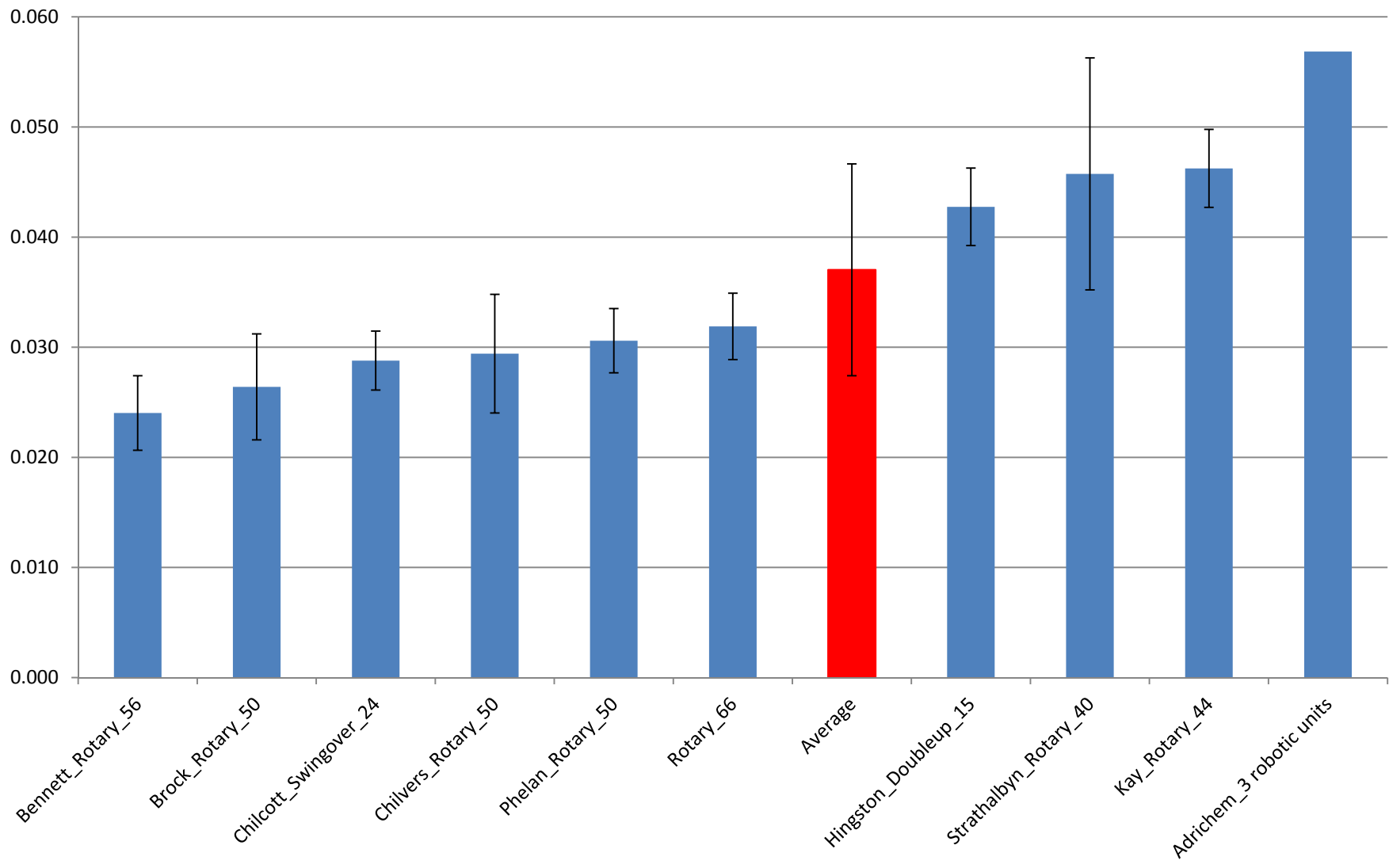
## Daily kWh vs daily milk production



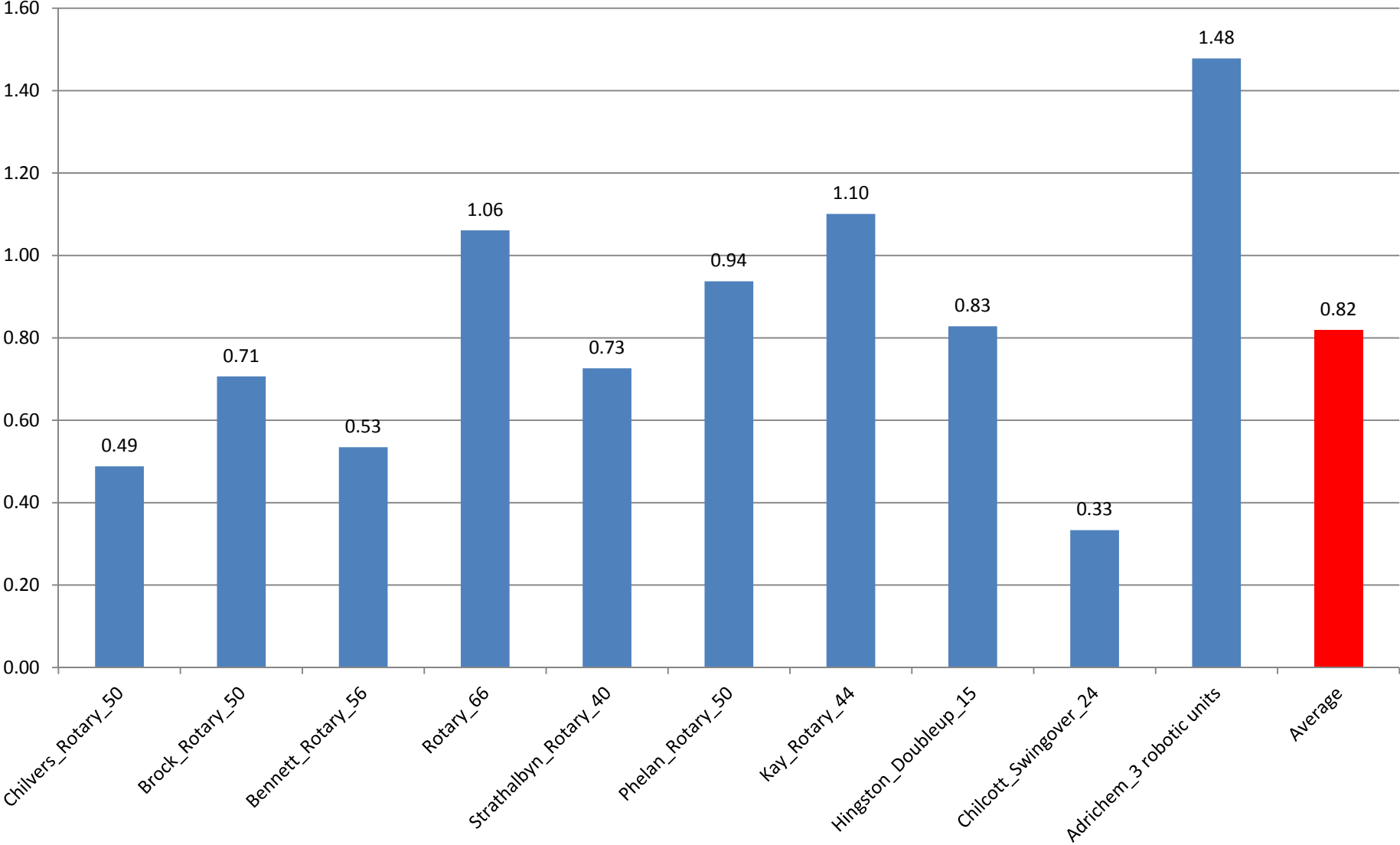
**Strong correlation  
between kWh and milk  
volume collected.  
 $R^2 = 0.89$**

- ◆ Average kWh (monitoring)
- Linear (Average kWh (monitoring))

