



# Center for Energy and Environment

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UNIVERSITY OF MINNESOTA

**Driven to Discover<sup>SM</sup>**

# Company Background



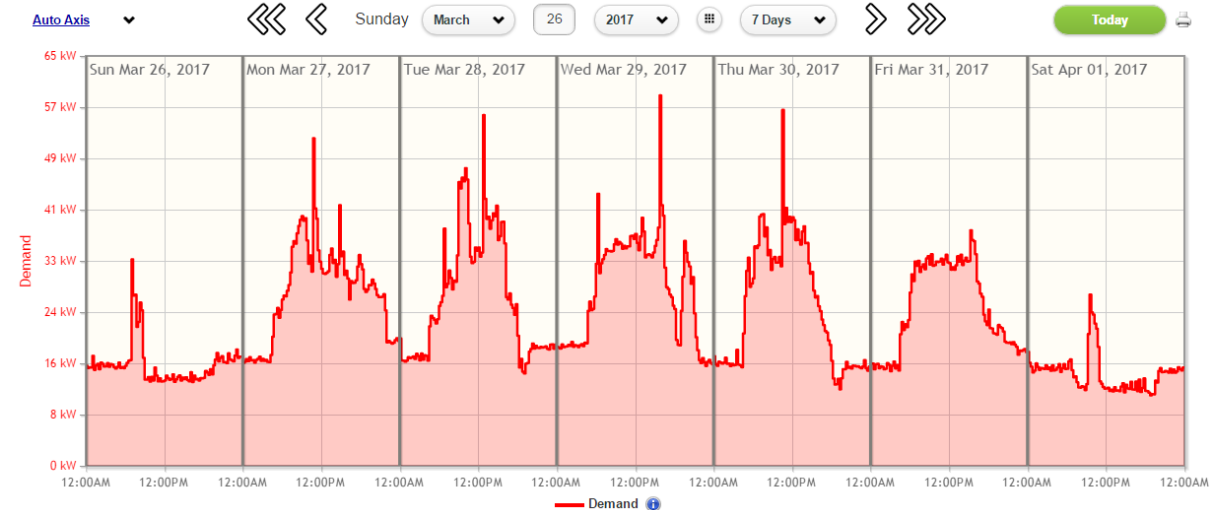
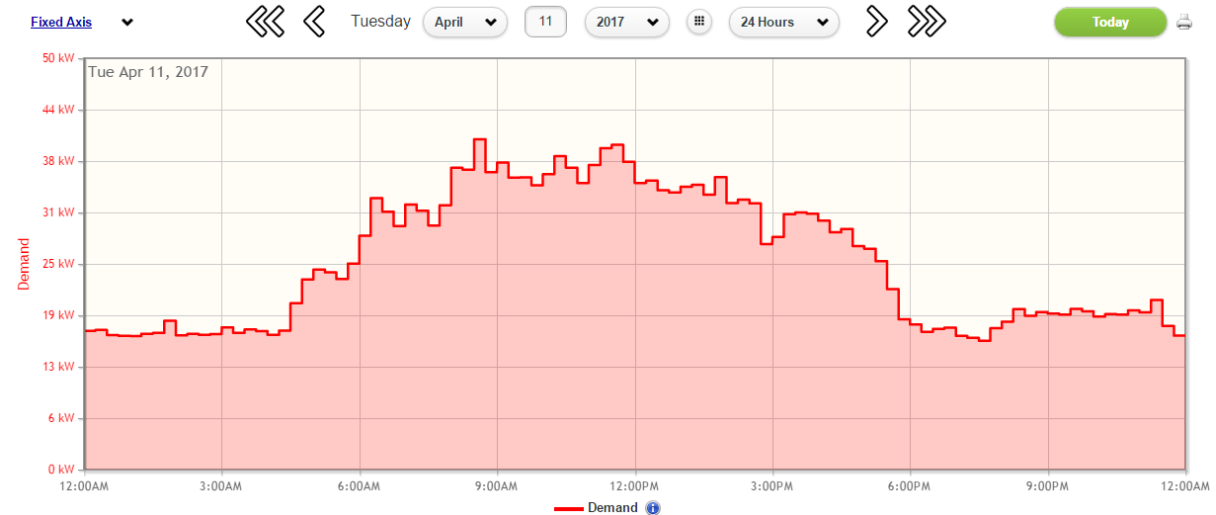
- **Started over 35 years ago, certified nonprofit**
- **Variety of departments, all focused on improving the efficiency of energy usage in both homes and businesses**
  - Research, Home Energy Squad, One-Stop Efficiency Shop, Energy Intelligence

