

## Case Study II: Applebee's



FISHER  
NICKEL Inc.

## Kitchen Layout



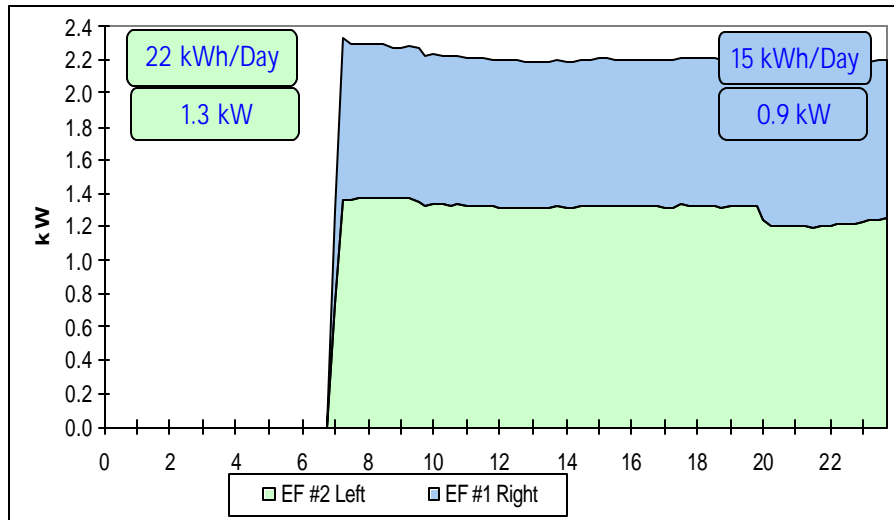
## Field Monitoring Components

- **Fan Power**  
(EF1, EF2, MUA, AC, etc.)
- **Fan Energy**  
(EF1, EF2, MUA, AC, etc.)
- **VSD Signals**  
(%EF1, %EF2, & %MUA)

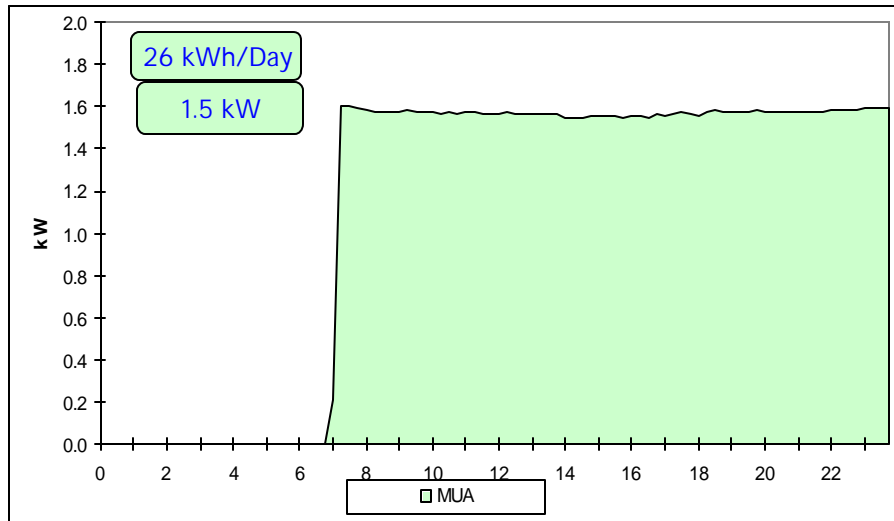
## Initial Air Balance

<u>Component</u>	<u>CFM</u>
• Exhaust Fan 1 (EF1) – Captive Aire rated @ 1.5 hp	2610
• Exhaust Fan 2 (EF2) – Captive Aire rated @ 1.5 hp	3753
• Make-up Air (MUA) – CAS rated @ 5 hp	4852
• Transfer	1511

