



Energy efficiency at Kunde: solar thermal & other programs

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Kunde Family Estate Winery

Introduction

- About Kunde
- Challenges to achieving energy efficiency
- Achievements thus far
- Solar thermal system
- Future goals

Kunde Family Estate

- 1800 acre Estate property in Sonoma Valley (650 acres planted to grapes)
- Property has been in family for over 100 years
- Harvest about 2000 tons
- Bottle 200K cases including custom bottling
- Winery built in 1989
- CSWP
GEELA award
Bay Green Business



Kunde Family Estate

Existing winery infrastructure:

- 30,000 sq. Ft. bbl cave
- Holds 6000 bbls



Challenges to achieving energy efficiency

- Securing capital when budgets are tight
- Changing attitudes
- Aging winery utilities and equipment
- Poor initial design / construction

Energy efficiency strategies

Low hanging fruit:

- Replace ballasts
- Change to CFLs
- Manage office equipment
- Etc...

Capital intensive projects:

- Insulate tanks
- Upgrade utilities
- Upgrade motors
- Etc...

Our strategies

1. Improve existing inefficiency through modification
2. Change behavior / habits
3. Add new equipment

Our strategies

1. Improve existing inefficiency through modification
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 3. Add new equipment
- Timers and solenoid valves

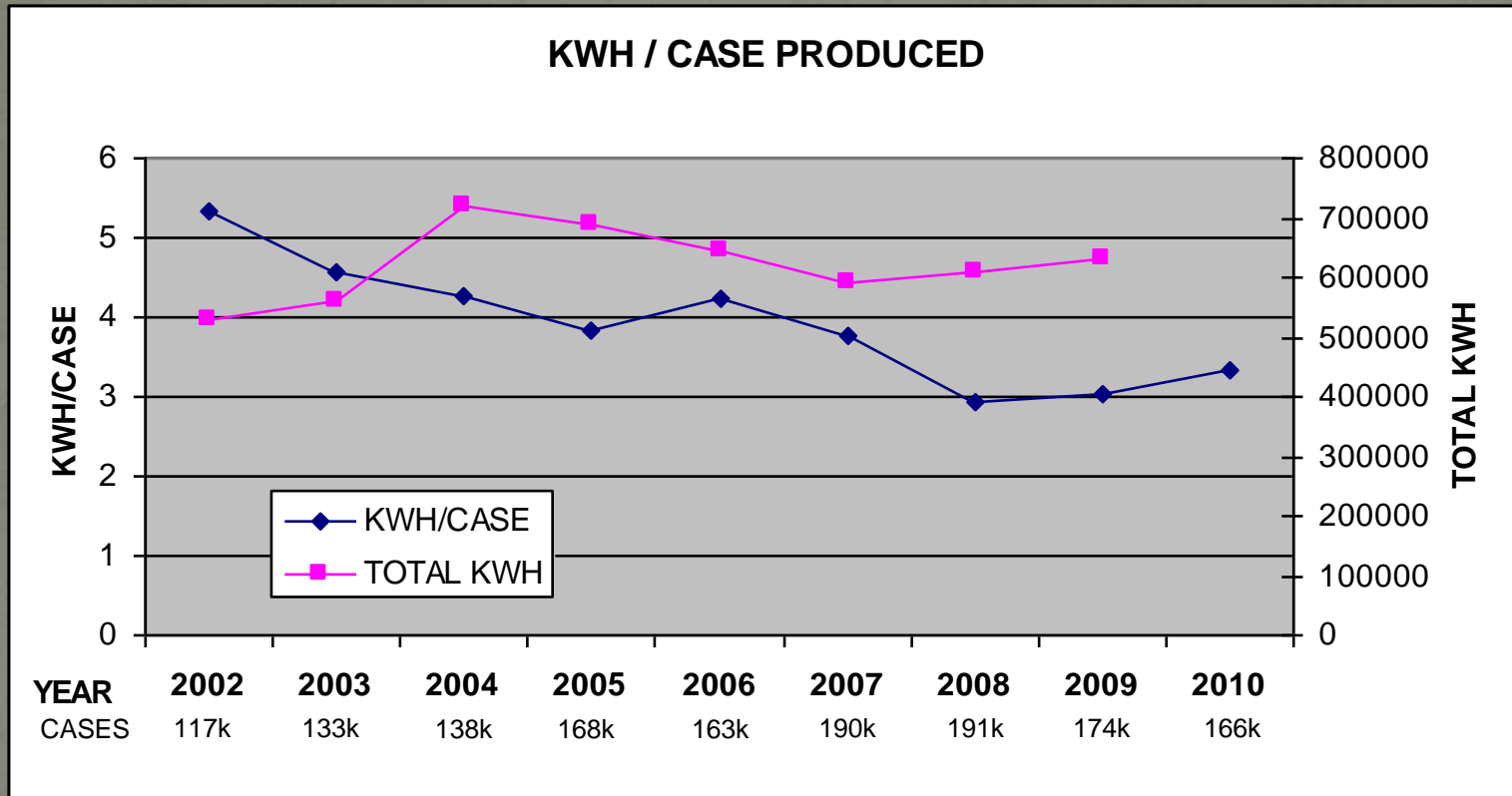
Our strategies

1. Improve existing inefficiency through modification
2. Change behavior / habits
3. Add new equipment
 - Four day work week
 - Fewer bottling line sanitations
 - Less start up / shut down time
 - Less commute time for employees

