Condair EcoPro Report

Virology Lab - Manitoba Canada

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Project Context

Virology Lab - Manitoba, Canada

A laboratory in Winnipeg Canada was seeking to evaluate two humidification strategies for their critical environment. The options considered were the DL Dual Adiabatic Humidifier and a traditional steam exchange humidifier (SETC). The primary focus of the comparison was long-term energy efficiency and operating costs.

Even when factoring in access to relatively inexpensive boiler steam, the annual operating cost of the steam exchange system was found to be significantly higher than that of the DL system. While the adiabatic system did require natural gas for pre-heating, the gas usage was far lower than what would be required to generate steam for humidification. This reduction in fuel demand, combined with the ability of the adiabatic system to deliver cooling at no additional energy cost, provided a significant efficiency advantage.

The analysis showed that the DL Dual Adiabatic Humidifier would save the laboratory approximately $72,000 per year in combined energy and cooling costs compared to the steam exchange option. This cost advantage would be implemented without compromising humidification performance or system reliability, both of which are essential in laboratory environments where stable temperature and humidity control are critical.

Initial and installation costs are based on typical values for humidification capacity and air volume. For project-specific energy analysis, contact na.applications@condair.com. If the details are unknown, this analysis can be adapted to your location and utility prices.

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Input Information

Utility Rate Information

Utility Type	Rate
Electricity Rate	0.0455 $/kWh
Electricity Demand Charge	11.91 $/kW/month
Natural Gas Rate	0.016 $/kWh
Propane Rate	0.04 $/kWh
Central Steam Rate	0.0075 $/lb
District Heating Rate	0.08 $/kWh
Water Rate	0.06 $/ft³
Sewer Rate	0.09 $/ft³

Analysis Setup

Building	
Project Location WMO	718520
Climate Zone	7
Building Type	Healthcare
Total Floor Area	71000 sq.ft
Window to Wall Ratio	50 %
Height Calculation	Building Height
Building Height	36 ft
Number of Floors	1
Envelope Performance	ASHRAE 90.1-2019
Infiltration	Airtight Building

Building Density	Peak	Off-Peak
Lighting	1.04 W/ft²	0.21 W/ft²
Sensible Equipment	1 W/ft²	0.2 W/ft²
Latent Equipment	0 W/ft²	0 W/ft²
Average Occupancy	53.82 ft²/person	269.1 ft²/person

Building Setpoints	Setpoint	Setback
Cooling	72 °F	81 °F
Heating	72 °F	64 °F
Humidification	40 %	20 %
Dehumidification	60 %	85 %

Operational Schedule - Peak Hours	Begins	Ends
Sunday	00:00	24:00
Monday	00:00	24:00
Tuesday	00:00	24:00
Wednesday	00:00	24:00
Thursday	00:00	24:00
Friday	00:00	24:00
Saturday	00:00	24:00

Air System	
HVAC Air System Type	VAV
HVAC Cooling Type	Air-cooled chiller
HVAC Heating Type	Gas Boiler
Total Air Volume	70285 CFM
Minimum Outside Air	100
Fan Efficiency	94.5
Preheat Energy Source	Natural Gas
Preheat System COP	0.8
Cooling System COP	2
Include Economizer	Yes
Maximum Humidifier Size	N/A

Energy Recovery (optional)		
Recovery System Present	Yes - Sensible Only	
Recovery Type	Rotary Thermal Wheel	
	Summer	Winter

Energy Recovery (optional)		
Sensible Effectiveness	80 %	80 %
Latent Effectiveness	0 %	0 %