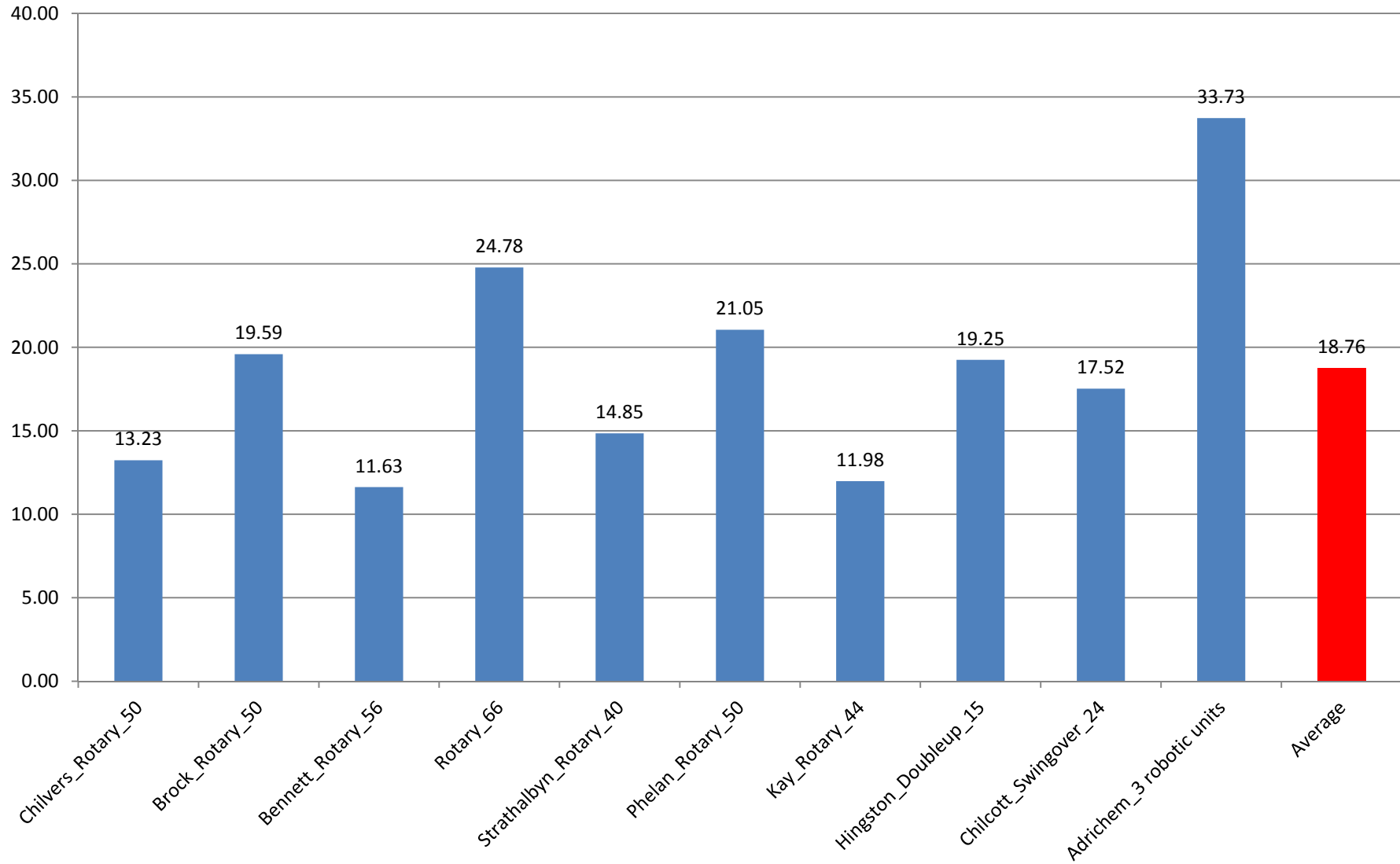
**kWh/L (variability shown in black lines)**



