

## LEADING LIFE SCIENCE COMPANY

Turnkey airflow optimization and decarbonization project at 52,000 square foot Boston area lab.



### AT A GLANCE

#### Goals

- Reduce Scope 1 Emissions
- Lower Lab Reheat
- Strong ROI

#### Results

- 11,089 CFM Reduction
- Supply Fan Speed Reduction: 80% to 62%
- Exhaust Fan Speed Reduction: 92% to 80%



“Thrive put together a holistic project that made a huge impact. The effort from design through commissioning will allow the owner to realize savings for years to come.”

**Nate Bolton**

Genesis AEC

The goal of a top 20 global life science company is to eliminate GHG emissions by 2040, which requires moving away from fossil fuels and procuring 100% renewable electricity. Central to their strategy was the installation of a ground source heat pump (GSHP) for their Boston area campus to satisfy building thermal requirements. In order to make electric heating possible and right size the GSHP, the company identified the need to first optimize the buildings' heating loads using ventilation optimization – the #1 strategy in R&D facilities to eliminate reheat, and corresponding thermal demand. As experts in R&D airflow optimization, Thrive Buildings was commissioned to perform a decarbonization project for the campus building with the highest energy use intensity (EUI).

### SMALL LAB, BIG OPPORTUNITY

The 52,000 square foot building which focuses on medical device testing is one of the smaller research lab buildings on campus. However Thrive identified an outsized opportunity for efficiency and decarbonization improvements:

- The building used constant volume airflow with a baseline of 20 ACH. This high airflow level was the primary driver in the building's site EUI of over 500 kBtu/sqft.
- Supply air terminal units were variable air volume (VAV) with reheats, however there were no exhaust VAVs, resulting in the entire system being hard-balanced.
- The building's air handlers and exhaust fans had existing VFDs (variable frequency drives) that could be leveraged in the implementation phase.

### A COMPREHENSIVE PLAN & TEAM OF EXPERTS

Thrive executed a turnkey, design build retrofit of the building's airside infrastructure, pulling together a leading team of engineers and trades. A key partner was Genesis AEC, the pharmaceutical engineering experts, to develop the MEP strategies to deliver deep airside savings. The work included:

- Exhaust VAVs: The addition of 20 exhaust VAVs, enabling the entire air distribution system to be converted from constant to variable volume.
- Lab DCV: Aircurity's air quality monitoring platform was installed in 12 rooms to enable lab demand control ventilation – further optimizing airflow and creating an IAQ information layer for site Environmental Health & Safety personnel.
- Controls: Optimized control sequences were implemented for the labs, supply AHUs, and exhaust fans.

- Exhaust Fan Turndown: The two exhaust fans serving the labs didn't have bypass dampers. With the airflow reduction, the fan discharge velocity was correspondingly reduced, creating the potential for re-entrainment of hazardous chemicals. To maximize energy savings, including turndown on the exhaust fan VFDs, the team hired the wind consultants RWDI to perform a wind study. Analysis confirmed the new, lower building exhaust met all dilution requirements, saving energy and reducing total project cost as no bypass dampers were needed and the existing VFDs were fully utilized.
- Utility Rebate: To deliver the highest project payback and ROI, Thrive worked with the client to apply and receive utility rebates from both Eversource and National Grid. Thrive worked closely with Leidos, Eversource's utility program manager, to develop the initial energy models and M&V plan.

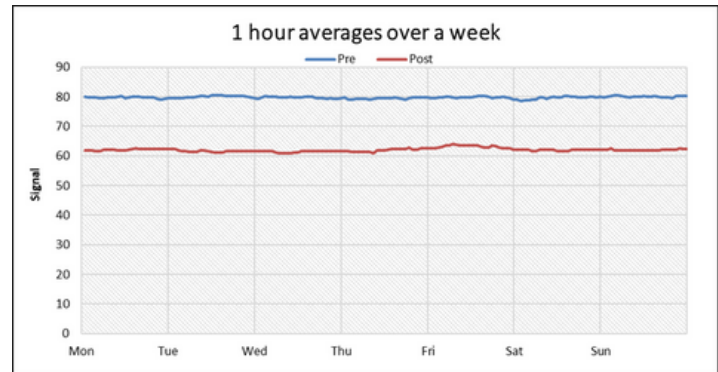
## RESULTS

Today the building is operating as a fully modernized VAV system, dynamically responding to lab conditions via the Aircurity platform. According to the data from the Leidos post M&V report, overall building airflow is down 11,089 CFM, a more than 50% reduction from baseline. Further, supply fan speed was reduced from 80% to 62% and exhaust fans from 92% to 80%.

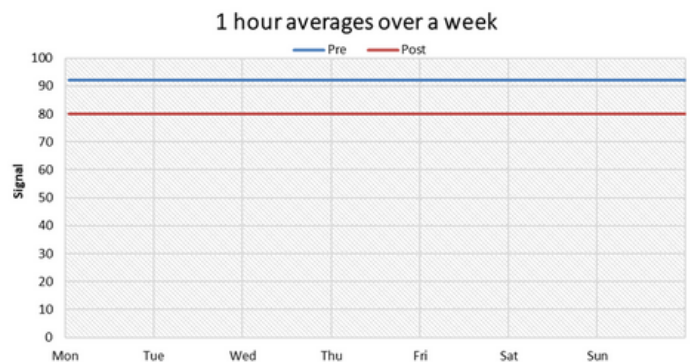
*Measured supply flows for relevant VAV boxes shows a flow reduction of 11,089 cfm on average when comparing current data to "pre" data from September of 2022.*

Box #	Pre CFM	Post CFM	CFM Savings
55	3,655	2,204	1,451
54	5,248	2,200	3,048
53	3,485	2,199	1,286
34	1,398	301	1,097
58	600	108	492
47	399	170	229
63	1,871	1,219	652
42	301	154	148
48	698	892	-194
32	1,360	1,338	22
62	669	756	-87
57	950	358	592
41	1,498	638	859
33	1,870	900	970
44	497	276	222
49	150	149	0
46	901	853	48
40	1,547	1,295	252
<b>Totals</b>	<b>27,097</b>	<b>16,008</b>	<b>11,089</b>

*The supply fan shows a reduction of roughly 18%.*



*Exhaust fan 2 shows a reduction from 92% to 80%.*



## ABOUT THRIVE BUILDINGS

Thrive Buildings provides clients with a frictionless and turnkey contracting solution for decarbonizing the most challenging and energy intensive buildings. The unique solution combines innovative funding, leveraging of rebate incentives, and carbon penalty avoidance with best-in-class technology for maximized efficiency gains.

Headquartered in Philadelphia, PA, Thrive Buildings customers include Merk & Co., Columbia University and Takeda Pharmaceuticals. For more information on the company please visit: [thrivebuildings.com](https://thrivebuildings.com).