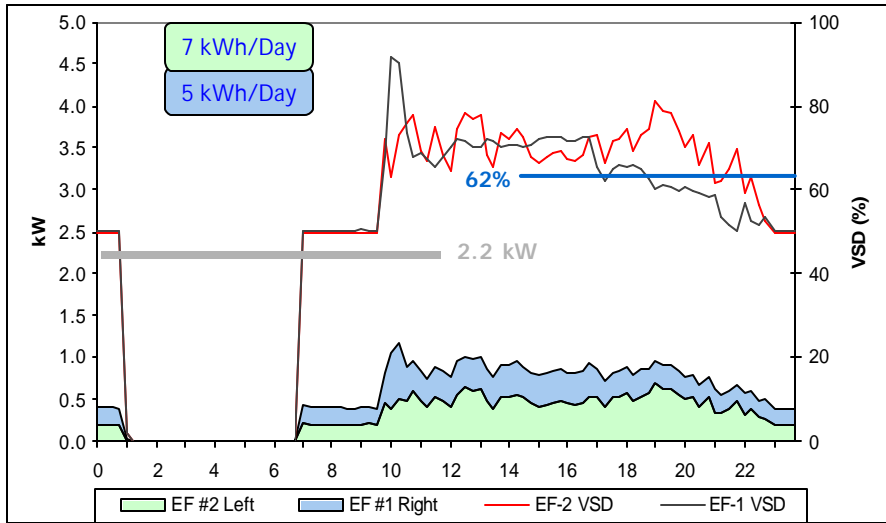
## Exhaust Fans w/o MELINK



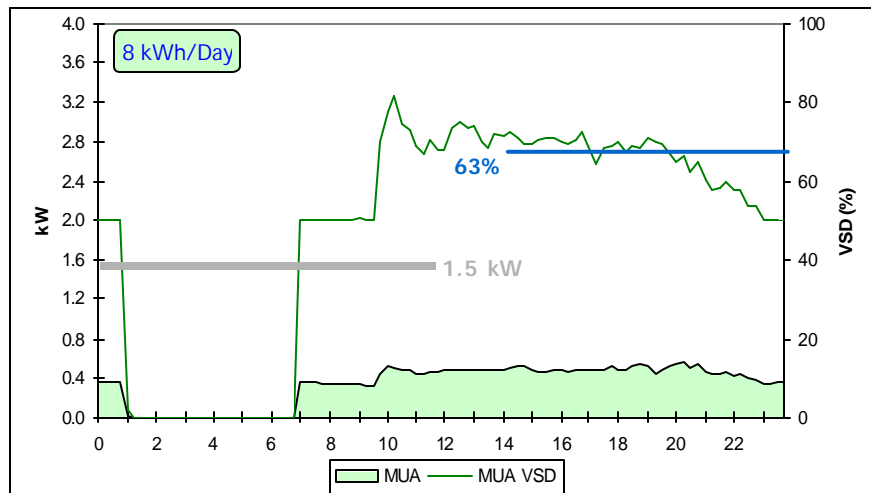
## Makeup Air Fan w/o MELINK



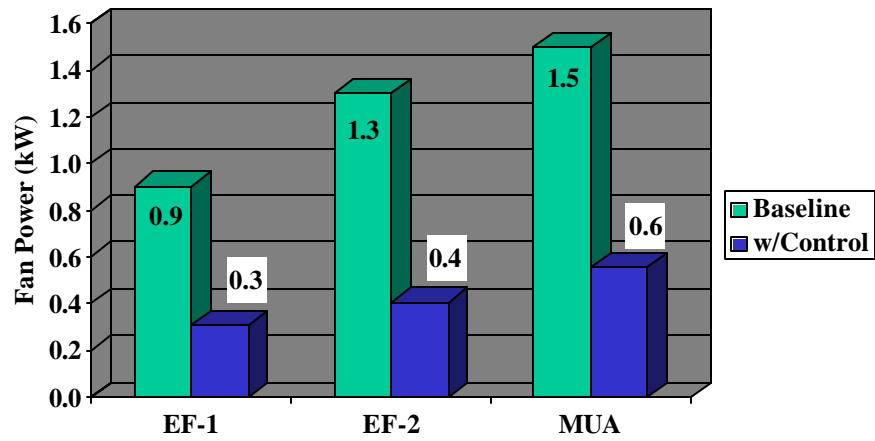
## Exhaust Fans with MELINK



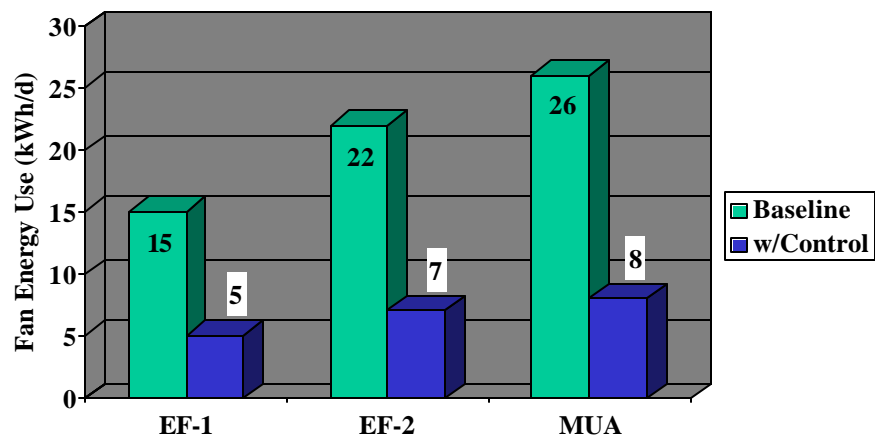
## Makeup Air Fan with MELINK



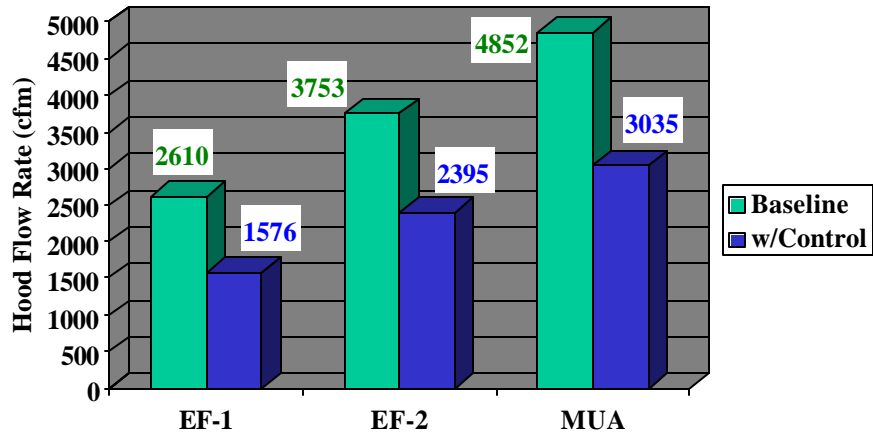
## Fan Power Comparison



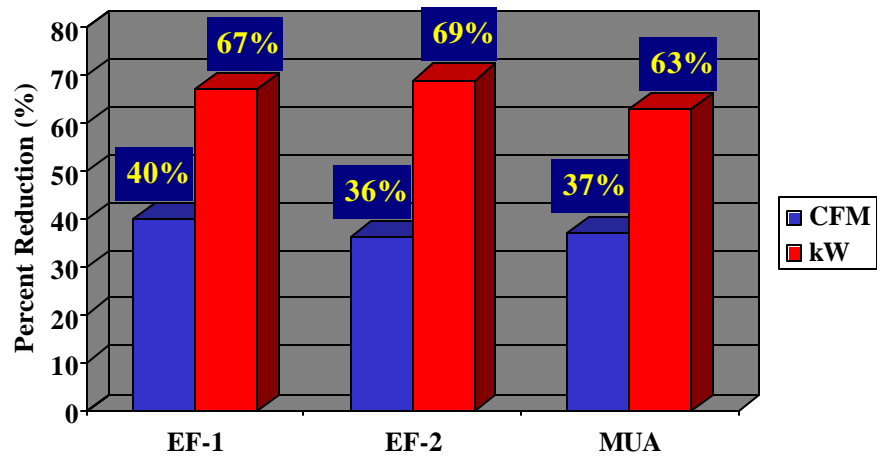
## Fan Energy Comparison



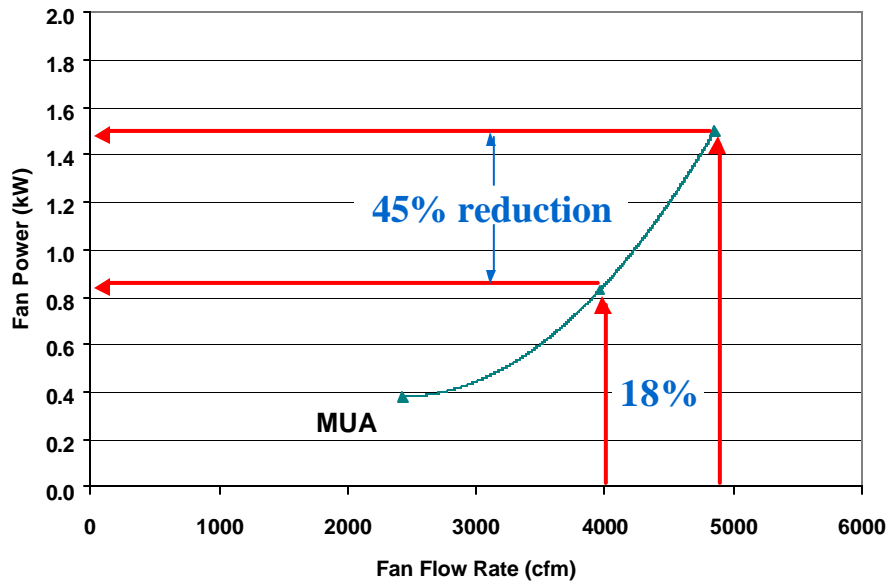
## CFM Comparison



## Percent Reduction: CFM & Fan Power



## Fan Power vs. Flow Rate

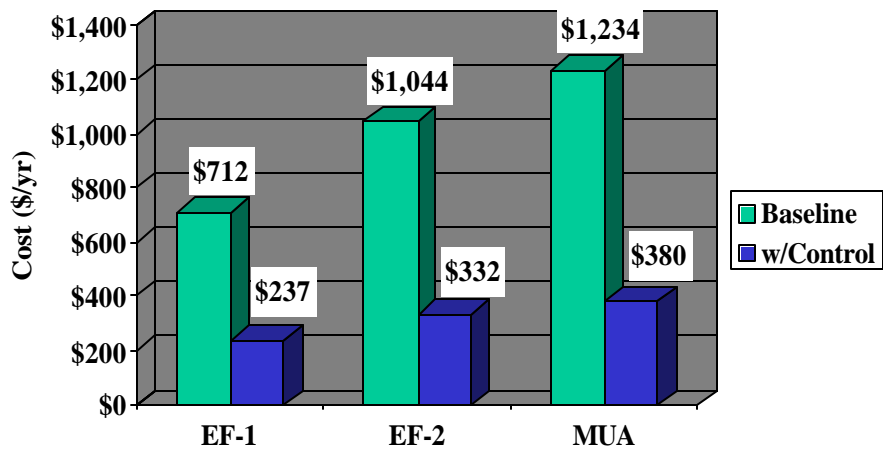