# kWh per cow

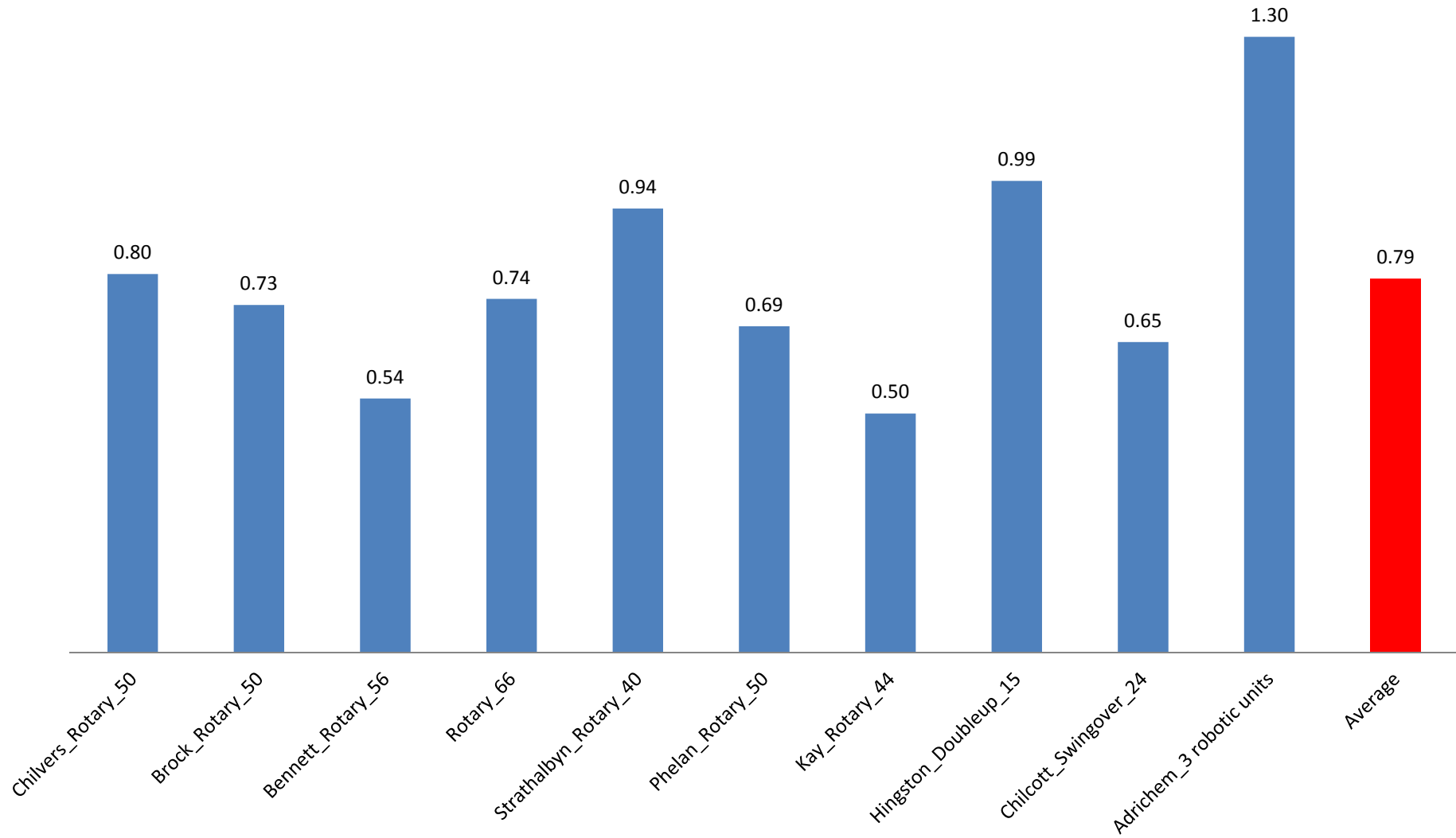


## Dairy shed energy cost per cow (c per cow)

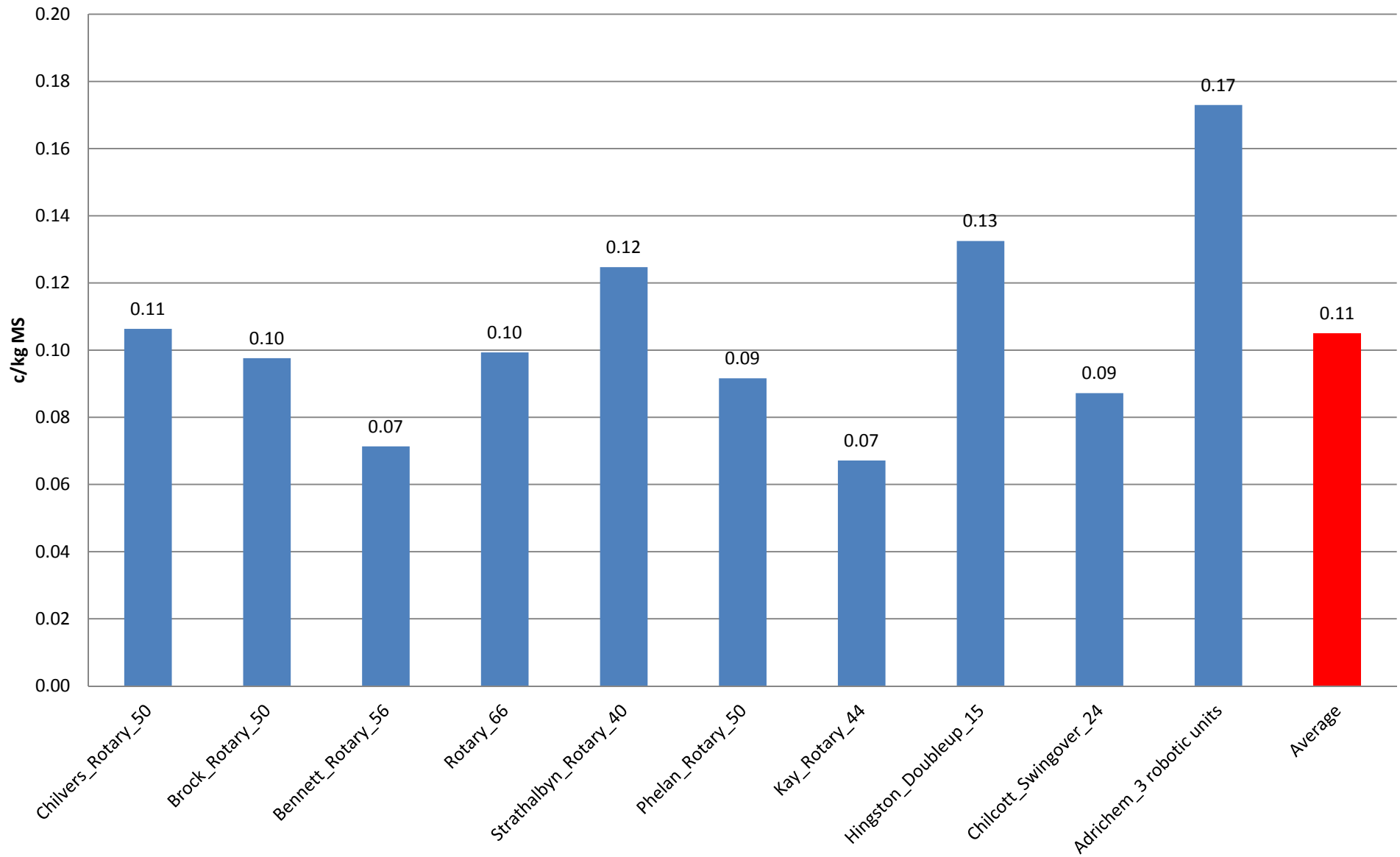




## Dairy shed energy cost per L milk production (c/L)

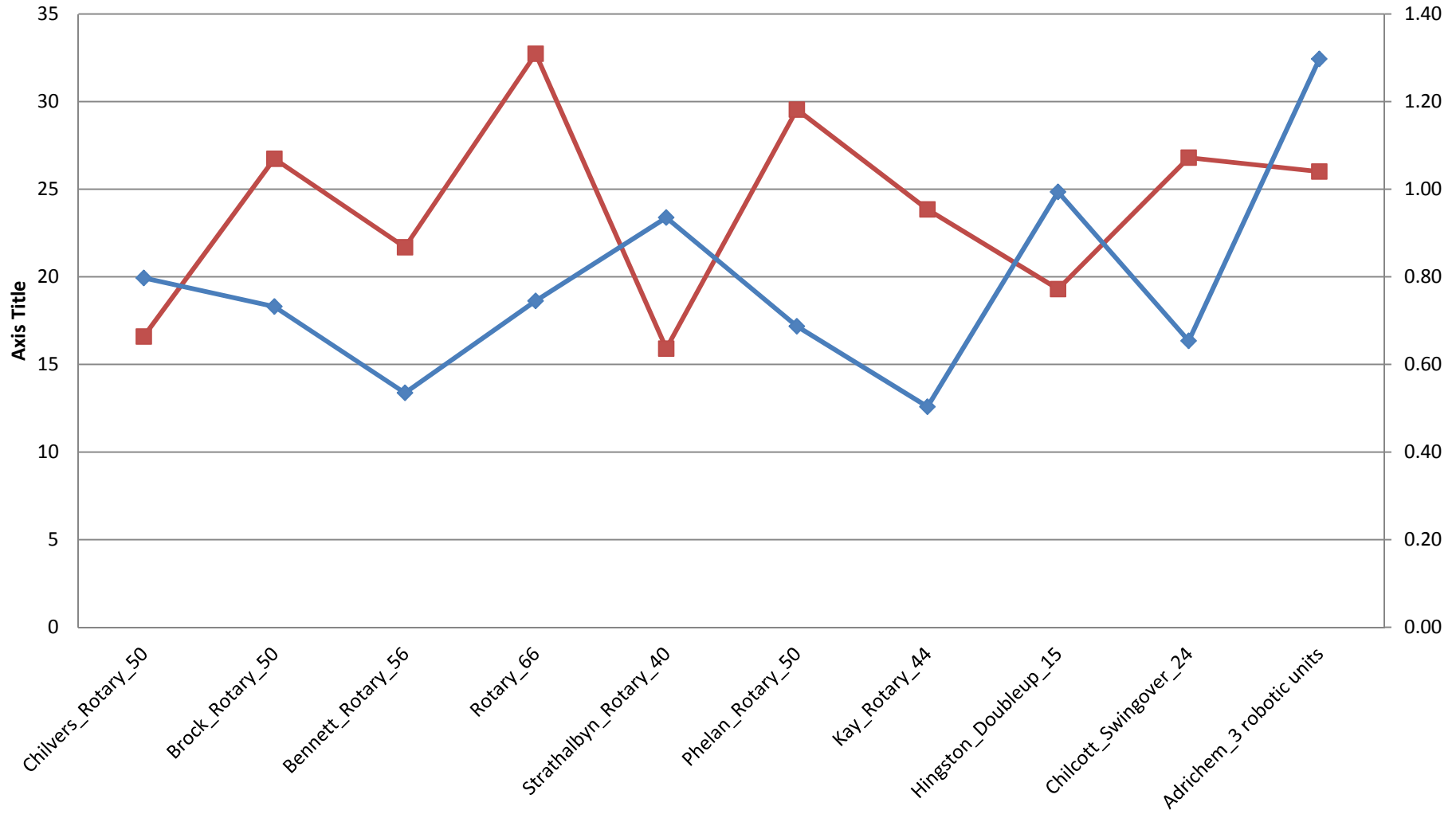


## Dairy shed energy cost per kg MS (c/kg MS)



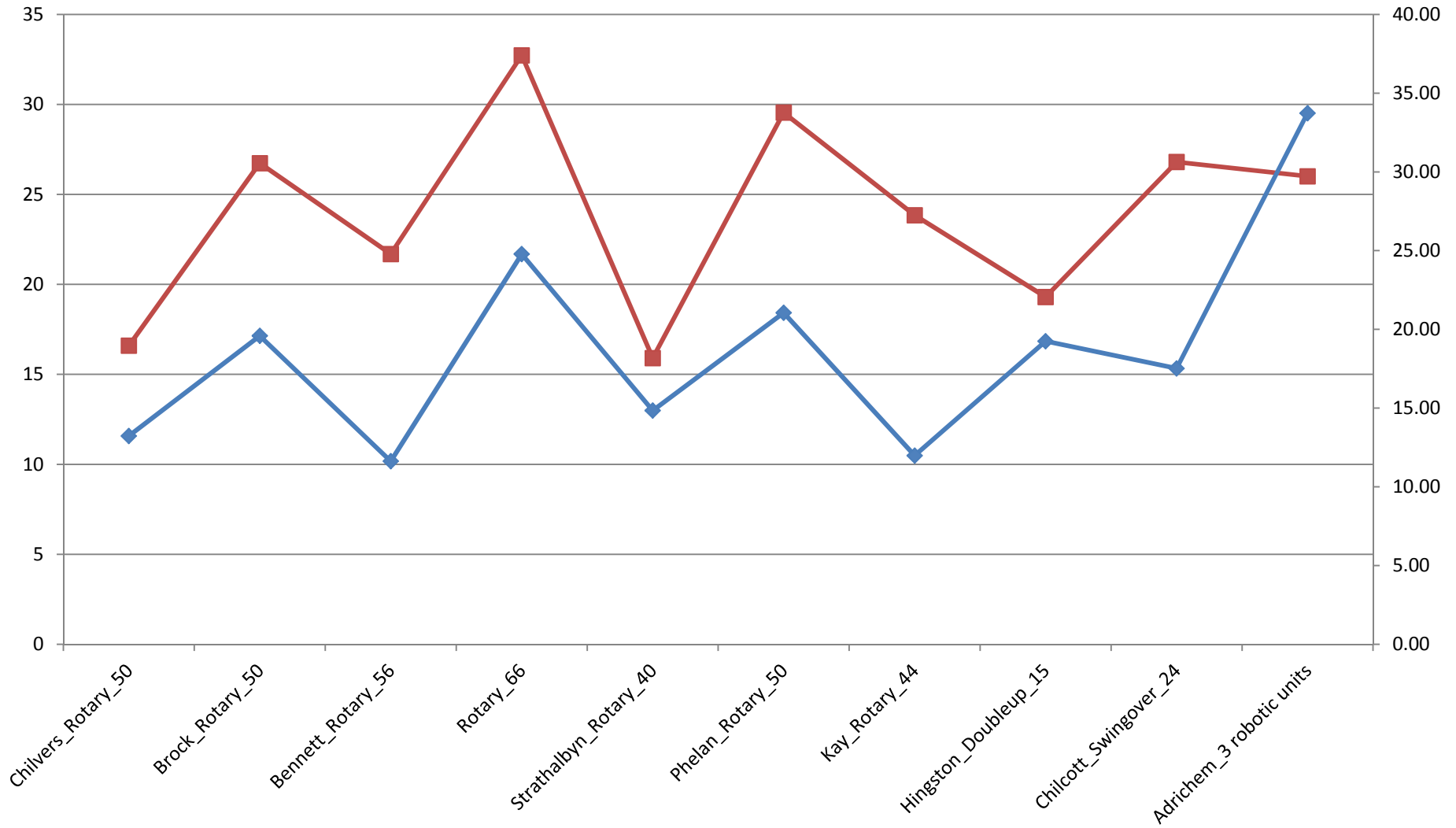
