

# **Bartek Ingredients - Case Study**

**Jason Perry**  
**Vice-President, Operations**

**Ownership: Canadian, private**

**Sales: \$40 million, 95% exported**

**Employees: 120**

# Maleic Anhydride Plant

## Stoney Creek



# Malic Acid, Fumaric Acid Plant

## Stoney Creek



# Products

## Maleic Anhydride

Primary Use:

Unsaturated Polyester Resins

- Home construction
- Automotive
- Marine

## Malic Acid and Fumaric Acid

Primary Use:

Food Ingredient

- Flavour enhancer
- Preservative
- Fruit drinks
- Flat breads

# Products



# Energy Balance

## Maleic Anhydride

### Consumes

- ↖ electricity 4,000 kW
- ↖ natural gas 1,500 kW

### Produces

- ↖ steam 10,000 kg/hr  
@ 260 psi

## Malic Acid

### Consumes

- ↖ electricity 800 kW
- ↖ natural gas 2,500 kW

# New Era

**How to address inherent inefficiencies?**

**How to plan and manage growth?**

1) Re-evaluate existing process design

2) Re-evaluate capital projects

 Use excess steam to produce electricity

 Use excess steam to offset heating/gas need

# Existing Process

## Electrical:

- right size motors
- install premium efficiency motors

## Heating:

- re-evaluate gas heaters and burners
- reclaim energy from high pressure condensate

## Programs:

CIPEC	Natural Resources Canada
Energy Wise	Union Gas
CHP	OPA

**Other programs? No comprehensive summary**



# Steam Turbine

## *Benefits*

- expect to offset electricity demand by ~ 1 MW or roughly \$750,000 per annum
- adapts to varied steam production rates
- relatively low maintenance

## *Draw backs*

- high capital cost
- difficult to integrate with existing plant equipment
- doesn't make full use of energy in steam
- complicated approval and review process

## Comments:

1. No clear set of electrical protection requirements
2. Utilities not staffed adequately
3. Too many separate authorities

# Steam Turbine



# Steam Turbine



# Steam Turbine Cooling Tower



# The Value of Steam at Bartek

10,000 kg/hr =

As Electricity:

~ 1,000 kW

~ 750,000 \$/yr

As Natural Gas:

~ 6,000 kW

~ 2,000,000 \$/yr

# How to Use Steam in Place of Natural Gas?

The Malic Acid process uses low-temperature heat

1. Move/rebuild the malic acid plant beside the maleic anhydride process
2. Connect the 2 existing sites via pipeline to share energy resources
3. Reclaim energy discharged in cooling towers in a new system such as greenhouses

# Most Economical Solution = Combination of Uses

## Maleic Anyhydride Plant

### *Produce:*

10,000 kg/hr steam as  
3,000 kW heat  
500 kW electricity

2.5 km



## *Malic, Fumaric Acid Plant*

### *Consume:*

3,000 kW heat

# Energy Discharged in Cooling Towers





# Conclusions

1. Energy efficiency in industry:
  - Necessary to remain economically competitive
  - Not just a moral exercise
2. Capital intensive projects:
  - Require clear description of all programs available
  - Require appropriate levels of support
3. Co-generation facilities require:
  - Fair and well defined framework in which to evaluate and implement projects
  - Comprehensive approach
4. Society must/will accept and understand the changes of creative solutions such as LTDH.