{"report_id": "1706793868748x328693151843483650", "dev": "yes", "html":
"\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n
Debugger
Normal
Slow
Step-by-step
report
Inspect
Show responsive boxes
43
Clear errors
Open Page in Editor
Disable Debugger Mode
Back
HUB Model
Company Information
Equipment
Pressure
Leaks
Report
Version: 8.2
Fluid System Optimization Report Prepared for:
Hub
Hub Facility
123 hub street
Hub, HU

Hub Model Supply

Report Completed By:

Principal Investigator: Peter Vinck
Date: 2/13/24
Other Information
Company Name:
Hub
Address:
123 hub street
City, State, ZIP:
Hub, HU hubhub
Primary Contact:
Hubert
Telephone:
1234567890
Description of Business:
Disclaimer:
The estimated costs shown for each opportunity are based on previous experience with comparable cost reduction plans in other facilities. Inflow Corporation do not guarantee the cost savings or reduction in total energy requirements presented in the recommendations. Inflow Corporation shall, in no event, be liable to Hub in the event that the potential energy savings are not achieved.\n
The recommendations are based on an analysis of conditions observed at the time of the survey, information provided by Xcel Energy MN - A24 Sec and costs based upon Inflow Corporation experience on similar projects. Estimated savings are computed on the basis of research by government agencies product literature, and engineering associations. Actual savings will depend on many factors including: conservation measures implemented, seasonal weather variations, fuel price increases and specific energy use practices of the facility\u2019s occupants and workers. Performance guidelines provided in the report are for informational purposes only and are not to be construed as a design document. This report is written for energy saving purposes only and should not be used for bid specifications.

Inflow will not benefit in any way from your decision to select a particular contractor or vendor to supply or install the products and measures recommended by Inflow Corporation. You are encouraged to ask for the option of contractors or suppliers you have worked with in the past for further information on the suggested measures.

Disturbance, removal or replacement of building material, insulation system, high intensity discharge and fluorescent lamps,

lamp ballasts, power factor correction capacitors, starting and running capacitors of motors and other potentially hazardous components that contain asbestos, mercury or PCB\u2019s will require proper handling and disposal in accordance with applicable federal and state laws and regulations. It is the customer\u2019s responsibility to ensure that the contractor follows such guidelines in implementing the recommendations of this report.

Inflow advises that customers check with their Utility sales representative to determine the estimated value of their rebate and to verify that the equipment qualifies for programs prior to implementing any conservation measure. Some measures identified in this report may qualify for an efficiency rebate. Some projects may require pre-approval prior to purchase and installation. The customer is responsible for submitting project information to their Utility sales representative to obtain pre-approval for projects and to determine the eligible rebate amount.

Table of Contents

1 Executive Summary

The intent of this evaluation is to understand the facilities current compressed air usage and identify cost saving opportunities for the system. To determine accurate calculations, Inflow Corporation data logged all the relevant compressors power consumption and took pressure reading for approximately 11 days in January, 2024. Cubic feet per minute of the primary compressors output was calculated from power and pressure at the compressors and manufacture's data.\n
The compressed air system costs approximately $14,000 per year in electrical costs. With the appropriate modifications suggested you could save an estimated $0 per year which is a reduction of approximately 0% of the cost of your potential compressed air systems energy consumption. Rebates are available for purchasing the needed equipment from Xcel Energy MN - A24 Sec. There are several recommendations which are laid out in this report . These recommendations have paybacks that range from 0 to 0 years, depending on future needs and proposed scenarios which will be explored in this report. The complete list of opportunities is listed in Section 8 in this report.

2 Goals

There are multiple goals for the compressed air study at Hub, Hub Facility, including; an understanding of the cost and usage of compressed air, identify low cost/no cost ways to save energy, reducing compressed air system costs and Xcel Energy MN - A24 Sec incentive availability.

1 - These are all my goals

3 System Dashboard

3.1 Energy Rates

Elec. - Demand Rate
$
15.83
$/kW - Summer

Elec. - Demand Rate
$
11.5192
$/kW - Shoulder/Winter
Elec. - Use Rate
$
0.08649
$/kWh On Peak
Elec. - Use Rate
$
0.04926
$/kWh Off Peak

3.2 Compressed Air Use Data

Data Summary
1
Production
50
18.5
Peak Demands
Make Air Peak ACFM
Peak kW
15 Minute Peak
283
63.6
10 Minute Peak
315
5 Minute Peak
354
3 Minute Peak
480
2 Minute Peak
480
15 Minute Low
15
Pressure - PSIG
107.1
KPI
kW/ACFM
0.368
0.225

3.3 Compressor Capacity

Capacity
100% Redundancy
100% Redundancy - 15m max
100% Redundancy - 2m max
Supply Capacity - 0% Redundancy
-5
-237
-434
480
ACFM
ACFM
ACFM
ACFM

3. 4 System KPIs & Diagram

KPI's

Summer Demand
15.83
$/kW
Shoulder/Winter Demand
11.5192
$/kW
Blended $/kWh
0.067875
$/kWh
Production
50
ACFM
Utility peak CFM (15 min)
283
ACFM
Utility peak CFM (2 min)
480
ACFM
Header Pressure (Op. 1)
107.1
psig
Air Quality Rating
\"Type
ISO 8573-1
Tagged Leakage
0%
% of avg. CFM
Cost per CFM per year
$280
$/ACFM/yr
Cost to make 1000 CFM
$1.97
$/1000 ACFM
Average Efficiency
0.443
kw/ACFM
Peak Efficiency
1.267
kw/ACFM
System Load Factor
0.349
avgkW/peakkW
Average CFM
50
ACFM
Energy Average
22.2
kW-avg
Energy Peak
63.6
kW
Energy Usage
52,576
kWh/yr
Costs
$14,041.81
$/yr

