WINERY RESOURCES – FUTURE CHALLENGES
WINEENG 2018

CAPS

Energy Efficient Compressed Air Systems

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ENERGY EFFICIENCY COUNCIL inc.
MEMBER

Agenda

Efficiency Opportunities - Why Compressed Air?

5 Facts About Compressed Air

Compressed Air Energy Auditing

Case Studies

Proudly Australian

CAPS Head Office

100% Australian Owned

Australia's largest independent compressed air and blower company

Delivering comprehensive air solutions for over 30 Years

Air Compressors:
- Rotary Screw
- Scroll
- Centrifugal
- Portable Diesel

Power Generation
- Standby Generators
- Prime Power Generators
- Heavy Industry Turbine Generators
- Cogeneration & Trigeneration
- Portable and Stationary Diesel

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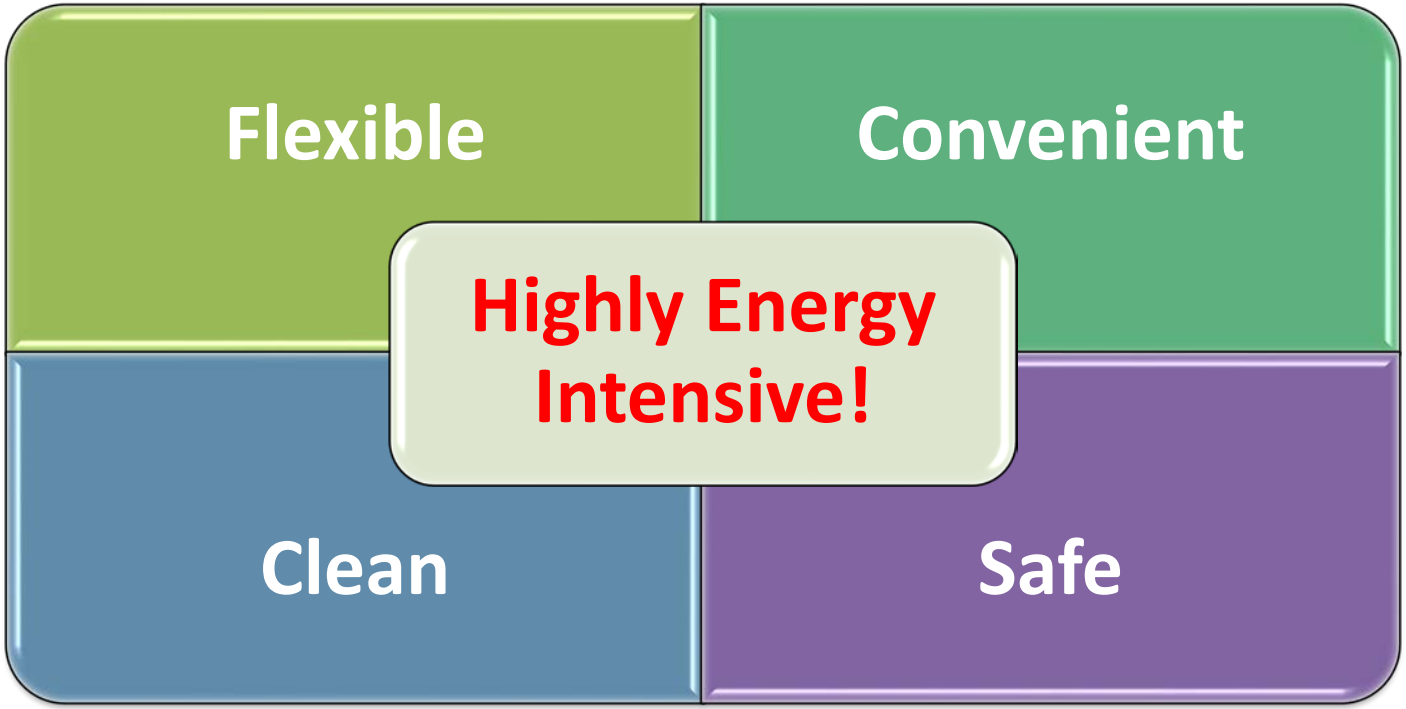
Blowers:
- Positive Displacement
- Single/Multi-Stage Centrifugal
- Rotary Screw
- High-Speed Turbo

