



Donaldson Compressed Air Optimization

Sanat Iyer

MnTAP Advisor: Jon Vanyo

Company Supervisor: Hans Wucherpennig



UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

Company Background



- **HQ in Bloomington, MN**
 - 1,250 employees
 - 600,000 sq. ft
- **Global span**
 - 140 facilities
 - 44 nations
- **Filtration solutions across several markets**



Donaldson Ultra-Web dust collector optimized for performance

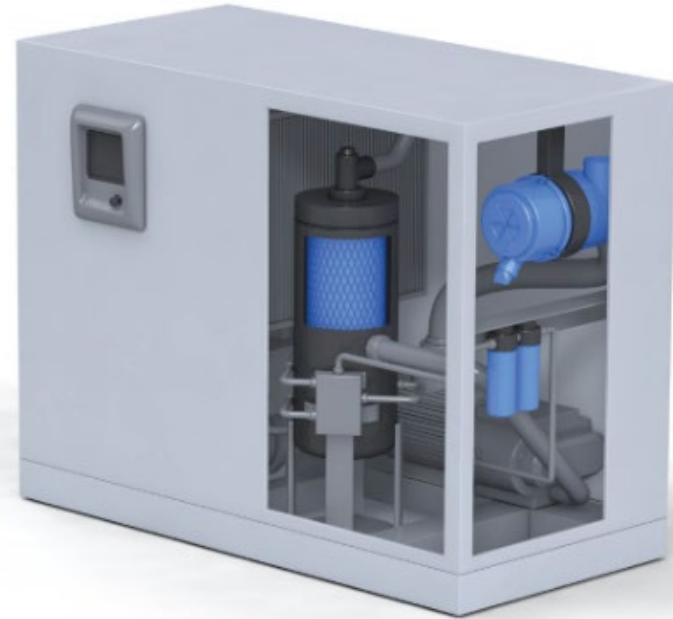
Incentives to Change

- **Donaldson has 2030 Ambitions for Sustainability.**
 - 42% carbon reduction
 - Science-based and aligns with Intergovernmental Panel on Climate Change
- **Energy savings are cost savings.**