## Fan Energy Cost Comparison

	kW	kWh/d	Cost \$/yr
<b>EF's</b>	2.2	37	\$1,756
<b>MUA</b>	1.5	26	\$1,234
		Total Fan Energy Cost	\$2,990
<b>EF's (Melink)</b>	0.7	12	\$569
<b>MUA (Melink)</b>	0.6	8	\$380
		Total Fan Energy Cost	\$949

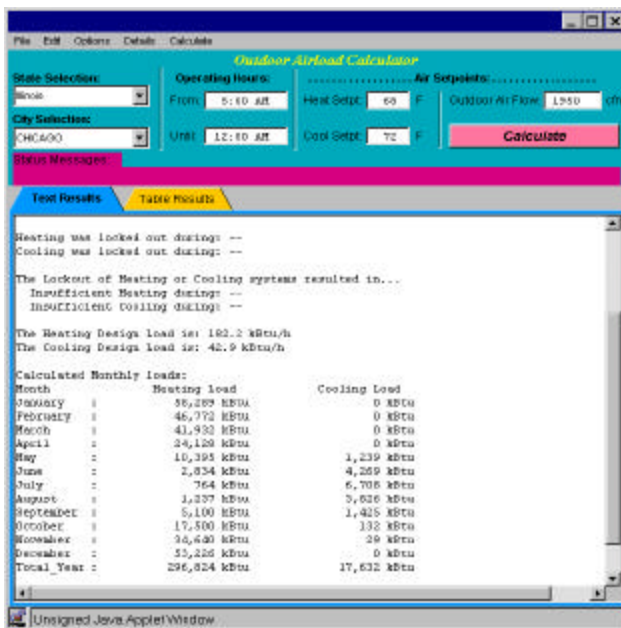
Based on 17 hr/day operation at \$0.13/kWh.

## Fan Energy Cost Comparison



Based on 17 hr/day operation at \$0.13/kWh.

Outdoor  
Air Load  
Calculator  
*and*  
Fan Energy  
Estimator



Free Download: [www.archenergy.com/AECHome/ckv/oac/default.htm](http://www.archenergy.com/AECHome/ckv/oac/default.htm)



## Assumptions: Total Savings Scenario

- Average MUA Reduction: 1800 CFM
- Dedicated MUA heated to 65°F with direct-fired unit at 90% efficiency.
- Direct MUA cooling to 80°F, if any.
- Representative energy rates for each city (\$0.66-\$0.80 per therm, \$0.08-\$0.13 per kWh)

## Summary (Rancho Cucamonga)

	kW	kWh/d	Saving \$/yr
<b>Fan Energy</b>	1.3	20	\$2,040
<b>Heating &amp; Cooling</b>	---	---	\$339
		<b>Total Savings</b>	\$2,380
		<b>New Installation</b>	\$6,000
		<b>Payback</b>	<b>2.5 years</b>

Based on 17 hr/day operation at \$0.13/kWh in Los Angeles.

## Savings around U.S.

