



**Energy Management**

**Control Environment**

**Control / Automation**

# **EFFICIENCY REDEFINED FOR DAIRY / CHEESE PLANTS**

**ATMO Sphere Presentation, June 13th**

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## End – User

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**Fromagerie Polyethnique**  
Saint-Robert, Québec, Canada

The adventure of the Fromagerie Polyethnique began in 1992 by an encounter between Lebanese merchants and a group of local farmers. Incorporated in 1993, Fromagerie Polyethnique is born! Construction begins in 1994 and production starts in 1995

**Fromagerie Fritz Kaiser**  
Noyan Québec, Canada

Founded in 1981 by Mr. Fritz Kaiser, the cheese dairy is situated in Noyan close to the border of the state of New York. The dairy specializes in the production of washed, bloomy and mixed rind cheeses. **Swiss/German owner**



# Fromagerie Polyethnique



## Energy efficiency history:

- 2003 Hedge windbreak
- 2007 First heat pump installation
- 2008 First energy management system installed
- 2008 Installation of solar wall for fresh air heating
- 2010 New business commitment for energy efficiency and waste reduction
- 2011 New energy efficient blast cooler



# Fromagerie Polyethnique

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## Motivation:

- Corporate Commitment of Energy Efficiency
- Reduce gas emission
- Reduce waste and GHGE
- GREEN Business Philosophy
- Company Advertisement / Marketing

# Fromagerie Fritz Kaiser





# Fromagerie Fritz Kaiser

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## Motivation/Challenge:

- Expansion with lower operational cost
- Reduce GHGE
- European concept
- GREEN Business Philosophy
- Going from a small hand made production to a more industrial production
- Utilisation of all incentive available

# Interesting design challenge

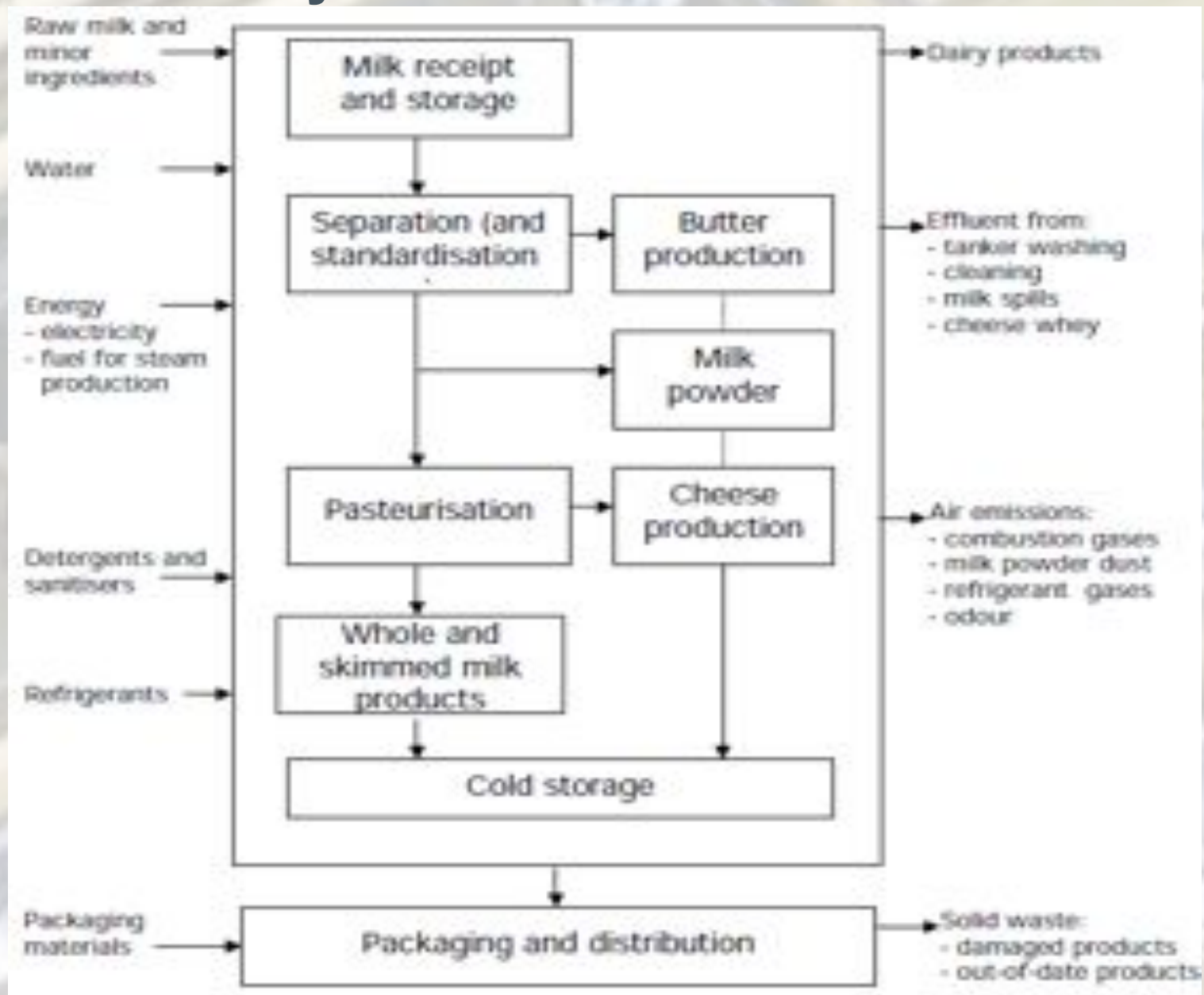
- Analysis of all energy requirement
- Use ALL the heat produced by the MYCOM ECOCUTE unit
- Balance the need and the production of hot water
- Reduce the high production peak demand
- Produce all different temperature required
- Use the MYCOM ECOCUTE unit on his peak performance