Packaged Solutions
Nitrogen and Gas Systems
Engineering, Design and Installation
Service and Ongoing Support
Energy Efficiency Services

Most industries depend heavily on compressed air

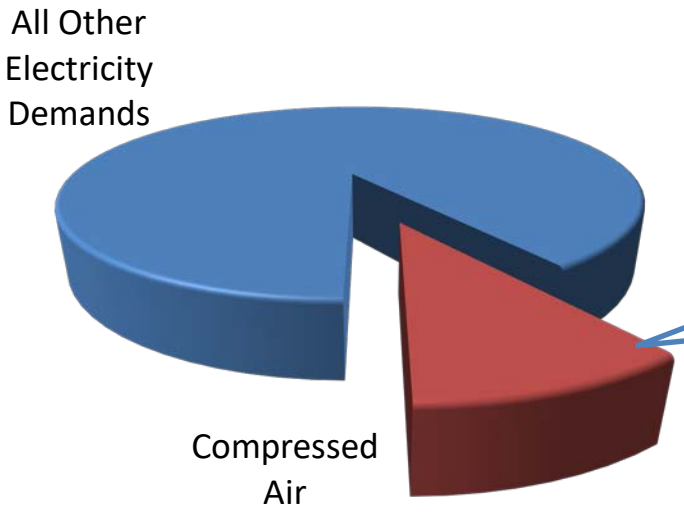
Grit blasting
Foaming washers
Instrument air
Etching, frosting and boring glass
Leak testing
Component testing
Aeration
Maintenance
Cooling
Agitation and Blending
Sand blasting
Floatation process air
Blowing for cleaning purposes
Medical breathing
Cryogenic uses
Machine operation
Pneumatic tools
Moulding machines
Concrete finishing
Centrifuges
Seal air
Bottle cleaning
Impregnating wood
Inflating tyres
Snow making
products
Vaporisation
Diaphragm pumps
Combustion air
Fumigation
Ejecting rejects
Jet loom
Vibrating
Laundry machines
Elevating liquids
Blowing light and electronic tubes
Hoists and lifts
weaving
Jet pulverising
Actuation and positioning
N2 & O2
Governor systems
Spray painting
Clutches, brakes and clamps
Pelletising
Charging shock absorbers
Grease pumps
Cleaning by air jet
Humidifying
Hyperbaric oxygenation
Process air
Kiln cleaning
Bottle washers
Breathing apparatus
Blowing bottles and glassware
Pneumatic conveying
Pneumatic controls
Down hole drilling
Dehydration
Vacuum systems
Emptying and cleaning liquid lines
Lubrication systems
Ejecting punchings and stampings
Lifting and racking blocks
Can filling