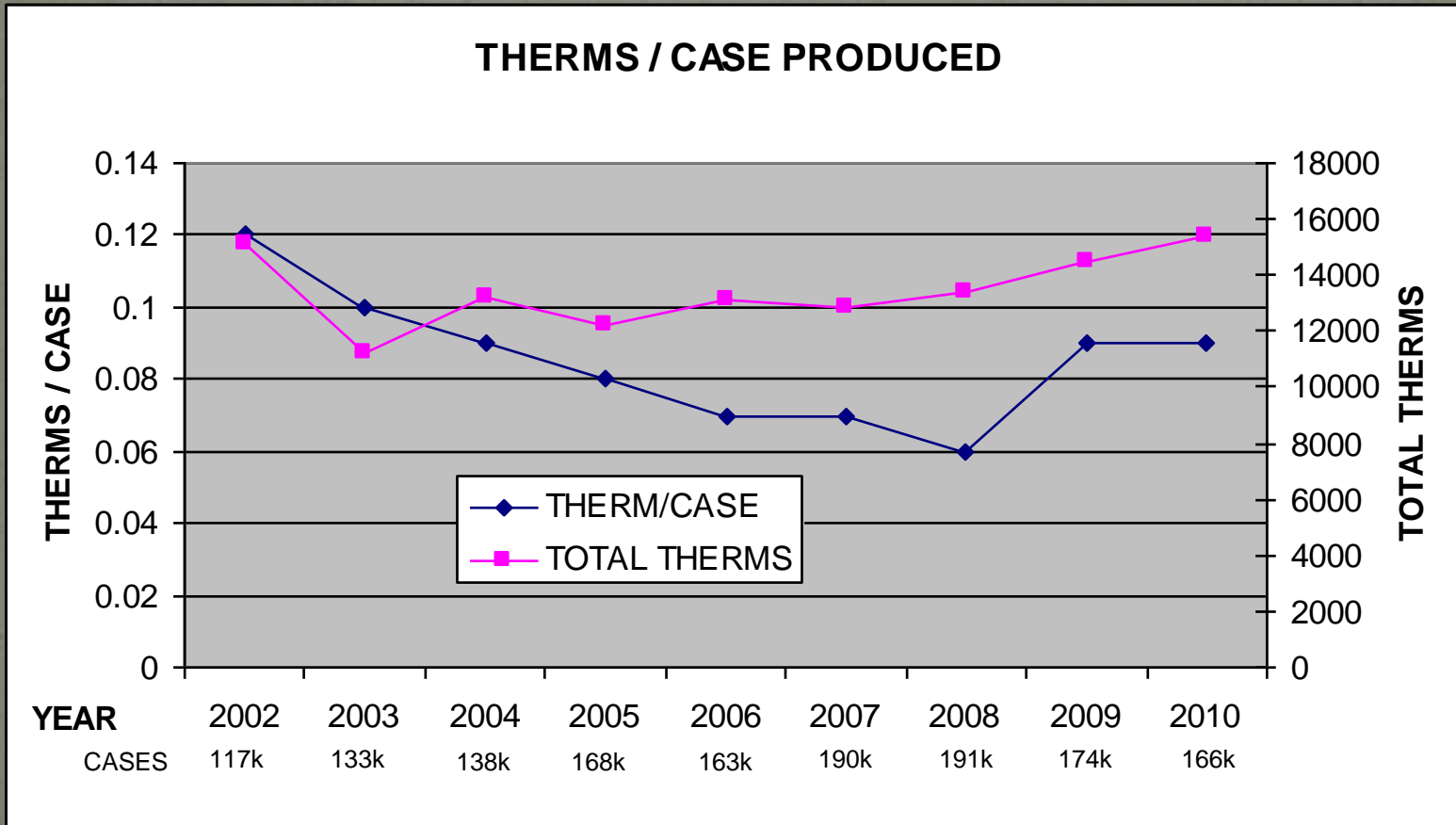
Our strategies

1. Improve existing inefficiency through modification
2. Change behavior / habits
3. Add new equipment
 - Production planning
 - Fewer bottling line sanitations
 - Spell out the costs / advocate for your needs
 - What do we need to use today?

Energy usage: electric



Energy usage: gas



Our strategies

1. Improve existing inefficiency through modification
2. Change behavior / habits
3. Add new equipment
 - Solar thermal system

Solar thermal

- Use solar energy to pre-heat process water
- Used more frequently in residential, less so in commercial and production facilities
- Usually used in conjunction with conventional water heater.

