

Increasing energy efficiency on dairy farms

Dr. John Upton

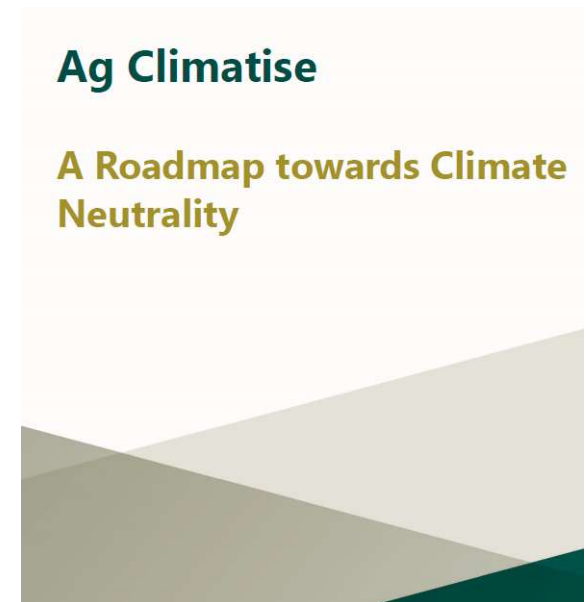


Overview

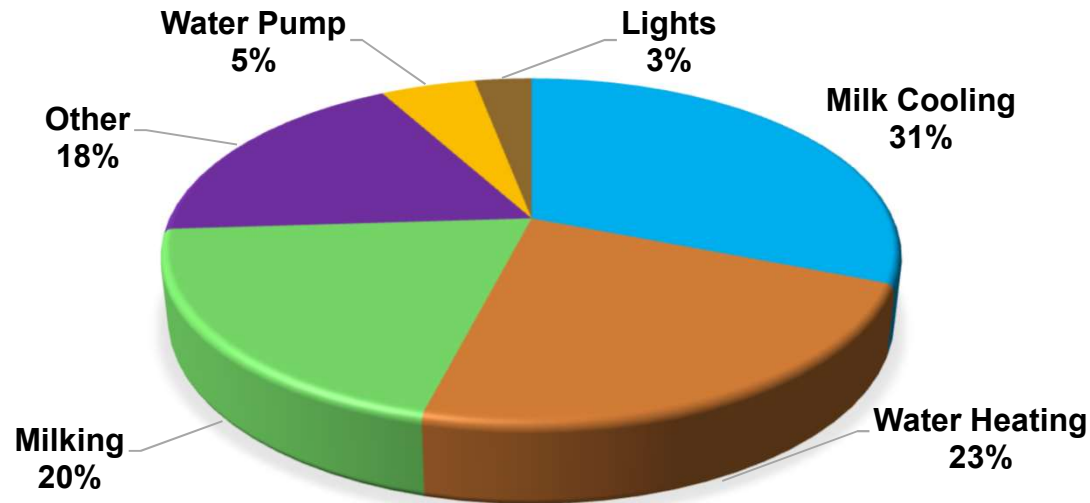
- Energy costs of milk production
- Efficient & renewable technologies available for use on dairy farms
- Decision support tool

Why reduce energy use?

- Better for the environment
- Better for farm profitability
- Ensures that we meet our targets



