

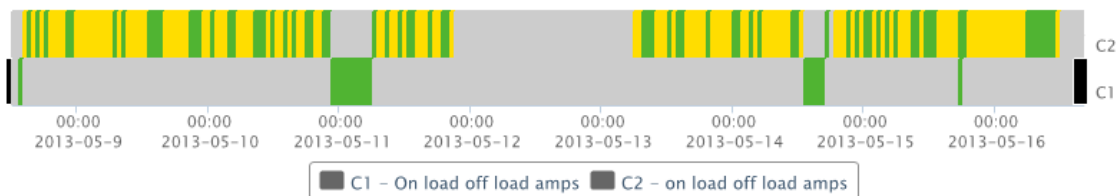
AUDIT REPORT

Purpose: To provide a statistical report detailing key performance indicators such as, Volume, Pressure, and Electrical Loading. Included within this report are sample data charts and graphs, which help to emphasize the main areas of inefficiency, along with a recommended strategy to improve them.

Please note that any report, or comments resulting from this audit are based on the information you provide and the circumstances prevailing at the time of the audit. Following the audit, we may be able to recommend operational or equipment changes to increase the effectiveness of the installation. This is not in any way a certification of the equipment or the installation.

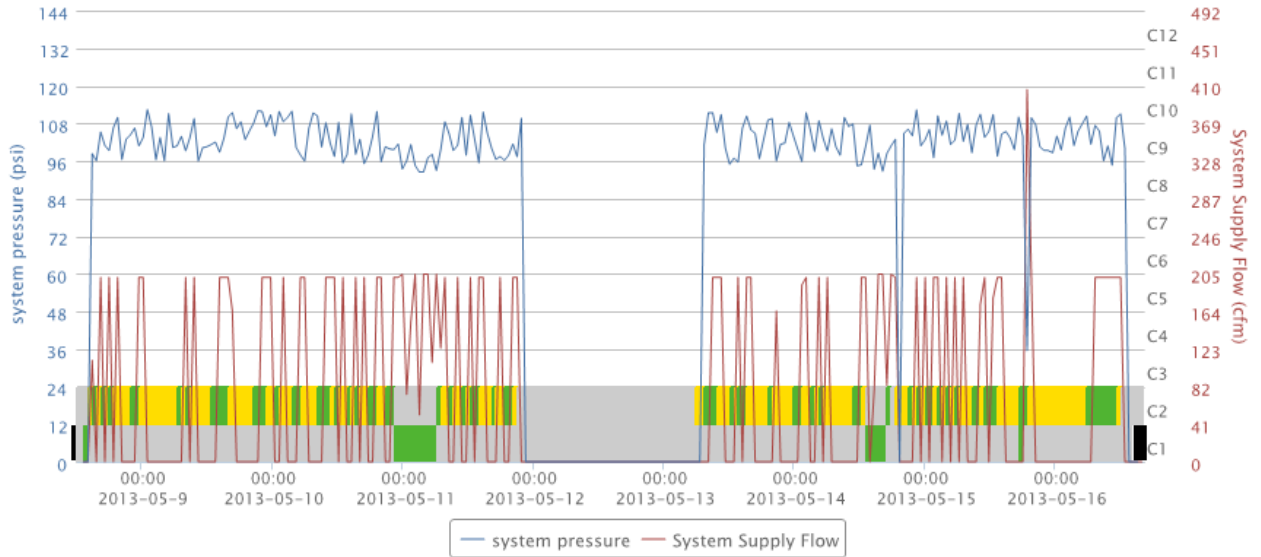
Background: A client requested A E Industrial & Air Equipment Ltd to carry out an on site compressed air energy audit to enable them to formulate a future strategy for the reduction in electrical energy related to compressed air generation, whilst allowing a practical solution to be offered to suit your long term strategy. All costs within this report are based on 8.999 pence per kilowatt hour, day rate & 6.180 per kilowatt hour, night rate.