# Costs per L vs L per cow

L per cow c/L milk



# Costs per cow vs L per cow

L per cow c per cow



# Individual dairies, individual circuits

Due to budget constraints, we could not monitor every circuit in every dairy. We monitored what we could, given the equipment available.

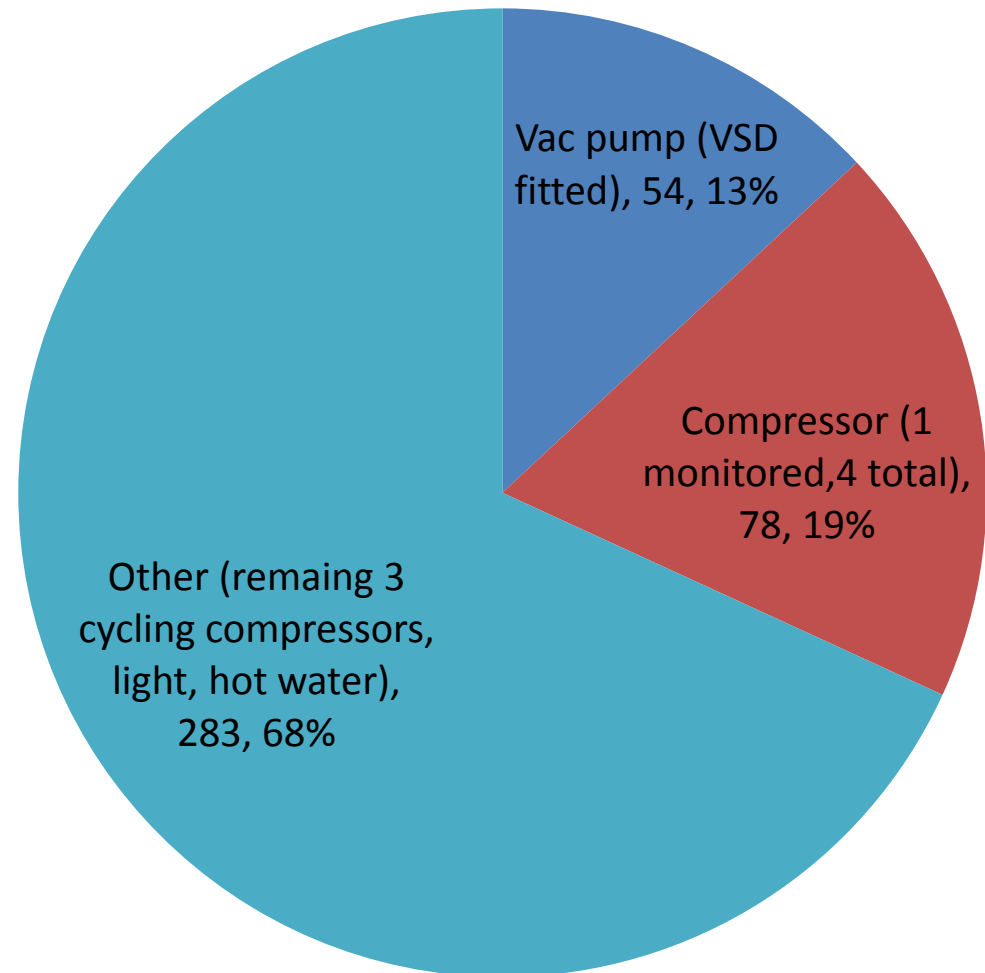
Pie charts show average daily kWh and % of total daily.

