Time-Shifting Electricity Use on Dairy Farms

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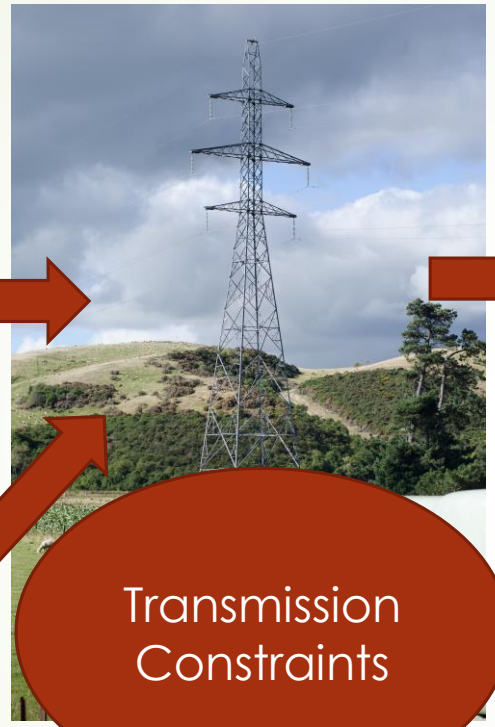
The Problem – Lack of insight

Fossil Fuel to make up shortages



Transmission Constraints

Lines Constraints

Variability of Renewables

High costs of Electricity

https://www.newzealandnow.govt.nz/resources/working-in-dairy-farming

Photos: Dave Pearce

Case Studies


Dave Pearce

- 2 Large Commercial Māori-owned dairy farm blocks ~4000 ha each in dairy
- Smaller lots within the blocks each milk 900-1200 cows per day
- Electricity Costs ~ $100k p.a. for each lot (~5% of Costs)
- Land can't be sold – kaitiakitanga underpins whole operation
- Farms use incentive programmes to reinforce Environmental, Social and Animal Welfare best practice.