Compressed Air



5 Facts About Compressed Air

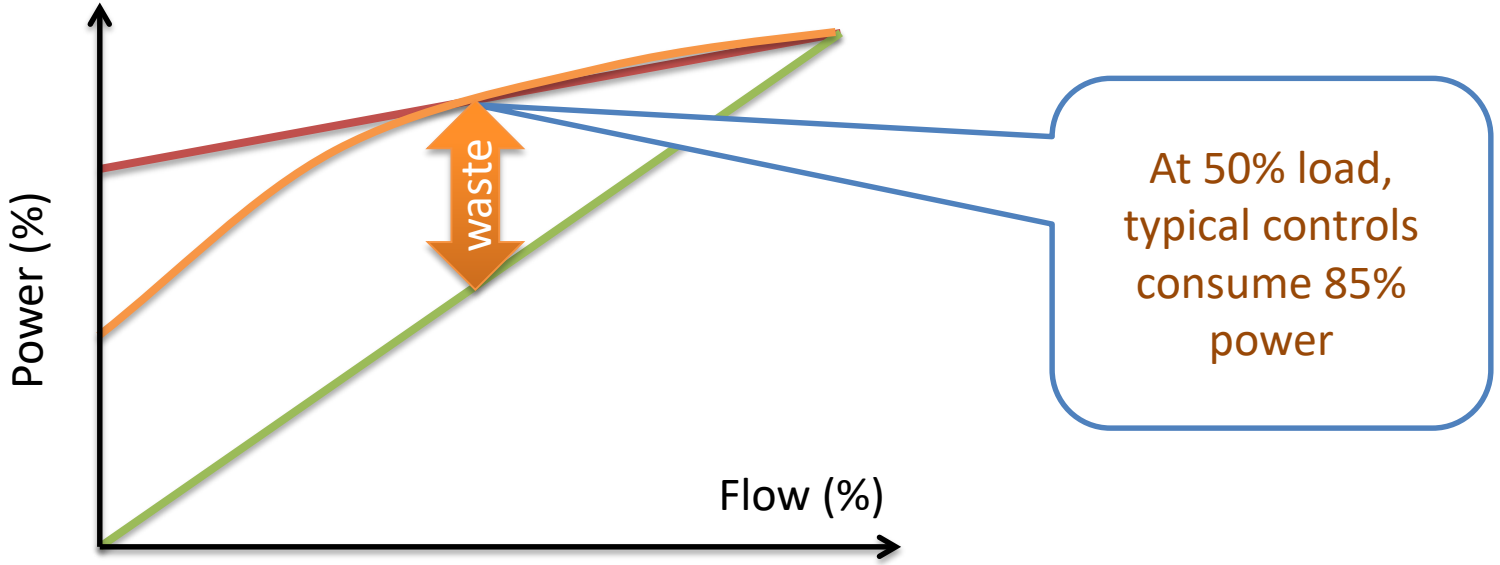
FACT #1:
Compressed air is used extensively by industry



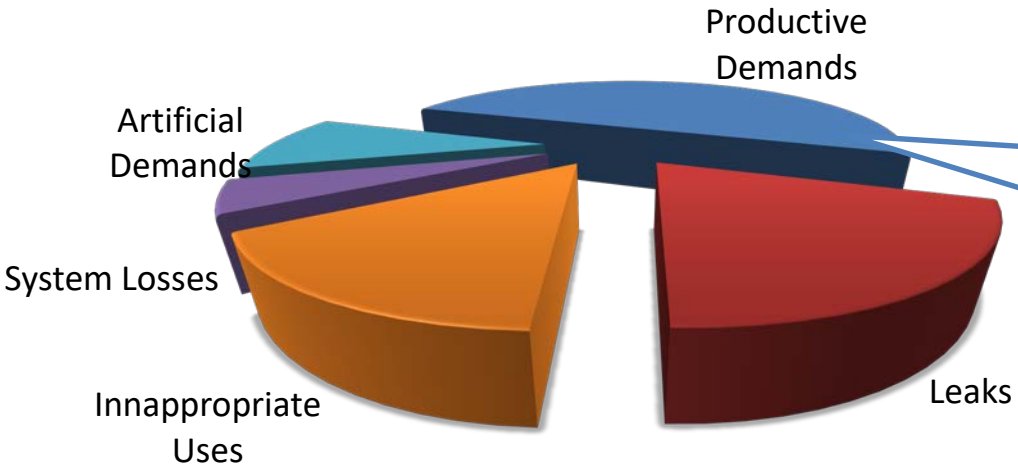
10-15% of all industrial electricity is used to generate compressed air

