KITCHEN VENTILATION REPORT

Energy Savings Using Modulating Vent Controls, Theory or Fact?

Over the last several years various manufacturers have developed modulating vent controls that are to be utilized in commercial kitchen applications. The promise of substantial savings has been the goal, but real information relating to actual installations has not been as readily available as would probably been liked. This issue has now been addressed by a study that was developed and implemented by the Construction Engineering Research Laboratory, US Army Corps of Engineers. Located in Champaign, Illinois, this group led a three year project that has been highlighted in a 300 page report that was completed just this year.

This study was formally presented at this year's annual ASHRAE convention which was held in Chicago, Illinois. The presentation was attended by a large and varied cross section on the HVAC engineering community along with other interested parties. The engineers involved in the project looked at four dinning facilities located in several different parts of the country. Not only were the sites of the country. Not only were the sites scattered, but different types of venues were represented in the study as well. Restaurant types included a fast food application, a 240 person school, a medium sized (600 people) dining facility and a large dining facility that serves up to 5,000 people.

The fan modulating systems were installed and monitored during 2012 and 2013. The summary of energy savings is shown in the table below. In spite of the varied applications, the energy saved is fairly consistent at approximately 33%.

Table ES-1. Summary of energy savings provided by DCV systems on kitchen hoods.

	Energy Use Before DCV			Energy Saved By DCV			Percent Saved		
Test Site	kWh/yr	Therms/yr	MMBtu/yr	kWh/yr	Therms/yr	MMBtu/yr	kWh	Therms	Btu
Fort Lee	215,560	23,716	3,108	99,294	6,436	983	46%	27%	32%
Ellsworth	8,889	3,548	385	5,169	1,166	134	58%	33%	35%
Fort Carson	29,313	22,546	2,355	16,582	7,043	761	57%	31%	32%
USAFA	60,655	18,975	2,105	31,885	6,722	781	53%	35%	37%
Totals	314,417	68,785	7,952	152,930	21,367	2,659	49%	31%	33%

Table ES-2. Economic results of installed DCV systems.

	Utility Cost Savings		Maintenance	Total	System	Simple	
DFAC Site	Electric	Nat. Gas	Cost	Savings	Cost	Payback, yrs	SIR
Fort Lee	$7,427	$3,579	$800	$10,003	$48,410	4.74	1.86
Ellsworth AFB	$339	$875	$400	$813	$30,255	37.21	0.28
Fort Carson	$995	$3,521	$600	$3,916	$51,790	13.22	0.79
Air Force Academy	$1,913	$3,362	$400	$4,875	$41,161	8.44	1.18

Several generalities also appear to be evident when reviewing the study.

1. Larger dining facilities with larger fans seem to benefit more from modulating fan controls than smaller applications.
2. Dining facilities in locations with more extreme climates also seem to benefit more from modulating fan controls.
3. GHG emissions as well as energy reductions are in fact, realized with modulating fan controls.

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