## Milking 850 cows

- Alternate day pick ups for half of monitoring period

Average daily use: 415 kWh

## Chilvers\_Rotary\_50

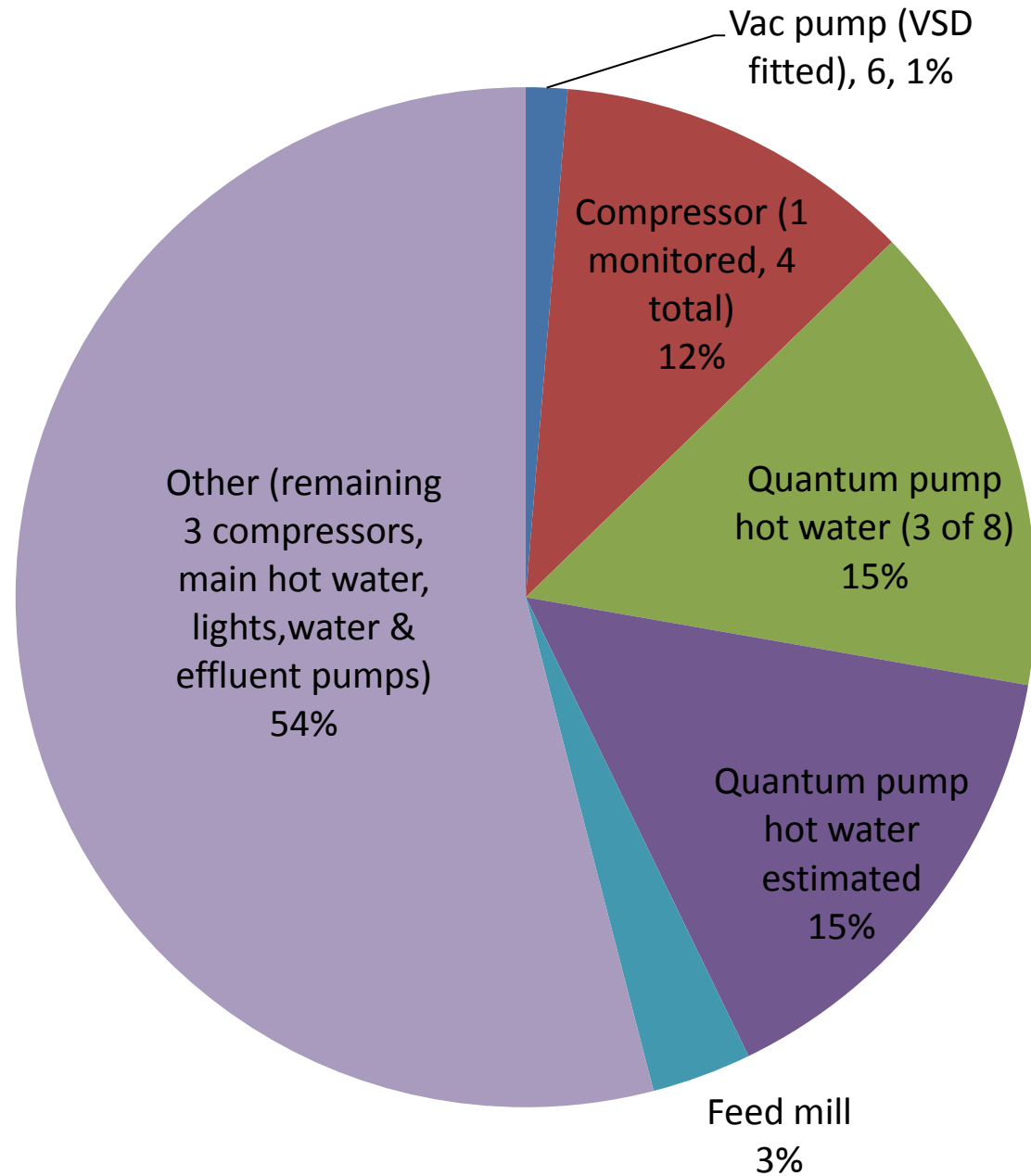


## Milking 650 cows

- Appears significant savings with this VSD
- Main hot water could be monitored

Average daily use: 459 kWh

## Brock\_Rotary\_50



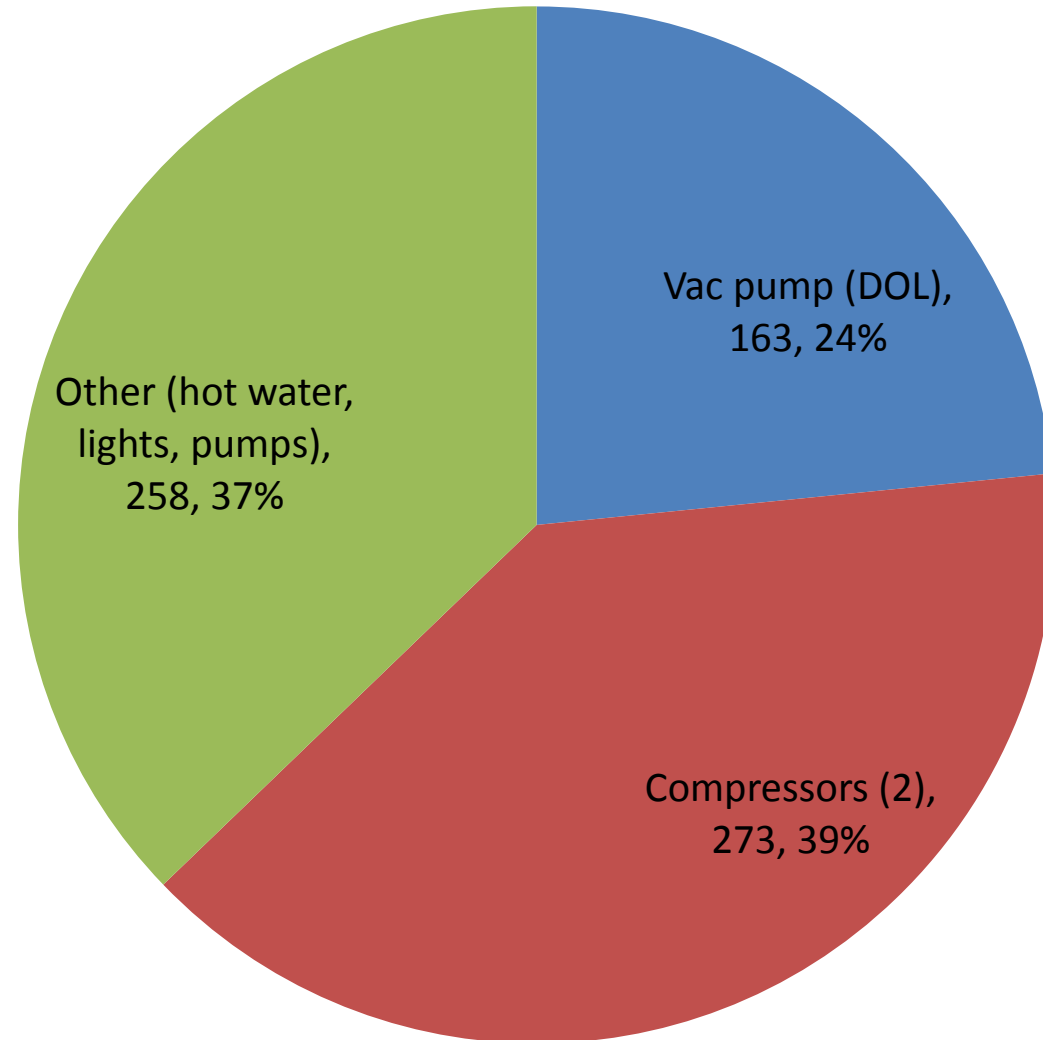


### Milking 1300 cows

- Most efficient of dairies monitored. Milking large cow numbers
- Further potential savings might include VSD & new milk cooling system