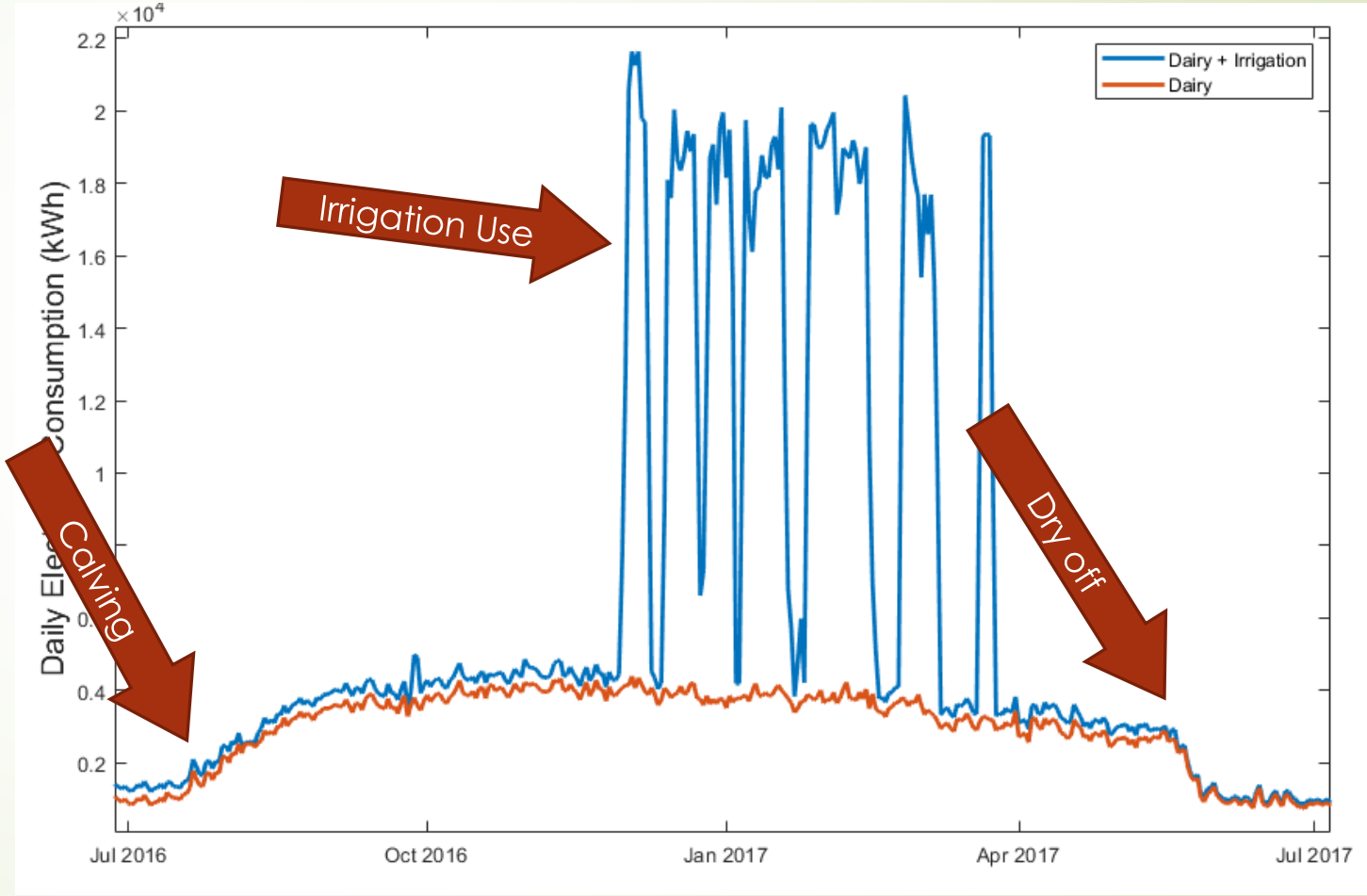
Insight from Smart Meter Data

4 to 12 Readings per year

Data Available every 30 mins

Seasonal Peaks

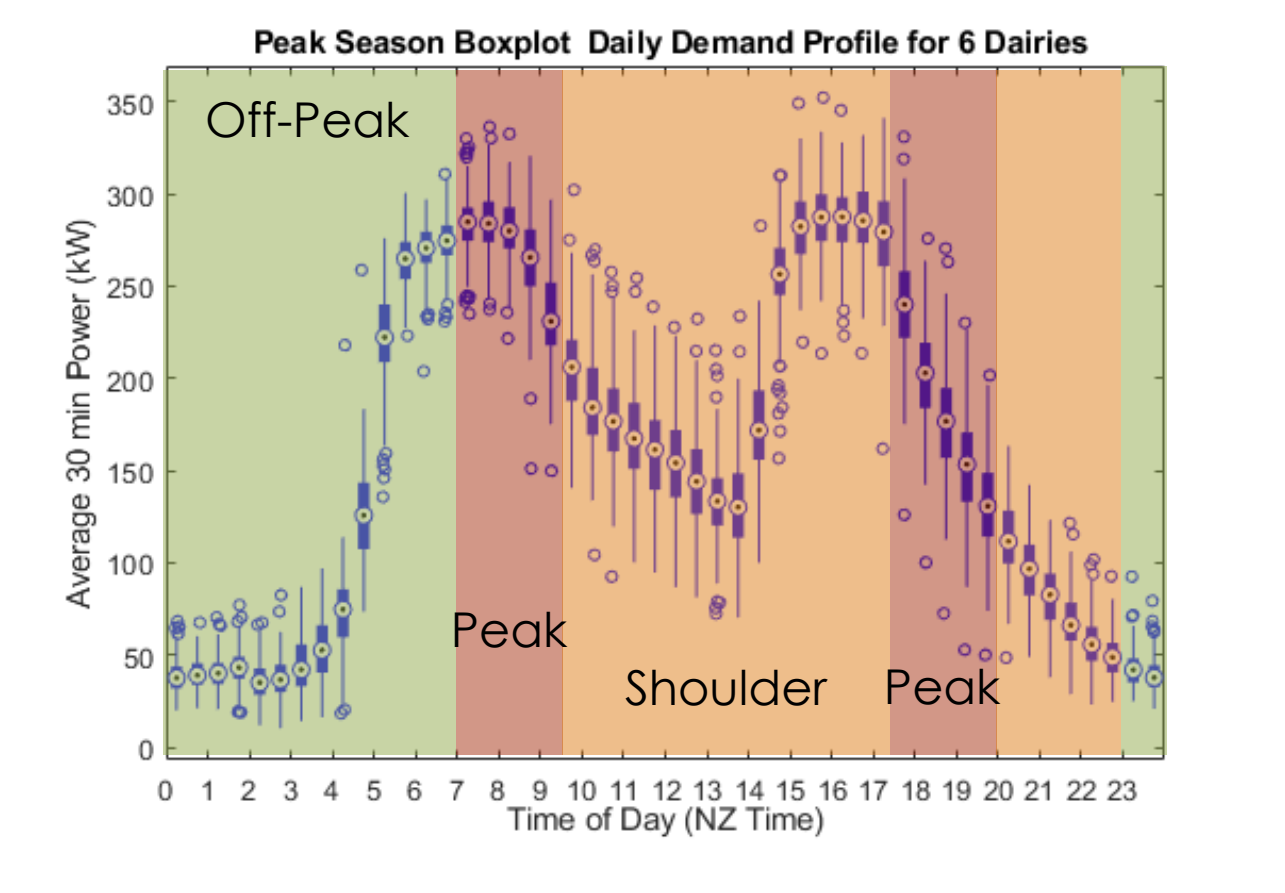
- Summer peaks
- Irrigation 1.5 times Dairy during use
- Sustained milking baseline consumption September – May
- Little opprtunity to shift demand seasonally