Energy cost of milk production



Cost of electricity = €5.00 per 1,000L of milk sold

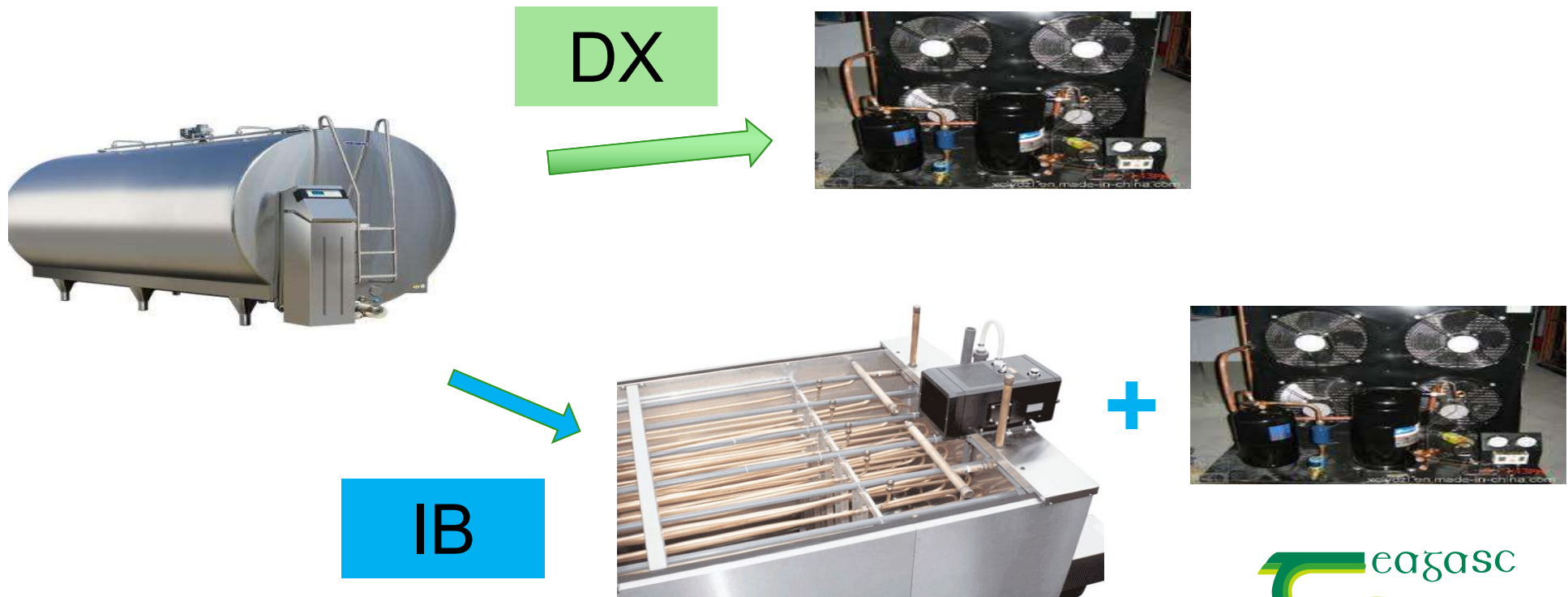
Max = €9.00 Min = €2.50

Night Rate Electricity

- Day rate = €0.18 / kWh
- Night Rate = €0.08 / kWh
- Night rate from 12 midnight to 9am
(11pm to 8am winter time)

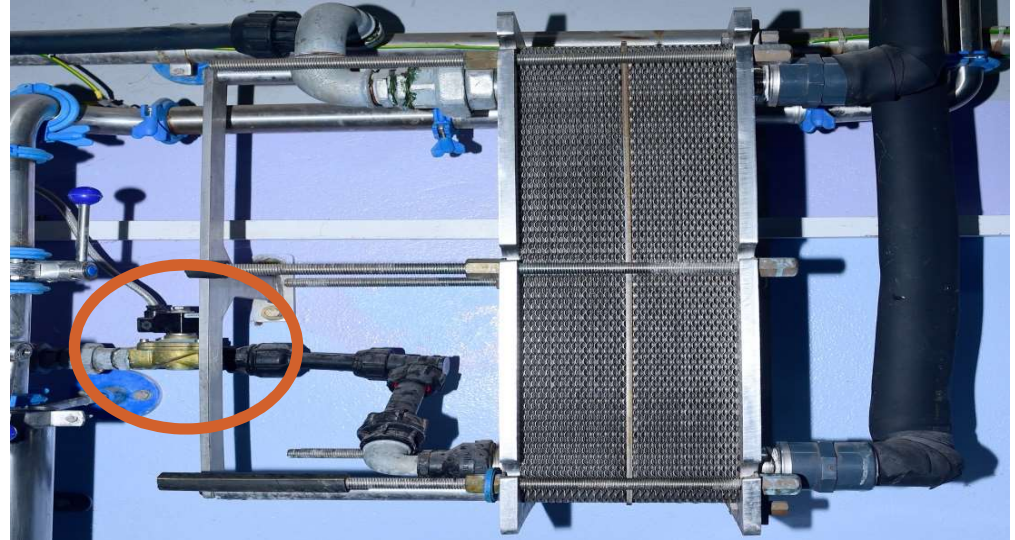


Milk cooling systems



Pre-Cooling

- Goal of pre-cooling is to cool milk to within 5 °C of incoming water temp
- Milk:Water of 1:2
- Can reduce cooling energy use by 40%



Vacuum Pump

- Use Variable Speed Control (possibilities for over 60% savings)
- Reduces pump speed when demand for vacuum is low
- Ramps up speed as needed



Water Heating

- Ensure adequate supply
- 10 Litres required per cluster
- 2% of bulk tank volume

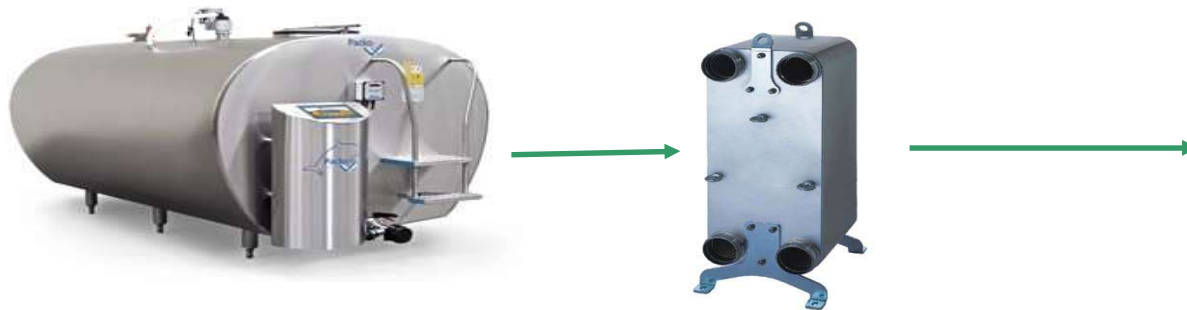


Water Heating Running Costs

System type	Cost per 100 litres hot water	CO ₂ emissions per 100 litres
Day rate electricity	€2.10	4.3 kg
Night rate electricity	€0.94	4.3 kg
Gas (LPG) fired	€0.87	2.4 kg
Oil (Kerosene) fired	€0.65	3 kg