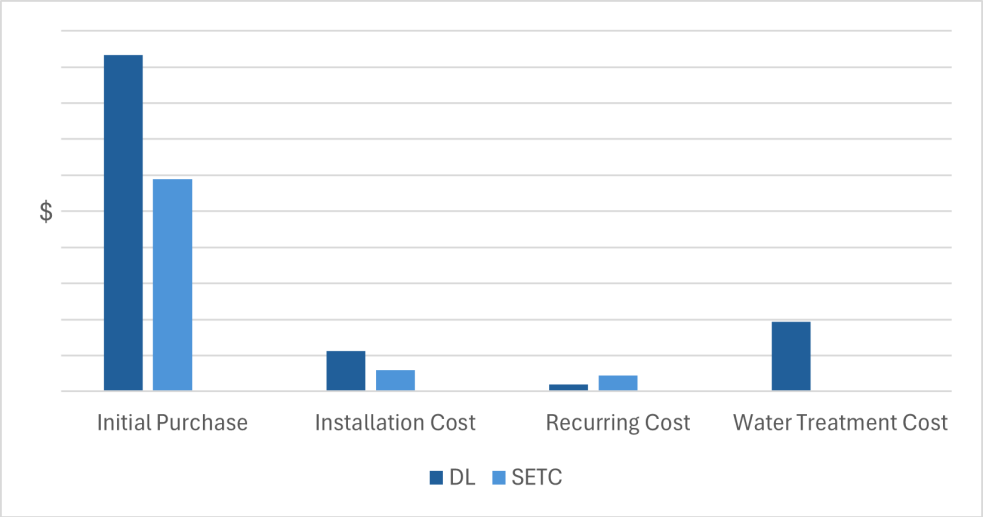
Product Comparison

Parameters	**Product 1**	**Product 2**	**Product 3**
System Type	In-Duct	In-Duct	N/A
Technology	DL-A	SETC	N/A
Bypass Dampers	No	No	N/A
Initial Purchase ($)	X	X (-) 37%	N/A
Installation Cost ($)	X	X (-) 47%	N/A
One-Time Cost	0 $	0 $	N/A
Recurring Costs (yearly $)	X	X (+) 125%	N/A
Water Type	Reverse Osmosis	Potable	N/A
Water Efficiency	90 %	75 %	N/A
Water Treatment System			
Water Treatment System	MLRO	-- Select --	N/A
Water Treatment System Water Efficiency	75 %	0 %	N/A
Water Treatment System Purchase ($)	X	0 $	N/A
Steam Generation			
Facility Boiler Type	None	Natural Gas	N/A
Facility Boiler Efficiency	0 %	70 %	N/A
Steam Distribution Losses	0 %	15 %	N/A

Financial Analysis

Financial Analysis	
Time Period	15 yrs
Utility Inflation Rate	5 %
Non-utility Inflation Rate	2 %
Discount Rate	10 %
Benefit	0 $

Initial Product Comparison



Comparison Summary

Condair Model	DL-A Series	SETC Series
System Type	In-Duct	In-Duct
Technology	DL-A	SETC
Water Type	Reverse Osmosis	Potable
Water Treatment System	MLRO	N/A
Facility Boiler Type	None	Natural Gas