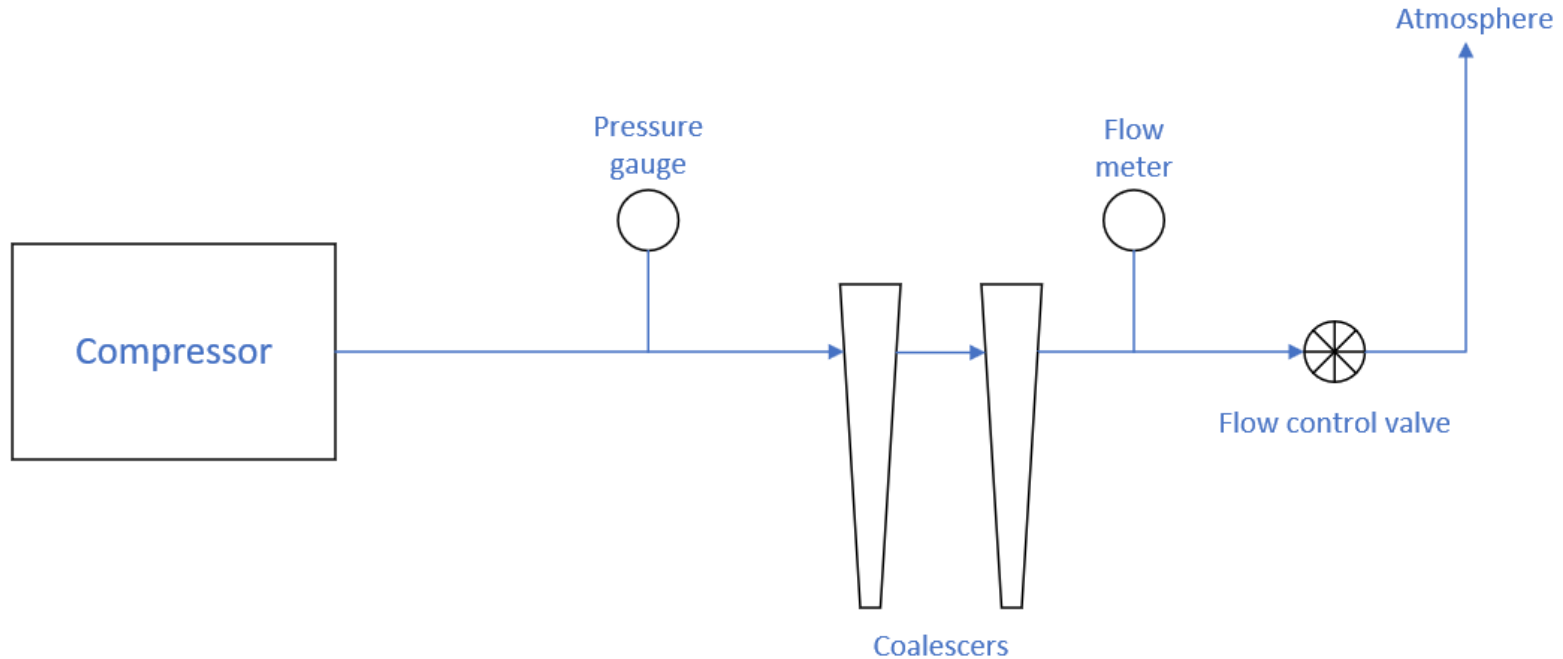


Current Situation

- Campus uses compressed air from house compressors
- Compressed air is also created in a lab for testing on filters
- Testing must be at constant pressure
- After testing, air is currently being vented

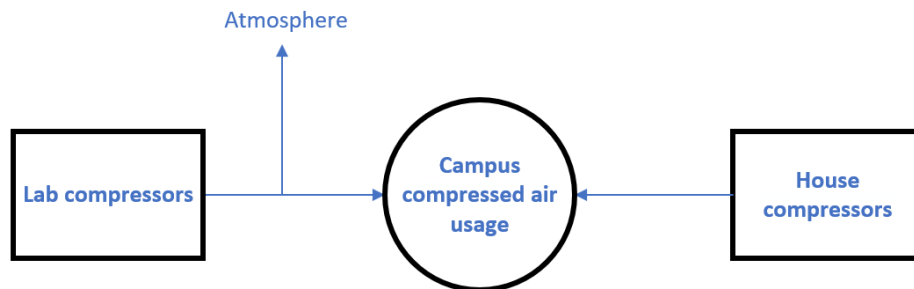


Compressed Air Process



Compressed Air Lab – Direct Recapture

- The idea is to connect lab air to house system
- Lab produces 480 cubic feet per minute (cfm)
- Lab production varies greatly
- Demand on campus is 240 cfm, which is currently supplied by house



Compressed Air Lab – Direct Recapture

- **Pressure relief valve implemented to attempt to meet test standards**
- **Test pressure fluctuated**
- **Constant outlet of air required to maintain test pressure**
- **Potential exploration may continue with regulator valve**



Pressure relief valve used for testing solution in lab (McMaster-Carr)

Compressed Air Lab – Energy Recovery

- Addition of turbine and generator to outlet of compressed air
- Minimal potential for impact on testing conditions
- Currently recommended

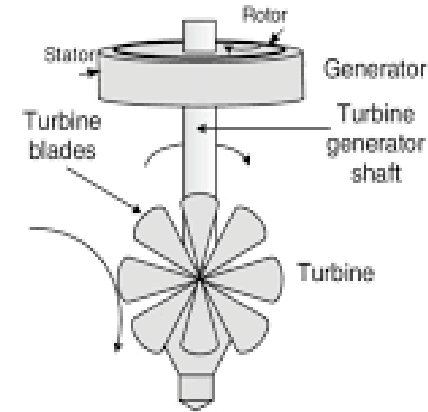


Diagram of potential energy recovery system

Solutions

Recommendation	Annual reduction	Total cost	Annual savings	Payback period	Status
Link lab compressors	450,000 kWh	TBD	\$45,000	TBD	Investigating
Install energy recovery system	550,000 kWh	TBD	\$55,000	TBD	Recommended
Fix air leaks (in progress)	TBD	TBD	TBD	TBD	Recommended

Personal Benefits

- Simple solutions for process optimization
- All useful information
- Deeper understanding of the background work of a manufacturing company