Heat Recovery

- Heat energy is removed from milk during cooling & transferred to water
- Up to 40% savings



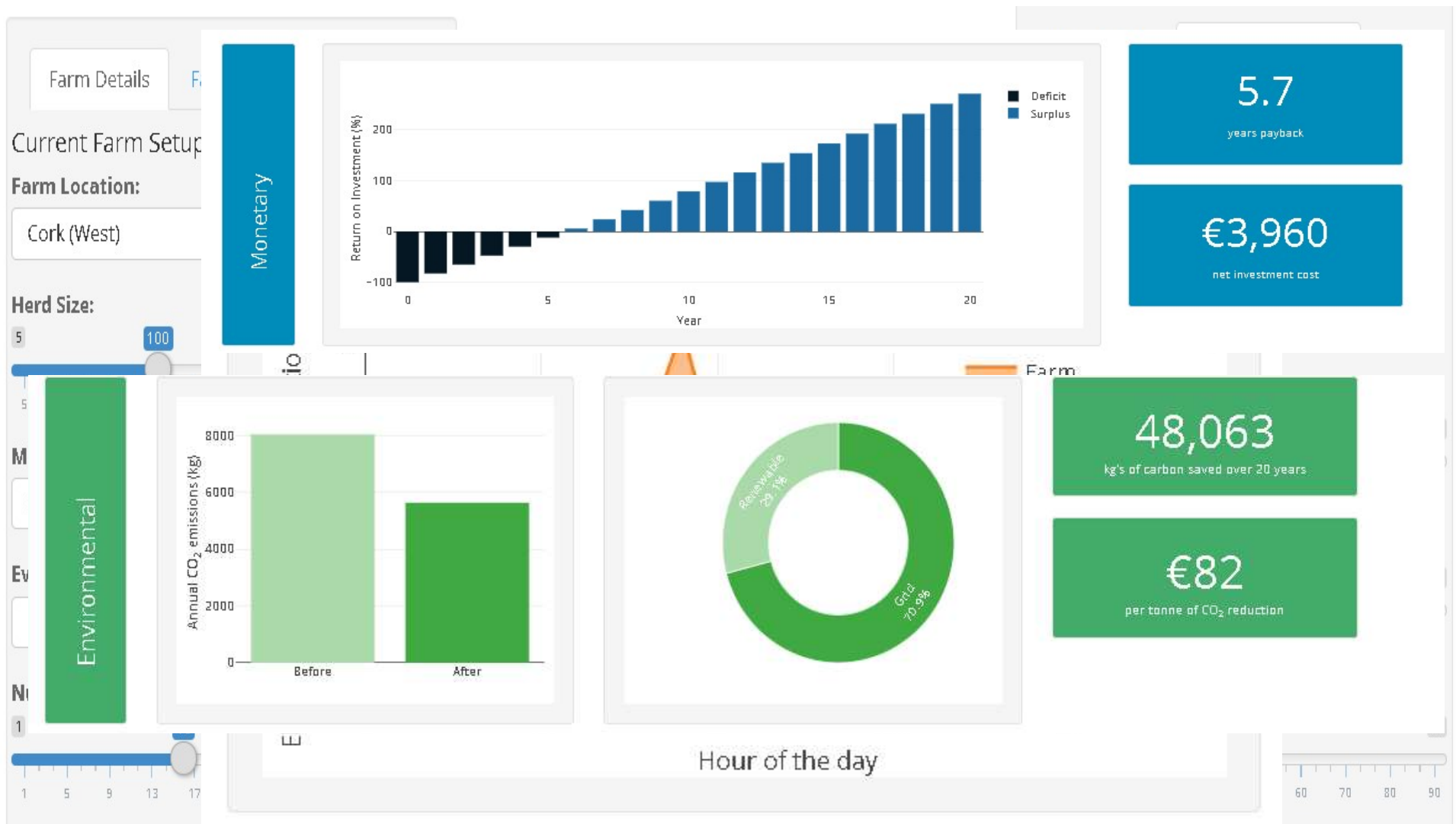
Solar Photovoltaic (PV)

- Generates renewable electricity from the sun
- Effective means of displacing fossil fuels and reducing energy costs
- Size for self consumption
- Use energy storage (water heater)
- Grants & ACA available



Decision support

- Every farm is different (cows numbers, farmer age, expanding, greenfield, water supply, milking system, grant eligibility)
- Dairy energy tool can help guide decision making <https://messo.shinyapps.io/AEOP/>



Summary

- Very achievable to reduce energy use by 20% and generate 20% of power demand from renewable sources
- We have the knowledge and technology to meet our targets, adoption is the next hurdle



Thank You