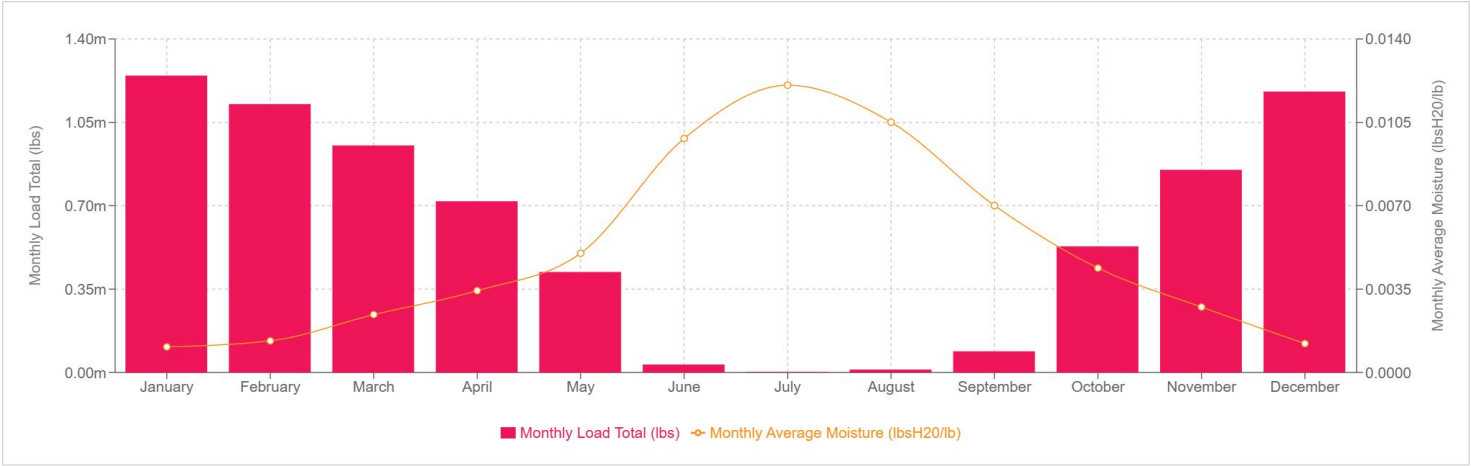
Energy and Water Usage Summary

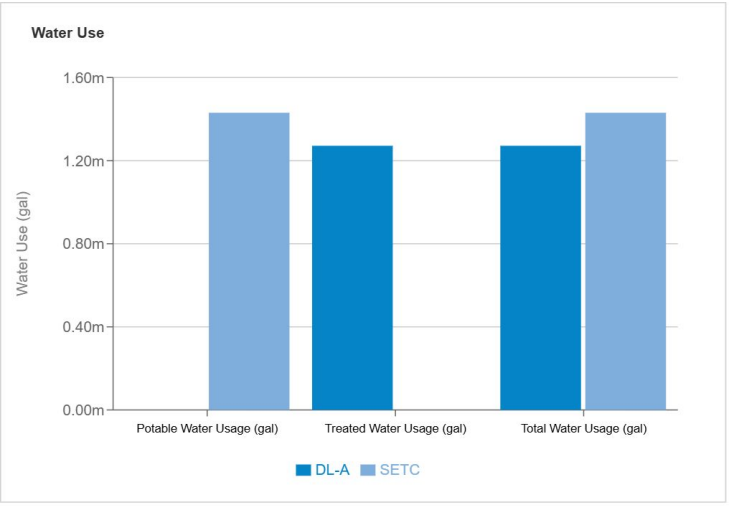
Condair Model	DL-A Series	SETC Series
Product Electricity Usage (kWh)	4,309	2,768
Fan Energy due to Pressure Change (kWh)	15,374	1,537
Preheat Energy (kWh)	0	0
Water Electricity Usage (kWh)	12,721	0
Boiler Electricity Use (kWh)	0	0
Product Gas Usage (kWh)	0	0
Gas Preheat Energy (kWh)	2,193,696	0
Boiler Gas Usage (kWh)	0	3,832,170
Adiabatic Cooling (kWh)	(642,237)	0
Total Energy Usage incl. Adiabatic Cooling (kWh)	**1,583,863**	**3,836,475**
Potable Water Usage (gal)	0	1,430,507
Treated Water Usage (gal)	1,271,562	0
Total Water Usage (gal)	**1,271,562**	**1,430,507**
Potable Water to Drain (gal)	317,890	572,203
Treated Water to Drain (gal)	95,367	0
Total Water to Drain (gal)	**413,258**	**572,203**