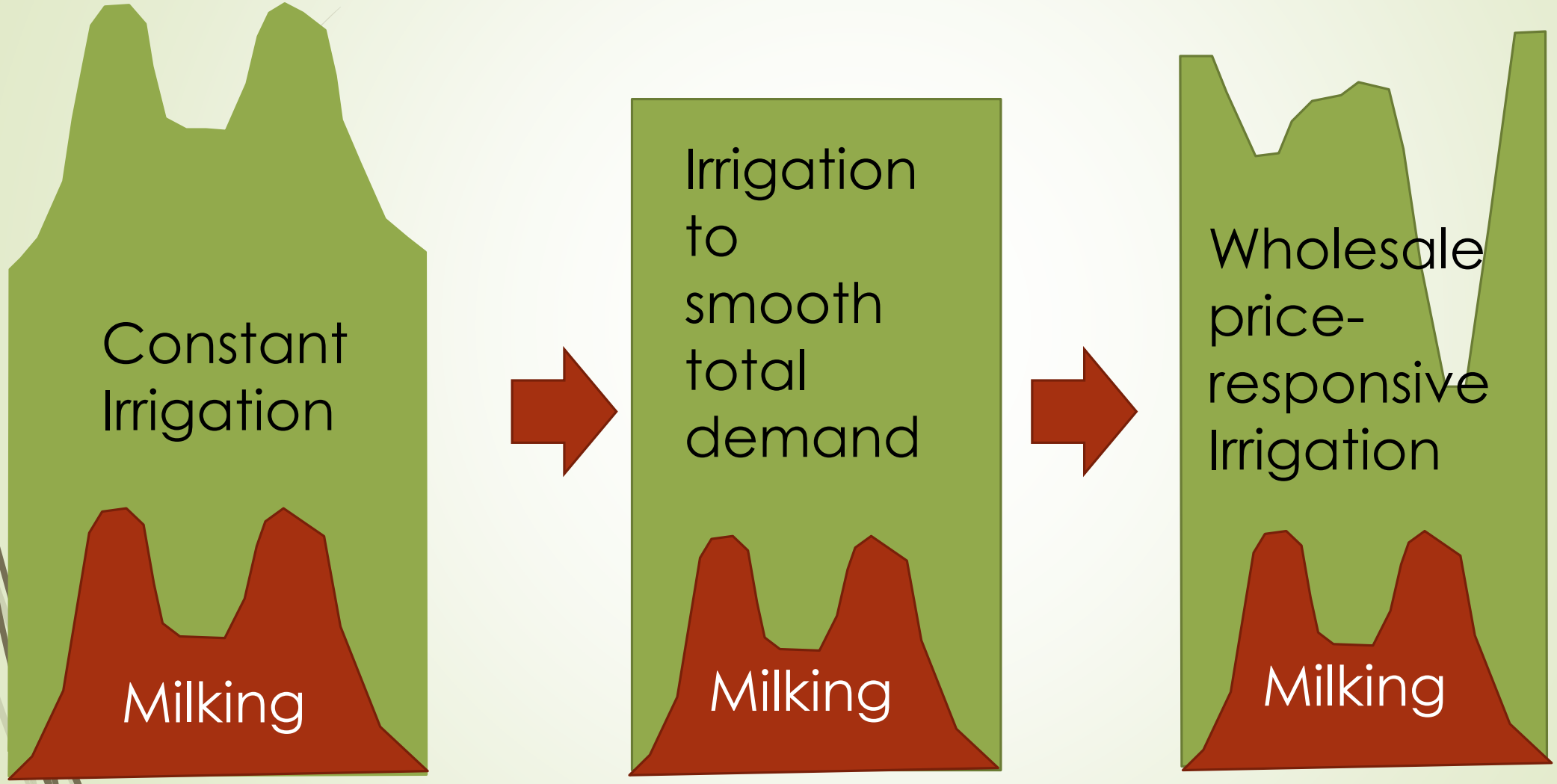
Daily Electricity Consumption (6 Milking Sheds + Irrigation)

Daily Peaks

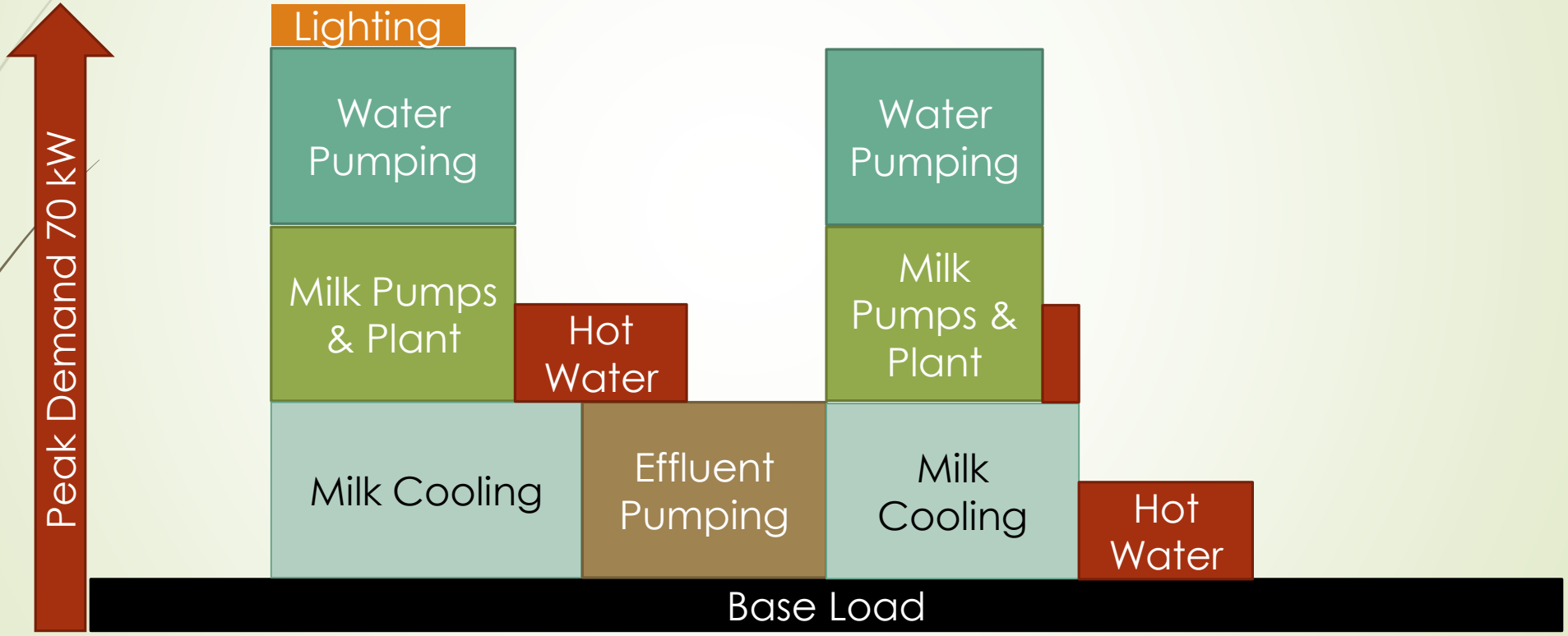
- Similar Patterns between farms
- Early AM Start but not finished milking by Residential Peak
- PM milking mostly finished by residential peak
- Large dip in consumption mid-day and overnight
- Opportunities to shift demand within the day