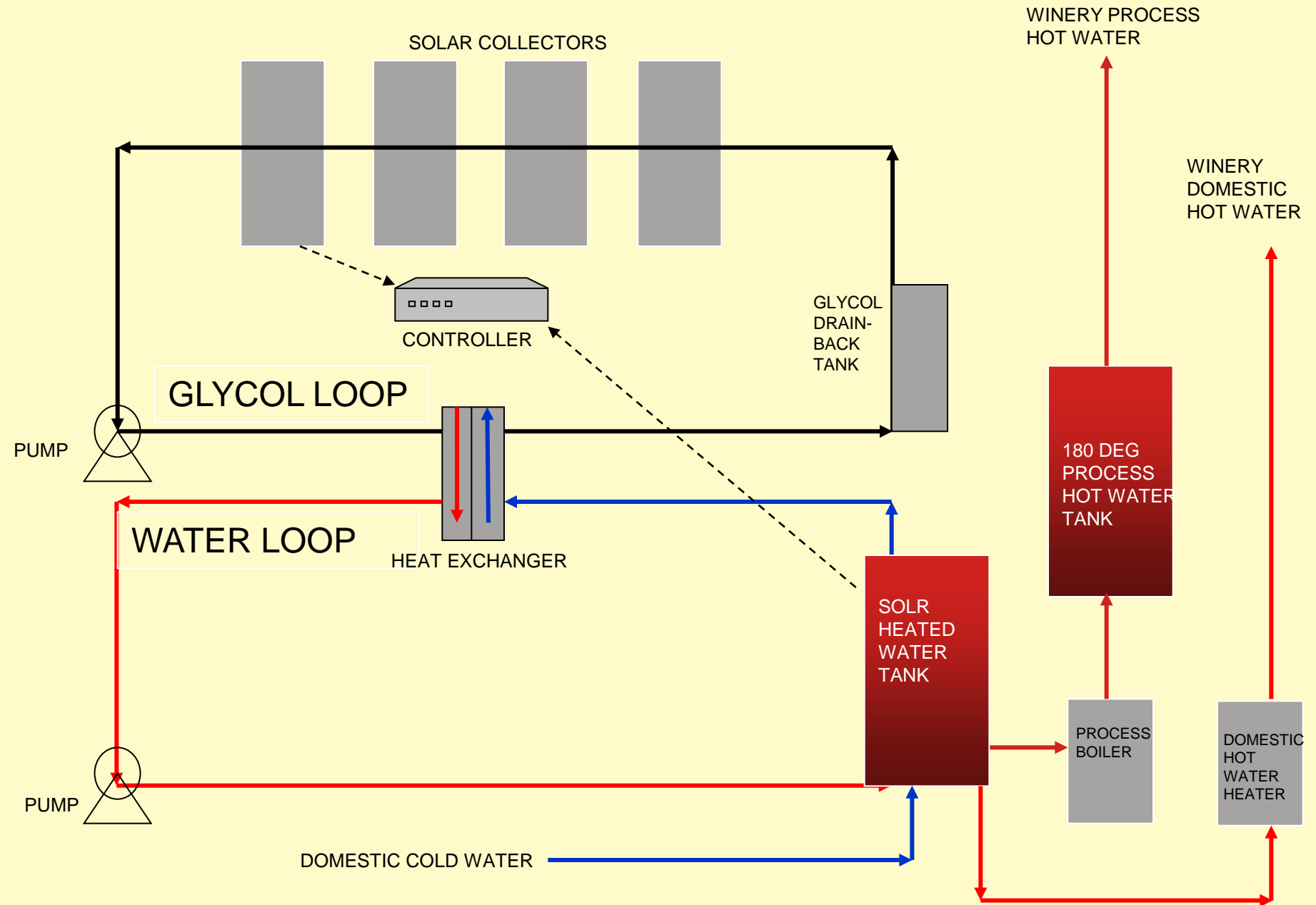
Solar thermal

- Advantages
 - Low capital expenditure for high profile project
 - Rebates and financing available
 - Simple technology

Solar thermal

- Disadvantages
 - Dependent on amount of incoming solar radiation
 - Still need conventional hot water system
 - Cost savings / ROI still being worked out for winery installations

SOLAR THERMAL SYSTEM COMPONENTS



Solar thermal panels



Heat exchanger & drain-back tank



Controller



Solar thermal

- System performance
 - Heat 1000 gal. tank from 60 F to 160 F in 6 hours on a hot sunny day
 - Will maintain tank at 140-150 deg. during summer, 80-90 deg. during winter
 - Gas bill decreased by 30%
 - Payoff in 5-10 yrs
 - Currently adding BTU meter and hot water sub-meter to quantify therms saved.

Solar thermal

- Financing
 - Overall cost \$105K
 - Financed through SCEIP – Sonoma County Energy Independence program
 - Eligible for 30% tax credit
 - Eligible for accelerated depreciation
 - Eligible for PG&E rebate
 - \$0.12 / therm saved
 - Currently working on measuring system performance

Our strategies

- Add new equipment
 - High efficiency barrel washer



Future goals

- Steam generator
- Finish tank insulation
- CIP system