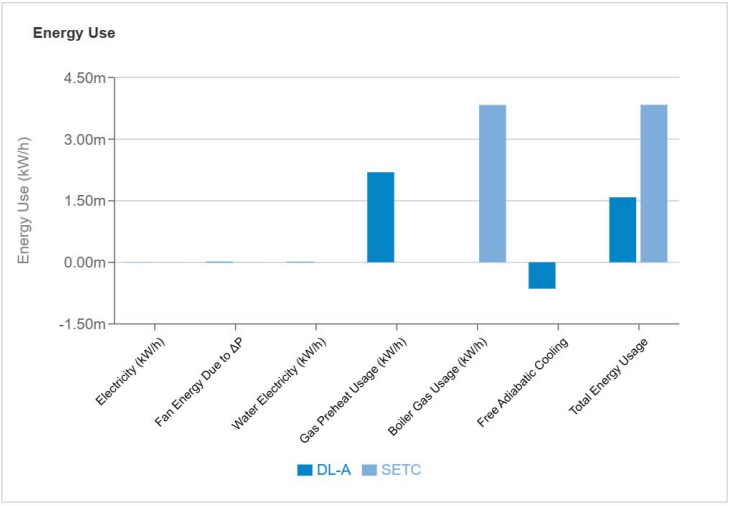
Energy and Water Analysis

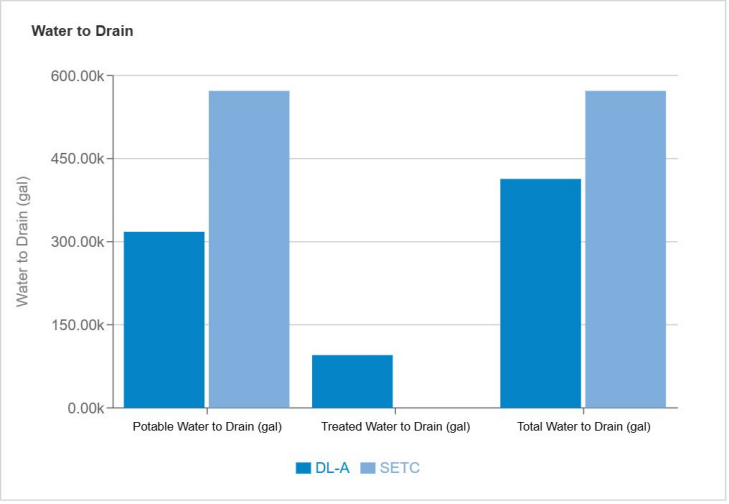
Maximum Humidification Load	1,972.79 lbs / hr
Annual Humidification Hours	6,150 hrs

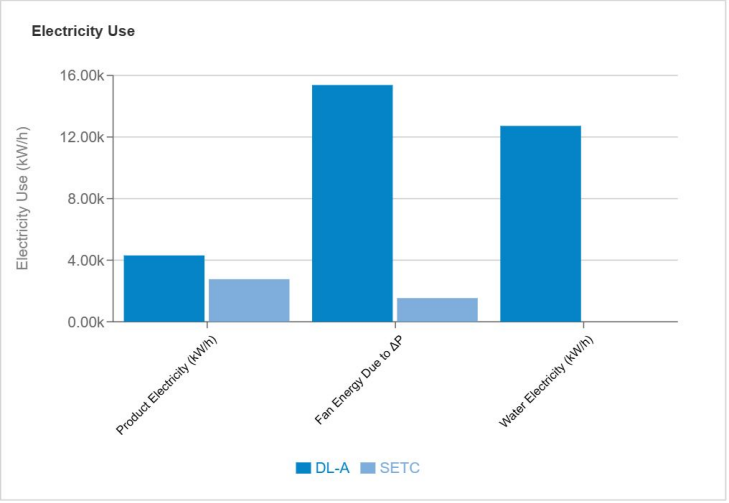
Monthly Load Total & Monthly Average Moisture

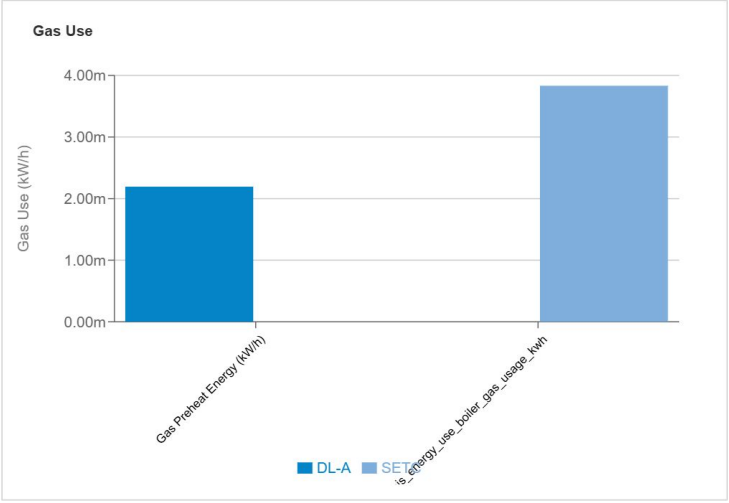












Financial Summary

Condair Model	DL-A Series	SETC Series
First Cost ($)	X	X (-) 48%
Recurring Costs ($)	X	X (+) 150%
Electricity Cost	$2,168	$285
Gas Cost	$35,099	$61,315
Cooling Cost Savings	($45,166)	$0

Condair Model	DL-A Series	SETC Series
Water Cost	$10,107	$11,370
Wastewater Cost	$3,285	$4,548
District Steam Cost	$0	$0
Total Utility Cost incl. Cooling Savings	$5,493	$77,519

Yearly Cost Summary