## Results

Hot water outlet °C	Hot water inlet °C	Heat source inlet °C	Heat source outlet °C	Hot water flow L/min	Heat source flow L/min	Heating Capacity kW	Chilling Capacity kW	Power kW	COPh	COPl	Notes
90	5.0	9.0	4.0	13.9	175.2	82.6	61.1	24.0	3.44	5.98	
90	65.0	9.0	8.0	19.8	158.2	34.6	11.0	25.4	1.38	1.79	
90	35.0	9.0	4.0	15.5	107.8	59.6	37.6	24.2	2.46	4.01	
90	65.0	9.0	4.0	19.1	29.1	33.3	10.2	24.9	1.33	1.74	Heat source flow is at below minimum limit.



# Dairy/Cheese Plant Process



# Cooling Requirement

Cooling in dairy/cheese plant is required:

- Storage (Raw milk) @ 39.2F / 4C
- Storage (finished product) @ @ 39.2F / 4C
- Brine @ 50F / 10C
- Blast cooler @ 32F / 0C





# Heating Requirement

Heating in Dairy/Cheese plant is required to produce:

- 140F (60C) C.I.P. Water - 164F (73C) Pasteurization- 77F (25C) Ventilation



Boiler  
**260F / 71C  
water**

Water Source  
Heat Pump using  
R134A to produce  
**160F / 71C water**



Water Source  
Heat Pump using  
R410 to produce  
**120F / 49C water**

Water Source Heat  
Pump  
using **CO2** to  
produce  
**194F/ 90C Potable  
water**



# Heating Requirement



Process	Product Temperature	Boiler (260F)	R410 heat pump (120F)	R134 Heat pump (160F)	CO2 Heat pump (194F)
<u>Ventilation</u>	77F (25C)	x	x	x	<b>x</b>
<u>CIP</u>	140F (60C)	x		x	<b>x</b>
<u>Pasteurization</u>	164F (73C)	x			<b>x</b>



# Fromagerie Polyethnique Load Distribution

Mycom ECOCUTE CO2 Heat Pump to produce hot water for:

- Washing water

Standard hot water boiler produce hot water into plant

CO2 ECOCUTE CO2 Heat Pump to produce chilled water for:

- Maturing room
- Milk storage
- Crystopia storage ice bank



Standard Freon chiller produce cooling for air handling equipment

# Fromagerie Polyethnique

## ECOCUTE Performance:

184,000 kW-h Annual Consumption  
534,5000 kW-h of Hot Water @ 194F / 90C  
382,900 kW-h of Cooling @ 39F / 4C propylene glycol

Cooling COP = 2.1  
Heating COP = 2.9  
Combined COP = 5.0

**Approximate Propane Reduction**  
**105,000 liters (27 738 Gal)/ year**



# Fromagerie Fritz Kaiser

Mycom ECOCUTE CO2 Heat Pump produces hot water for:

- Washing water
- Pasteurization
- Production process



Mycom ECOCUTE CO2 Heat Pump produces chilled water for:

- Brine
- Maturing room
- Milk storage
- Crystopia storage ice bank



Standard Freon chiller produces cooling for air handling equipment

# Fromagerie Fritz Kaiser

## Energy saving benefit with Mycom ECOCUTE Heat Pump:

	Consumption			Saving
	2010	Building expansion		
	Actual Liter	REFERENCE Liter	Proposed Liter	Proposed Liter
Building	0	37 967	22 636	15 331
Fresh water	39 796	65 161	6 438	58 724
Process	37 432	71 068	20 492	50 576
<b>TOTAL</b>	<b>77 228</b>	<b>174 197</b>	<b>49 566</b>	<b>124 630</b>
	34 948,07 \$	78 829,62 \$	22 430,35 \$	56 399,27 \$

**Approximate Propane Reduction**  
**124,630 liters(32 923Gal) / year**



Thank You