Average daily use: 694 kWh

### Bennett\_Rotary\_56

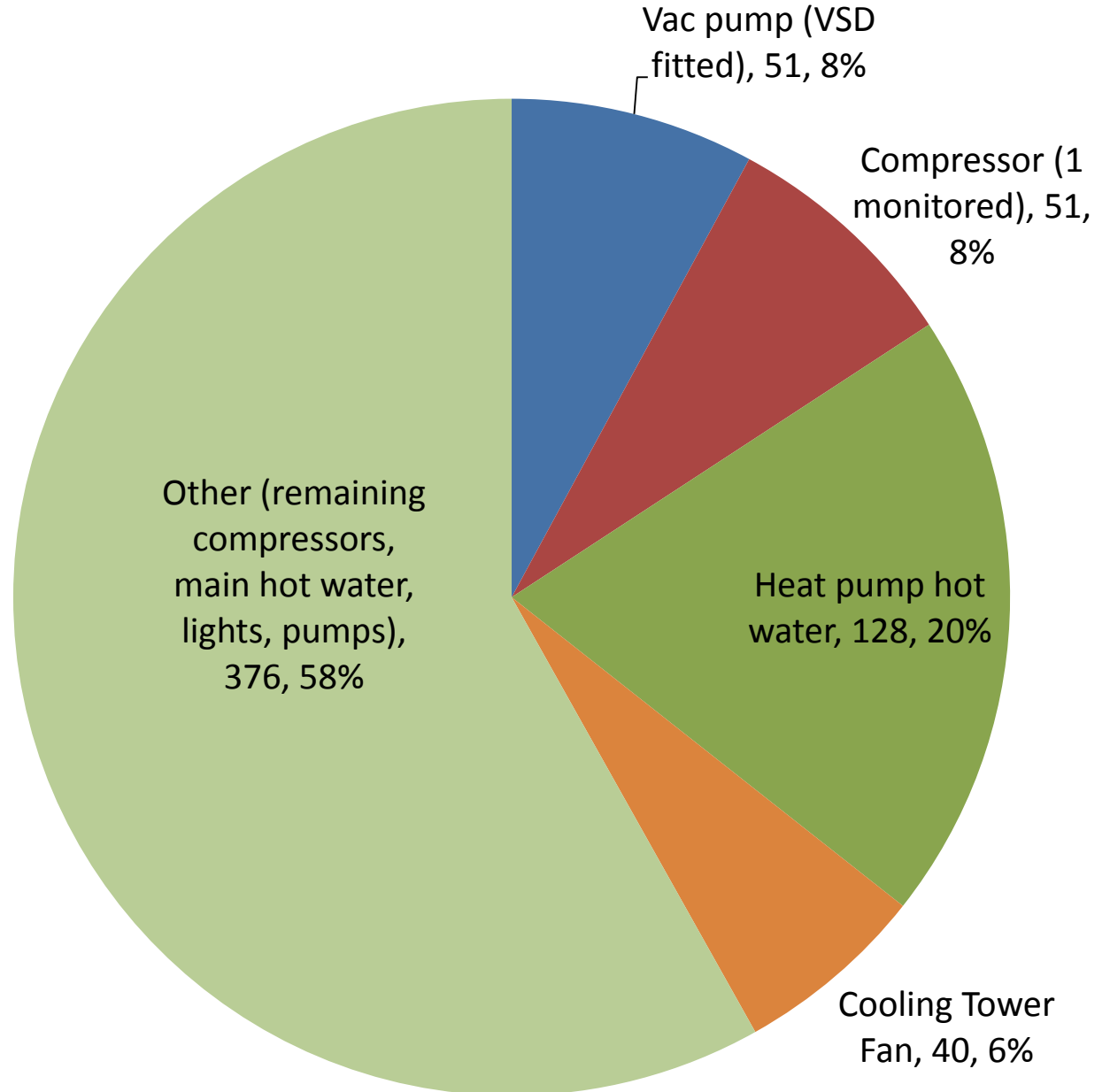


Average daily use: 646 kWh

### Rotary\_66

Milking 609 cows

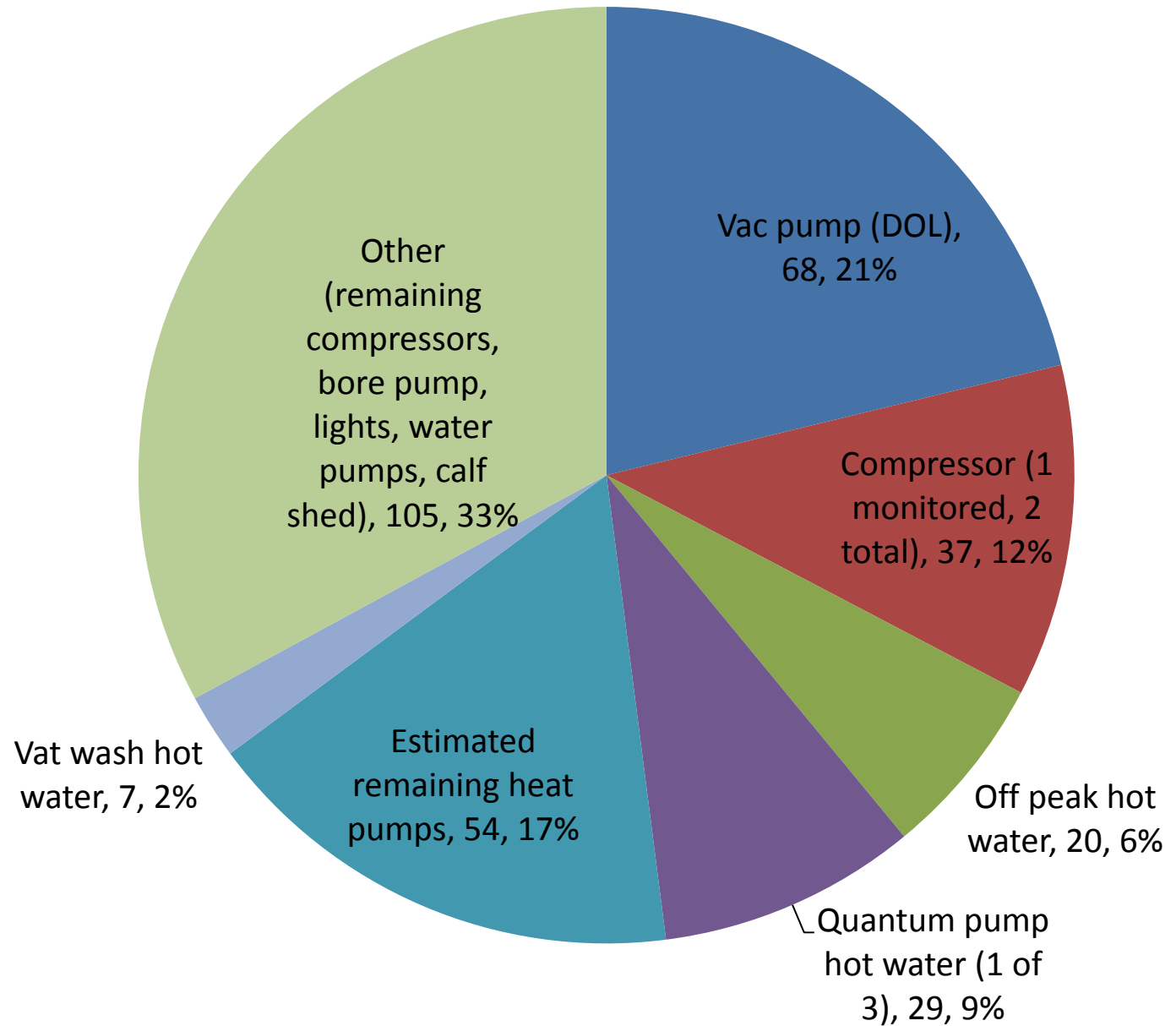
- Savings with VSD fitted
- Possibly minimal benefit from cooling tower – suggest monitoring without its use



# Milking 440 cows

Average daily use: 319 kWh

## Strathalbyn\_Rotary\_40

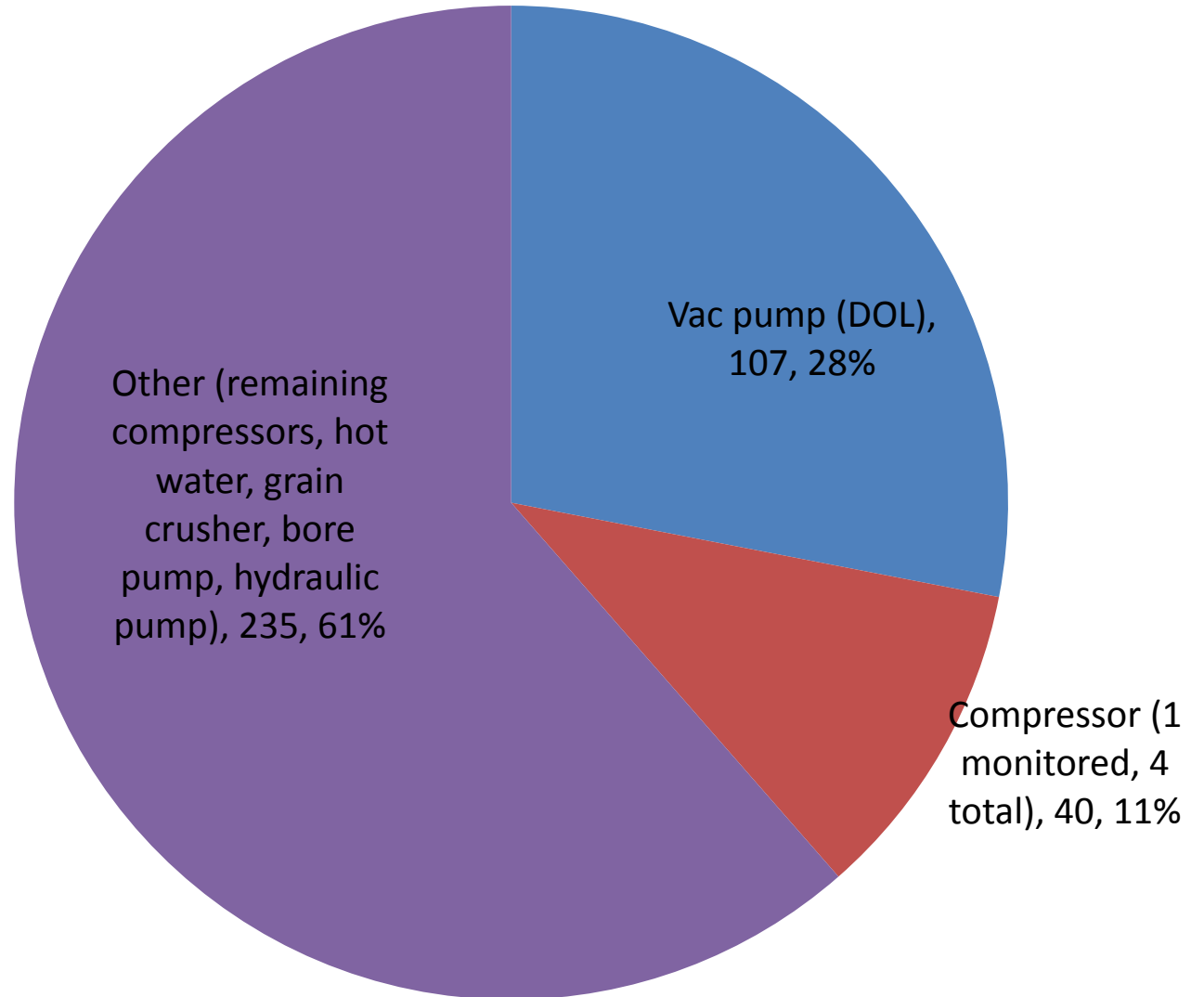


# Milking 408 cows

- Potential savings with VSD?