# Department Overview

- **Energy Intelligence (EI) works with small industrial businesses**
  - Show businesses how they're using energy
  - How they could improve practices
- **Funded by Xcel Energy, as part of Xcel's Conservation Improvement Program (CIP)**
  - Part of the MN Next Generation Energy Act of 2007

# Project Overview

- Visit four small industrial sites and recommend energy improvements
- Three weeks per site, two on-site and one at CEE
  - Each site set with smart meters prior to arrival
- Variety of sites and improvement opportunities



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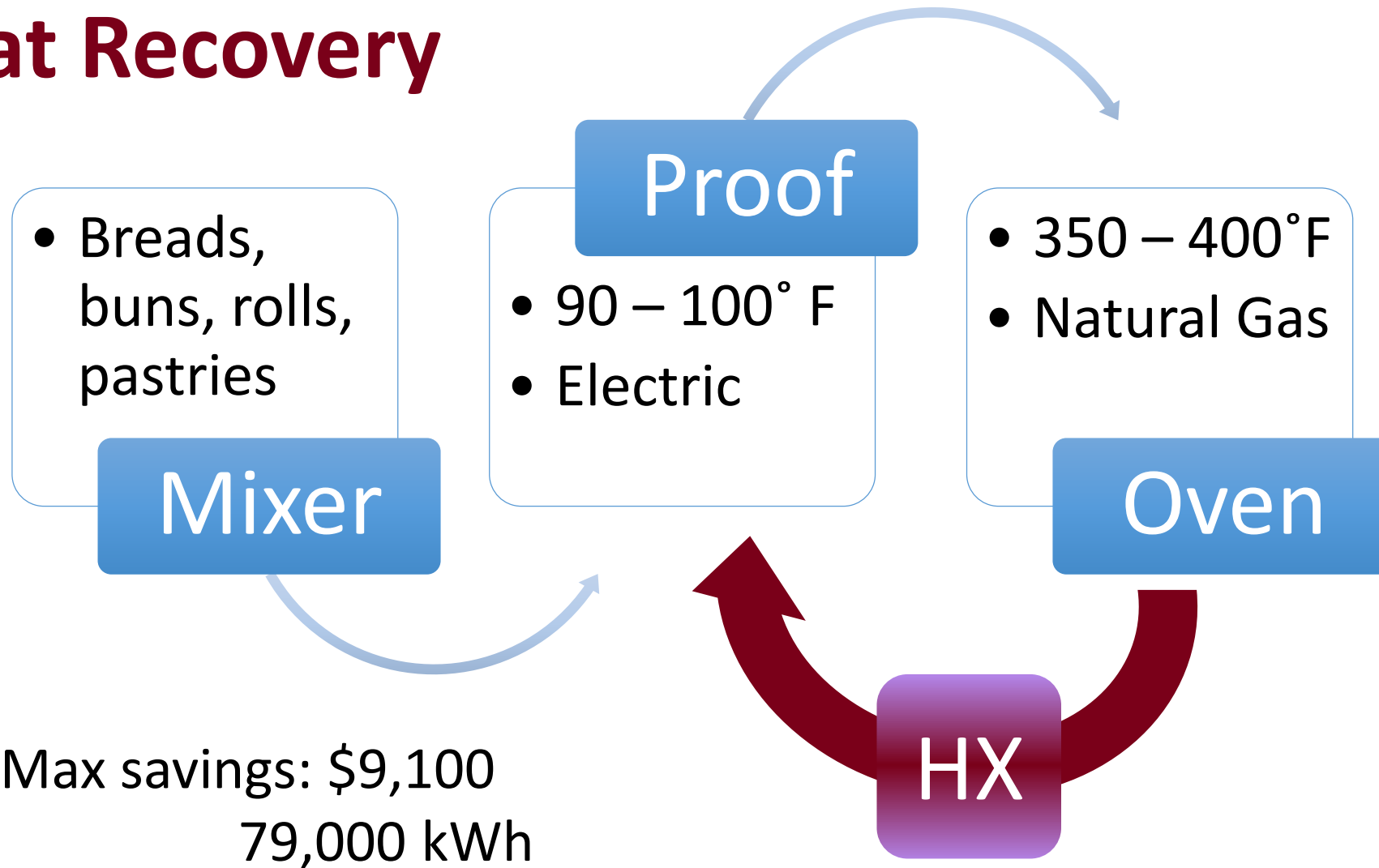
# SAINT AGNES