4 Supply - Compressed Air Supply Equipment

4.1 Condensate Removal (Drains, Oil Water Separators)

Summary
Removing condensate from your compressed air system is important. There are a total of 1 drains in the supply system and they are inventoried in Table 4.3 below. Overall, you have some opportunity to improve your condensate removal system.
Table 4.3 - Condensate Drain Inventory
Drain #
Location
Installed
Working
Type
Bypass
Off (min)
On (sec)
Cost/yr
kWh/yr
Recommendations
D-01
No
No
2
10
$36.11
532

5 Distribution

5.1 Peak Flow Usage

Summary
The following graph (5.1) shows the largest peak periods exceeding 250 ACFM for 15 minute period. There was several other days when the system was operating above 258 ACFM for more than 15 minute period. The graphs in the appendix will show these time periods along with the graph below.
5.1 Graph

5.2 Header Pressure

Summary
\"Type
Info
\"Type
5.2 Graph
5.2 Graph is calculating average pressure while the system is on regardless of the schedules outlined.

6 Demand - Usage Information

Summary
\"Type
Uses
\"Type

6.1 Leak Detection - Ultra Sonic

Summary
\"Type
Standards

Repair


Volume of Leaks Found: ACFM
Number of Leaks Found: 0
Leak Repair Cost Savings: $9,943 $/yr 100% repaired

7 Baseline & Proposed Operations

7.1 Baseline Annual Operation Detail
Measured
Calculated
Estimated
\"Make\" Air Flow
Pressure
Hours
kW Demand
kWh
Cost to Operate
Average ACFM
Peak 15min ACFM
P1 Header psig
Annual
Average
Demand (15min)
Annual
$/yr
Notes
Production
50
283
107.1
2366
18.5
63.6
43,662
$12,851
Dryers
0
0
0
3.8
3.8
8,914
$1,191

total
22.2
67.4
52,576
$14,042

7.2 Compressor Run Schedule with all compressors working and online

Production
EP100
GSI-15
Total
Control Type

Fixed Speed - OLOL
Fixed Speed - OLOL
kW
9.1
9.4
18.5
%Flow
3%
79%
ACFM
14
36
50
15 Minute Peak
kW
53.5
11.7
65.2
%Flow
55%
100%
ACFM
237
46
283
2 Minute Peak
kW
56.1
11.8
67.9
%Flow
70%
100%
ACFM
304
46
349

Production

Total ACFM: 50
\n
AC1 ACFM

14

AC2 ACFM

36

2 Min Peak ACFM: 349
\n
AC1 ACFM

304

AC2 ACFM

46

8 Energy Conservation Opportunities

The ECO table is used to compare options on upgrading your system from a cost savings perspective. These savings are based on air demands during the week of the survey and any new loads. There is some color coding for clarification purposes. These measures could be interactive or could show multiple options for comparison sake, please work with Inflow if a specific group of projects are going to be considered before you finalize your plan.
ECO table 8.1 - Energy Savings Compressed Air Supply
ECO\n(#)
Description
Investment
Installed
Incremental
Savings
$/yr
O&M
Energy Savings
kW max
kW Demand
KWh/yr
Incentive\nEstimate
$
Annual\nPayback
yrs.
$
$
$0
$
0
0
0
$
0
$
$
$0
$
0
0
0
$
0
$
$
$0
$
0
0
0
$
0

Appendix

A Energy Rates & Operational Hours

Elec. - Demand Rate
$
15.83
$/kW - Summer
Elec. - Demand Rate
$
11.5192
$/kW - Shoulder/Winter
Elec. - Use Rate

$
0.08649
$/kWh On Peak
Elec. - Use Rate
$
0.04926
$/kWh Off Peak
*These rates are provided by and do not include sales tax, fuel clause adjustment factors, along with other riders and fees. You realized savings typically will be higher than stated in the report.

System Operational Information

1 Production
2366
hr/yr
Total
2366
hr/yr

B Equipment Details

HRS
Nameplate HP
Compressor #
Make / Age
Model Number
BHP
kW at Full Load
Type
Flow ACFM
PSI Rating
Yr
29,000
100
AC1
IR
EP100
110
0
Oil Flooded, Fixed Speed - OLOL, Rotary Screw, Air Cooling, Fan Motor HP = 5
434
2008
3,000
15
AC2
FS Curtis
GSI-15
16.5
0
Oil Flooded, Fixed Speed - OLOL, Rotary Screw, Air Cooling, Fan Motor HP =
45.6
2023
Total / Max / Min
n/a
n/a
126.5
0
479.6
0
Filters #
Make of Filter
Model Numbers

Type
Micron Rating
SCFM Rating
Dryers #
Make
Model Numbers
Capacity (SCFM)
Technology
Type
(If Desiccant Dryer)
Control
Full Load kW
AD-01
Zeks
1000HSE
1000
Refrigerated
Refrigerated
Cycling
6
AD-02
FS Elliot
Internal
50
Refrigerated
Refrigerated
Non-Cycling
0.75
Storage Tank #
Size in Gallons
Storage Type
(Wet or Dry)
Location
DT-01
1040
Dry
Over head in compressor area

C Leak Log

Work Order #
1
Location
Note
Flow (SCFM)
Fixed

Total CFM

Percentage of Load to Tagged Leaks 11%

Percentage of repaired Volume: 0%

The page is higher than your real design as the debugger is visible and displays a white area. \n It will be back to normal when the debugger is off.
"}