Compressor Status Graph – Green is 'loaded' and yellow is "off-load"



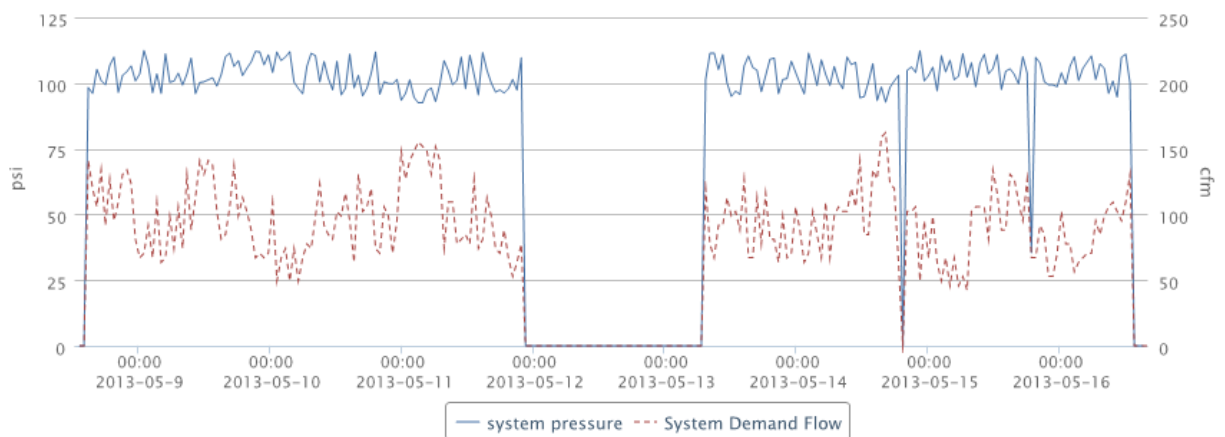
C1 is the Ecoair D50 air compressor
 C2 is the Sullair RS37 air compressor

Flow, Pressure & Status Graph – System Overview



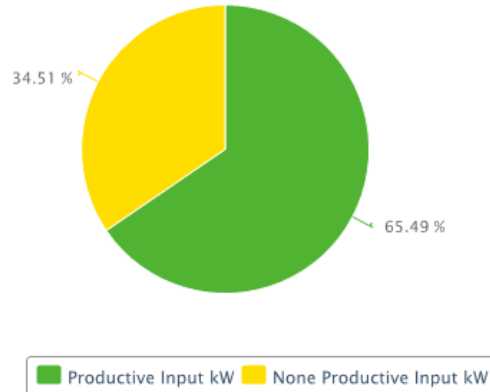
We can see from the above graph that the system pressure remains fairly constant, between 95 – 110 psi.

System Pressure & Flow - Overview



We can see from the above graph that the average system demand (flow) at its minimum is 48 cfm and 170 cfm at its peak.

Power (in kilowatts) – both productive and none productive (i.e. loaded & Unloaded)



From the above pie chart we can see that above one third of production time is 'none productive' which is basically the time that the air compressors are 'off load' but off course running.

Power and Output - System

Air compressor nickname	Air compressor brand ID	Air compressor model ID	MIN kW	MAX kW	Average kW	MIN output cfm	MAX output cfm	Average output cfm
Ecoair D50	Ecoair	D50	0	51.3	2.2	0	204.8	8.8
Fuidair RS37	Fluidair	RS37	0	185	20.6	0	201.3	51.3
System			0	200.3	22.9	0	406.1	60.1

Compressor Utalisation Chart - System

Air compressor nickname	Air compressor brand ID	Air compressor model ID	Loaded HRS	Loaded %	Offload HRS	Not loaded %	Stopped HRS	Stopped %
Ecoair D50	Ecoair	D50	0d 11h 51m	6.61	0d 0h 14m	0.14	6d 23h 22m	93.25
Fuidair RS37	Fluidair	RS37	1d 21h 59m	25.62	3d 12h 40m	47.17	2d 0h 49m	27.21
System utilisation			2d 9h 43m	32.16	3d 12h 36m	47.13	1d 13h 9m	20.7

Compressor Output Analysis Chart - System

Air compressor nickname	Air compressor brand ID	Air compressor model ID	Stopped HRS	Off load HRS	<= 10%	11% - 20%	21% - 30%	31% - 40%	41% - 50%	51% - 60%	61% - 70%	71% - 80%	81% - 90%	91% - 100%
Ecoair D50	Ecoair	D50	6d 23h 22m	0d 0h 14m	0d 0h 7m	0d 2h 54m	0d 2h 50m	0d 1h 37m	0d 0h 4m	0d 4h 15m	0d 0h 0m	0d 0h 0m	0d 0h 0m	0d 0h 0m
Fuidair RS37	Fluidair	RS37	2d 0h 49m	3d 12h 40m	0d 0h 0m	0d 0h 0m	0d 0h 0m	0d 0h 6m	1d 21h 45m	0d 0h 0m	0d 0h 0m	0d 0h 1m	0d 0h 0m	0d 0h 3m
		System	1d 13h 9m	3d 12h 36m	0d 0h 6m	0d 2h 54m	0d 2h 48m	0d 1h 42m	1d 21h 50m	0d 4h 12m	0d 0h 0m	0d 0h 1m	0d 0h 0m	0d 0h 3m