BAKING COMPANY

- Founded 1995
- Wholesale bakery
- Variety of breads, rolls, pastries



# Heat Recovery



# Findings- St. Agnes Bakery

Recommendation	Savings per Year (\$)	Energy Savings per Year (kWh)	Natural Gas Savings per Year (therms)	Project Cost (\$)	Payback Period (Years)
Recycle waste heat	\$9,100	79,400	N/A	TBD	TBD
Reduce proof box temperatures	\$500	<b>30%</b>	N/A	\$0	Immediate
Replace old motors with premium efficiency	\$400		N/A	Varies	Varies
Turn off office power strips	\$150		N/A	\$0	Immediate
Replace seal on heated and cooled devices	\$100		500	100	Varies
Reduce time oven doors are open	\$80	N/A	150	\$0	Immediate
<b>Total:</b>	<b>\$10,300</b>	<b>89,900</b>	<b>250</b>	<b>N/A</b>	<b>N/A</b>



- Started in 1992, as Epoxical
- In 2007, change to Endurance Technologies
- Epoxy resin and polyurethane manufacturer
  - Marine, pipe systems, and tooling applications





# Solar Array

- 32,000 ft<sup>2</sup> rooftop
- 220,000 – 240,000 kWh per year
- 84% of annual energy usage
- Estimated Cost: \$320,000
- Potential Savings: \$30,000
- Payback Period: 5-10 years



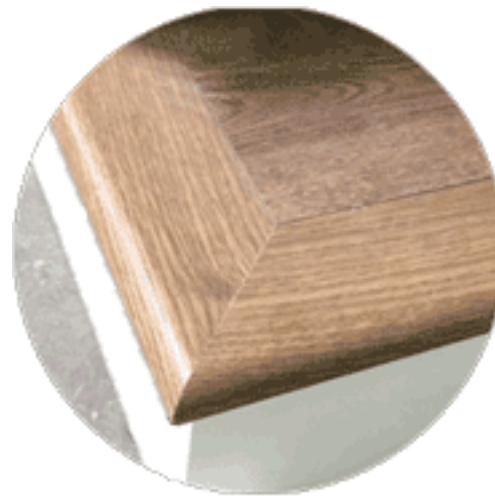
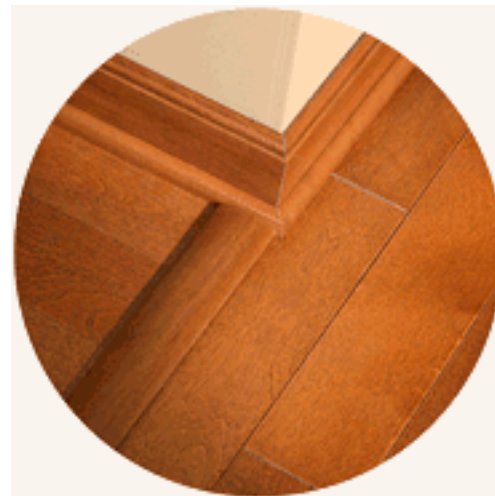
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# Findings- Endurance Technologies