Average daily use: 382 kWh

## Phelan\_Rotary\_50

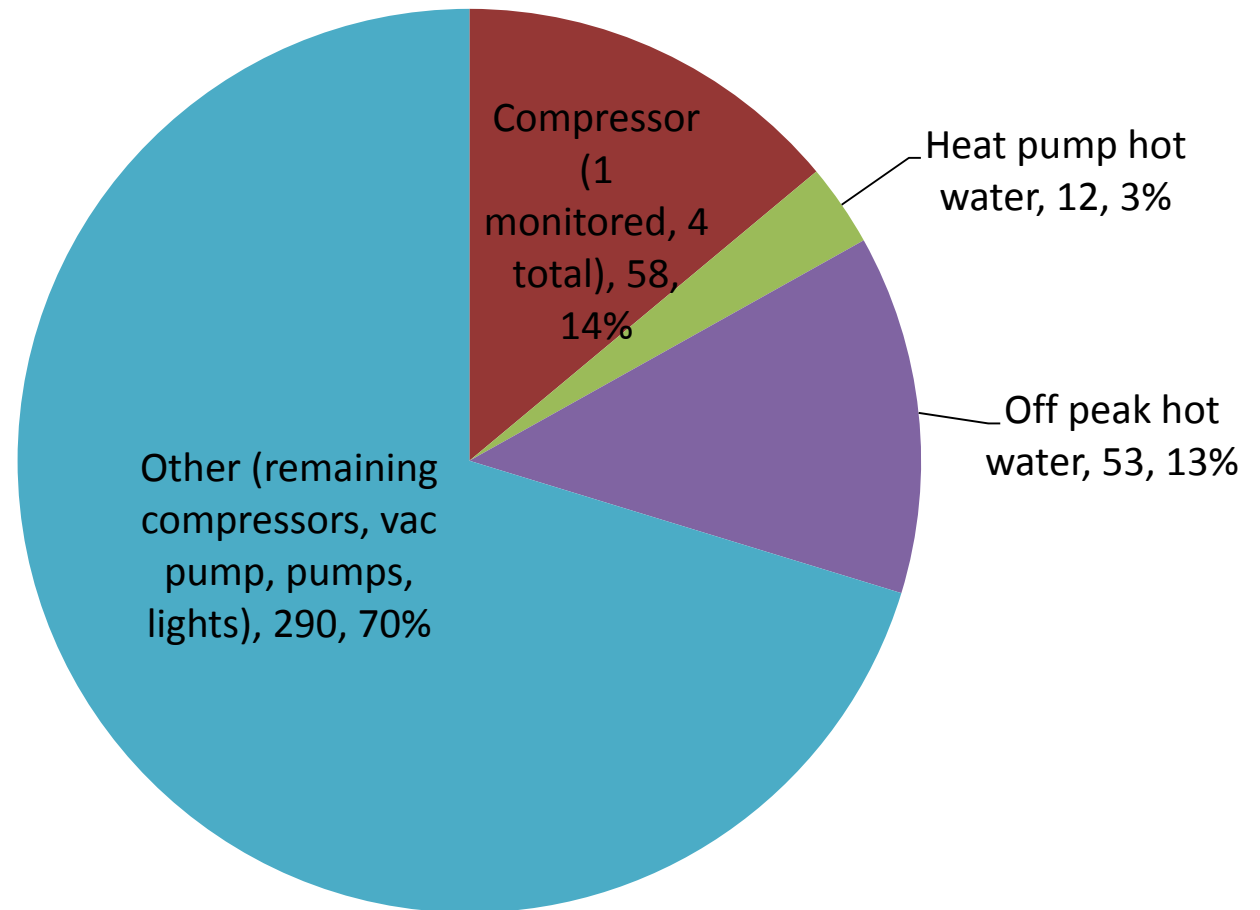


## Milking 375 cows

- Potential inefficiencies with heat pump hot water?

Average daily use: 413 kWh

## Kay\_Rotary\_44

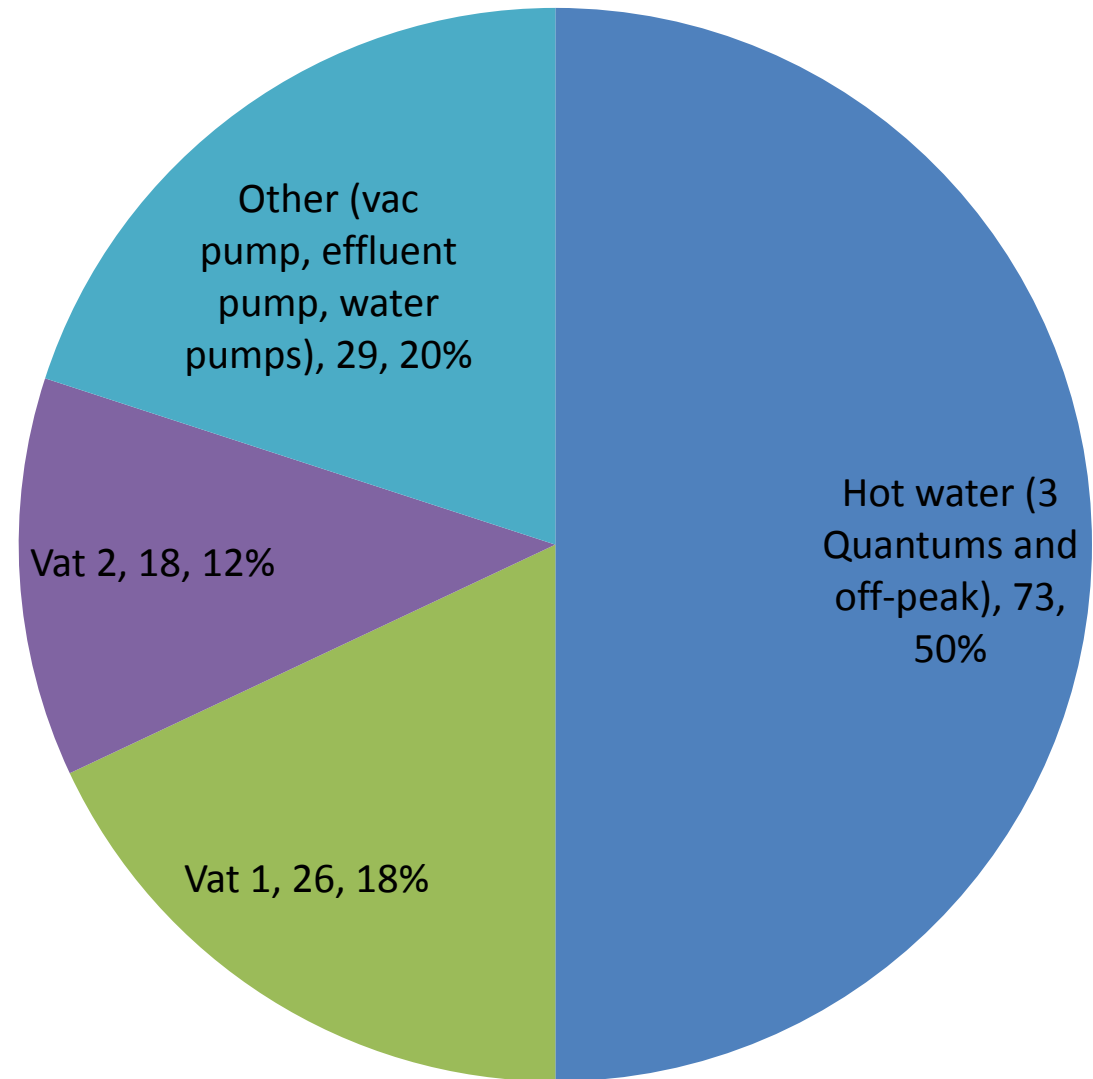


## Milking 265 cows

- With 50% of power bill heating water, maybe investigate other water heating options? Eg. solar?
- Two smaller vats are using relatively more energy