Key Performance Indicators - System

Air compressor nickname	Air compressor brand ID	Air compressor model ID	Total kW HRS	Output cfm	Productive HRS	Productive energy kW HRS	Non-productive HRS	Non-productive energy kW HRS	Specific efficiency kW/cf	Cost efficiency £/cf	Cost £
Ecoair D50	Ecoair	D50	401.4	1581.5	0d 11h 51m	397.6	0d 0h 14m	3.8	0.25	0.8	32.11
Fuidair RS37	Fluidair	RS37	3701.9	9206.8	1d 21h 59m	2119	3d 12h 40m	1582.9	0.4	0.65	296.15
		System	4103.3	10788.3	2d 9h 43m	2516.6	3d 12h 36m	1586.7	0.38	1.075	328.26

Costs and Flow Chart - System

Output	Productive energy kWh [Time frame]	Non-productive energy kWh [Time frame]	Total energy kWh [Time frame]	Total cost £ [Time frame]	Total energy kWh [Annual]	Total cost £ [Annual]
0 % expressed as flow	0.6	1577.9	1578.5	126.28	77301.4	6184.11
1 - 10%	3	0	3	0.24	144.5	11.56
11 - 20%	71.9	0	71.9	5.75	3520.7	281.66
21 - 30%	79	0	79	6.32	3869.8	309.58
31 - 40%	54.1	0	54.1	4.33	2649.4	211.95
41 - 50%	2107.4	0	2107.4	168.59	103204.4	8256.35
51 - 60%	187.5	0	187.5	15.00	9182.7	734.61
61 - 65%	0.4	0	0.4	0.03	20.2	1.62
66 - 70%	0.3	0	0.3	0.02	14.7	1.17
71 - 75%	0.6	0	0.6	0.05	28.1	2.25
76 - 80%	1	0	1	0.08	50.5	4.04
81 - 85%	0.7	0	0.7	0.06	34.8	2.78
86 - 90%	0.4	0	0.4	0.03	19.5	1.56
91 - 95%	0.2	0	0.2	0.02	12.1	0.97
96%	0	0	0	0.00	1.1	0.09
97%	0	0	0	0.00	1.1	0.09
98%	0	0	0	0.00	2.2	0.17
99%	0	0	0	0.00	1.1	0.09
100%	5.2	0	5.2	0.42	254.5	20.36

Conclusions:












It is clear from the analysis of the data produced from the data-log report that the fixed speed compressors you are running 'off load' for long periods. This is costly as electrical costs are incurred without any benefit to the compressed air system.

Reducing electrical costs would be a sensible thing to implement by reducing the 'off load' periods as much as possible.

There are also periods during the data-logging exercise where both air compressors are running, whether this is at a shift start up or when the Sullair unit is turned off but the Ecoair is left on and starts under its own pressure switch as the system pressure decays.

Recommendations:

The easiest way to eliminate the 'off load' running is to install a variable speed air compressor which would 'trim' to site demand. Obviously there would be quite a capital outlay involved and therefore we would recommend installing an inverter drive to control your existing Fluidair RS37 air compressor.

 						
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<input type="text" value="1704"/>						
<input type="text" value="4129"/>		18.4	0	0	0	0
<input type="text" value="917"/>	3.5 - 38.8	18.6	8.3	10.3	9445.1	755.61
<input type="text" value="1283"/>	42.4 - 81.2	22.1	12.2	9.9	12701.7	1016.14
<input type="text" value="310"/>	84.8 - 120.1	25.2	18.2	7.0	2170.0	173.60
<input type="text" value="309"/>	123.6 - 162.4	28.7				
<input type="text" value="22"/>	166.0 - 201.3	31.8				
<input type="text" value="18"/>	204.8 - 243.7	50.9				
<input type="text" value="27"/>	247.2 - 282.5	55.3				
<input type="text" value="27"/>	286.0 - 324.9	59.0				
<input type="text" value="11"/>	328.4 - 363.7	61.9				
<input type="text" value="3"/>	367.3 - 406.1	65.7				
You will save: 24316.8 kW hours, £ 1945.34 15027.78 kilo/CO₂ per year						

The estimates shown are calculated from given compressor performance data and are intended to demonstrate the potential energy cost savings achievable. These estimates do not constitute a contract or part thereof. Site conditions vary and operating conditions are not known. The web site author cannot accept liability if these savings are not achieved in practice.