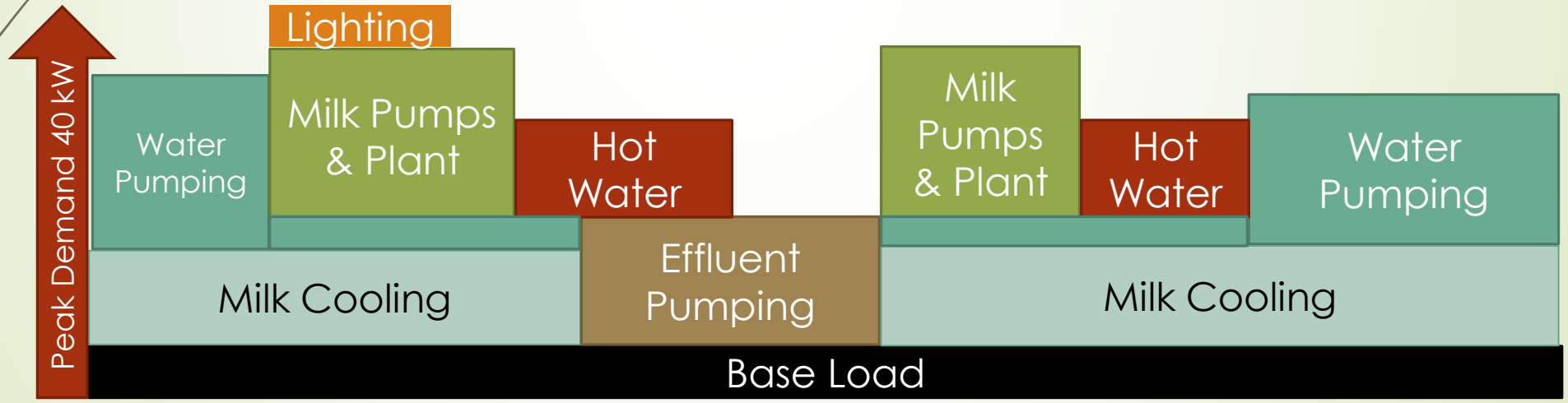
Possible Changes



Milking Routines



Milking Shed Load Shifting




Thanks,
Any Questions