Average daily use: 219 kWh

## Hingston\_Doubleup\_15

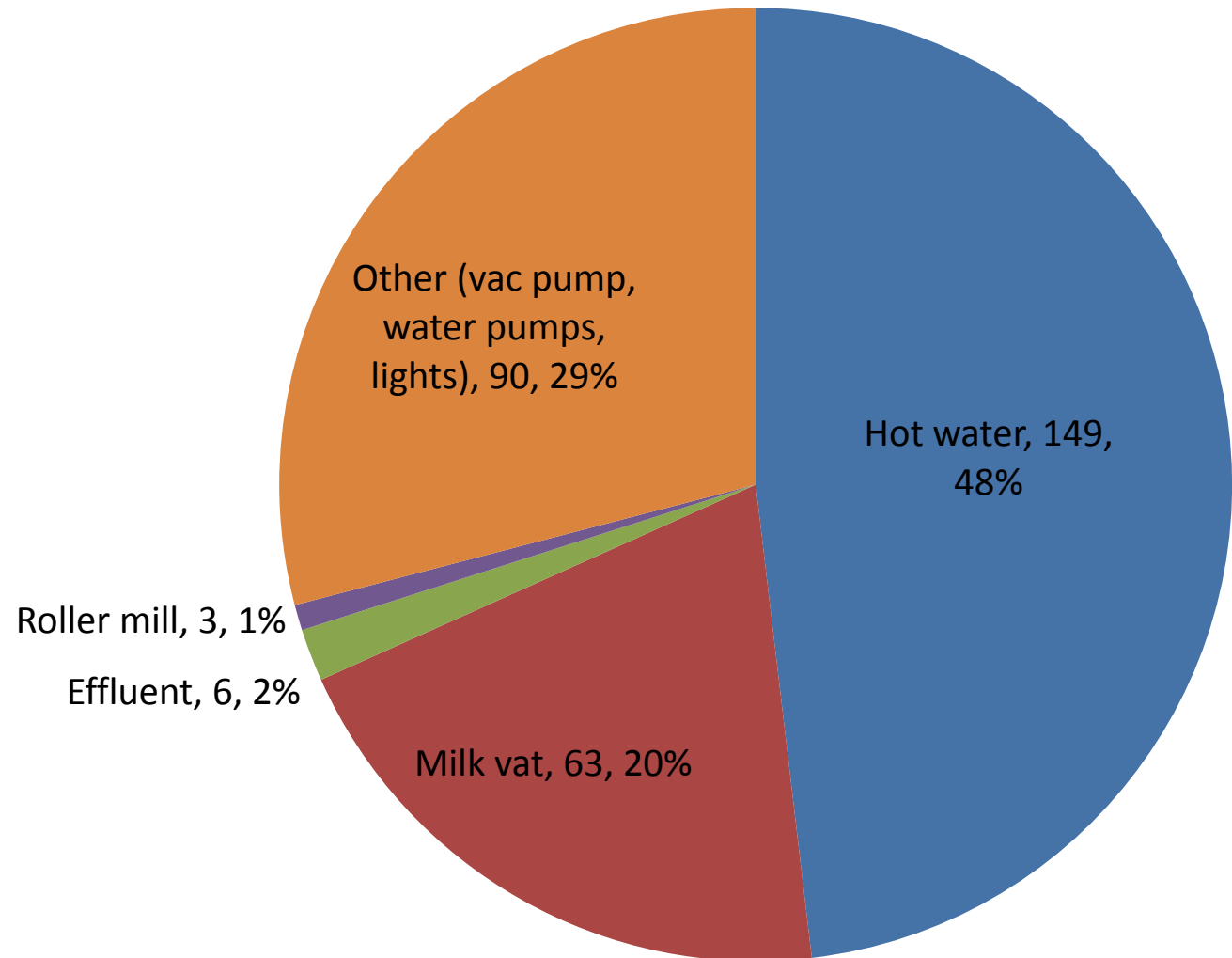


## Milking 280 cows

- With 50% of power bill heating water, maybe investigate other water heating options? Eg. solar?

Average daily use: 310 kWh

## Chilcott\_Swingover\_24



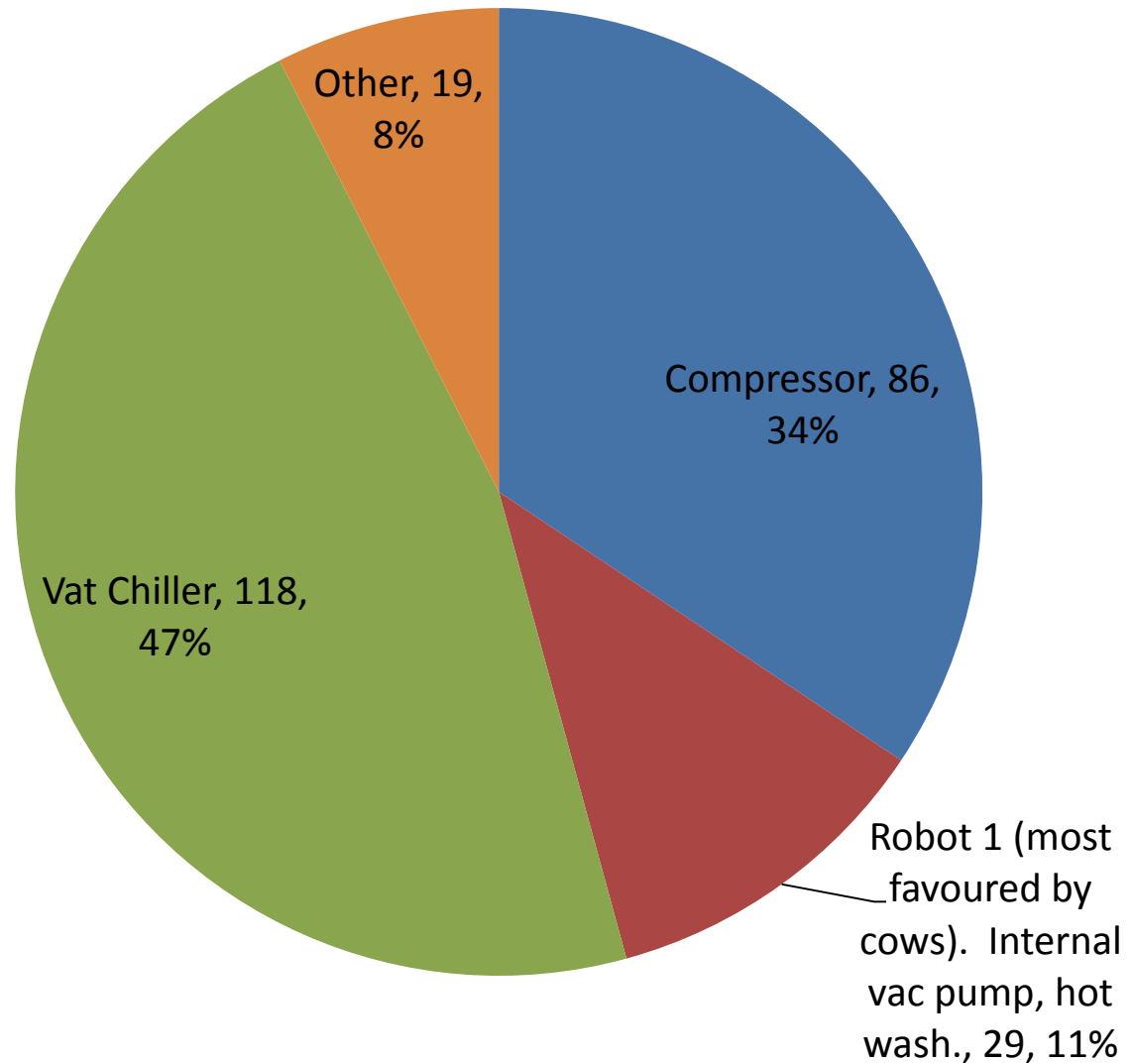


## Milking 170 cows

- Higher unit costs because everything wired at Tariff 22 and running 24/7.

Average daily use: 251 kWh

### Van Adrichem\_3 robotic units



# Saving Money/Energy

- Be on the best possible contract and tariff
- VSDs do save (eg. Brock, Chilvers, Rotary\_66)
- Behaviour changes can help eg. switching off equipment not in use

# Wasting Money/Energy

- Plate coolers not working properly – need servicing
- Heat pump hot water not connected properly
- Ensure good flow intake to compressors



# Water Monitoring in Dairies

4 dairies monitored, using ultrasonic flow meter fitted on outside of pipes. Easiest if all water enters dairy through one pipe.



# Irrigation Tas ultrasonic flow meter



# Water Monitoring Results

- 1.96 – 5.41 L water used/L milked
- One rotary dairy had 4% variation in water use between milkings.
- One rotary dairy had 46% variation in water use between milkings.
- Industry average for effluent design is 50 L/cow/day. Data ranged from 44 – 161 L/cow/day

# Learnings from water monitoring

- Cleaner dairy, more water used
- Patterns in water use could be attributed to milking staff.
- Important that staff understand link to volume of effluent that is produced.
- In context.....water used for milking is approximately 1,000 times less than the water used for irrigation (for every L milk produced).





## Energy monitors for industry use (equipment purchased by DairyTas)

- NHP billing class monitors, NHP software. Can monitor up to 6 circuits or 2 monitors with 3 circuits each.
- Needs to be installed by electrician.

# Contacts: Energy monitoring and audit info

Funded by  
Dairy Australia  
and your  
dairy service  
levy



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