Recommendation	Savings per Year (\$)	Energy Savings per Year (kWh)	Natural Gas Savings per Year (therms)	Project Cost (\$)	Payback Period (Years)
Solar array	\$30,000	240,000	N/A	\$320,000	5-10
New ceiling fan schedule	\$3,900	26,000	N/A	\$0	Immediate
Change lighting to LEDs	\$3,500	<b>25%</b>	N/A	TBD	TBD
Replace motors with premium efficiency	\$1,200		N/A	Varies	Varies
Add economizer to the boiler	\$1,000		1,500	TBD	TBD
Add no air loss drain to the compressor	\$180		1,200	N/A	TBD
Additional Recommendations	\$600	8,300	N/A	\$0	Immediate
<b>Total:</b>	<b>\$40,400</b>	<b>306,000</b>	<b>1,500</b>	N/A	N/A

# ARTISTIC FINISHES

- **Founded in 1985**
- **Business-to-business manufacturer**
  - Wholesale pricing
- **Wood veneer, vents, molding, and treads/risers**



# Line Controls

- 9 production lines
- Operating ~20%
- Single control switch
  - On/Idle/Off
- Cost: TBD
- Savings: \$38,100/year

# Baghouse/Gate Controls

- **17 potential pneumatic gates**
- **VFD on central motor (50 hp)**
- **Cost: \$11,950**
- **Savings: \$2,000**
  - 34,000 kWh
  - 20% cost reduction, consumption rate
- **Payback: 5.75 years**

# Findings- Artistic Finishes

Recommendation	Savings per Year (\$)	Energy Savings per Year (kWh)	Project Cost (\$)	Payback Period (Years)
Install line controls	\$38,100	613,000	TBD	TBD
Fix compressed air leaks	\$9,300	88,000	\$0	Immediate
Change lighting to LEDs		000	TBD	TBD
Install gate controls for baghouse		000	\$12,000	5.75
Reduce compressed air pressure		000	\$0	Immediate
Adjust startup procedure		000	\$0	Immediate
Use computer power management	\$1,000	16,000	\$0	Immediate
Change pneumatic tools to electric	\$700	7,000	TBD	TBD
<b>Total:</b>	<b>\$60,200</b>	<b>867,000</b>	N/A	N/A

**40%**

# INSIGHT BREWING

- Founded in 2014
- Brew ~8,000bbl/year
- Brewhouse, packaging, shipping, and taproom in one location



# Lighting

- **Current Lights: 87,000 kWh/year**
- **New Lights: 17,700 kWh/year**
- **Cost: \$19,000**
- **Savings: \$7,400/year**
- **Payback Period: 2.6 years**





# Findings- Insight Brewing

Recommendation	Savings per Year (\$)	Energy Savings per Year (kWh)	Natural Gas Savings per Year (therms)	Project Cost (\$)	Payback Period (Years)
Change lighting to LEDs	\$7,400	69,000	N/A	\$19,000	2.6
Move chiller outside	\$3,900	<b>45%</b>	N/A	\$0	Immediate, Completed
Compressed air system adjustments	\$700		N/A	\$0	Immediate, Scheduled
HVAC system upgrades, adjustments	\$700		300	\$900	1.3
Additional Recommendations	\$600	6,400	N/A	Varies	Varies
<b>Total:</b>	<b>\$13,300</b>	<b>125,400</b>	<b>300</b>	N/A	N/A

# Findings Overview

<b>Project Site</b>	<b>Savings per Year (\$)</b>	<b>Energy Savings per Year (kWh)</b>	<b>Energy Savings per Year (therms)</b>
St. Agnes Bakery	\$10,300	89,900	250
Endurance Technologies	\$40,400	306,000	1,500
Artistic Finishes	\$60,200	867,000	N/A
Insight Brewing	\$13,300	125,400	300
<b>Total:</b>	<b>\$124,200</b>	<b>1,388,300</b>	<b>2,050</b>

# Personal Benefits

- **Hands on experience with energy efficiency**
  - Compressed air leak checks, lighting audits, motor audits, etc.
- **Creative process to find inefficiencies**
- **Build relationships with employees at each site**
- **Opportunity to work with two amazing advisors**



**QUESTIONS?**