FACT #2:
Compressed air is an extremely inefficient form of energy

FACT #3:
Compressors can be extremely inefficient at part load

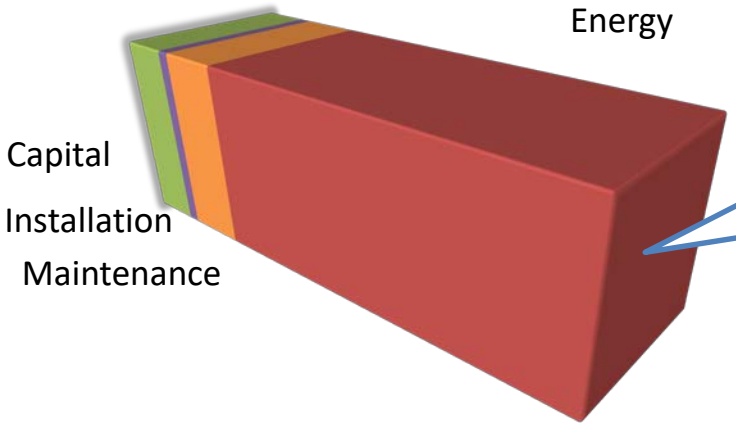


FACT #4:
Compressed air is wasted profusely



Typically, only 50% of compressed air is used for productive demands

FACT #5:
Electricity is by far the greatest cost of compressed air



Over 10 years, the energy cost will be 10 to 30 times the initial capital cost

Why are air systems so inefficient?

Growing businesses and evolving systems

Turn up the pressure

Technical outsourcing

Poor advice

Oversize it, just to be sure

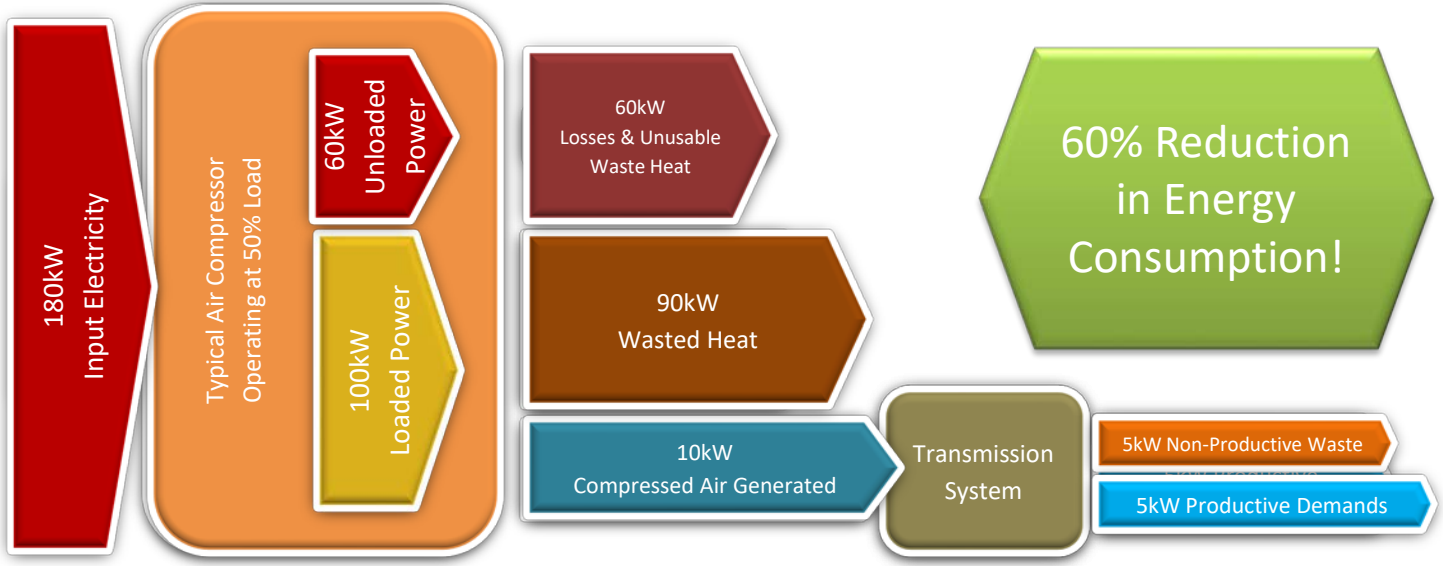
Old and inefficient equipment

Lack of knowledge and experience

Lets do it with air!

How can they be improved?

Systems Approach

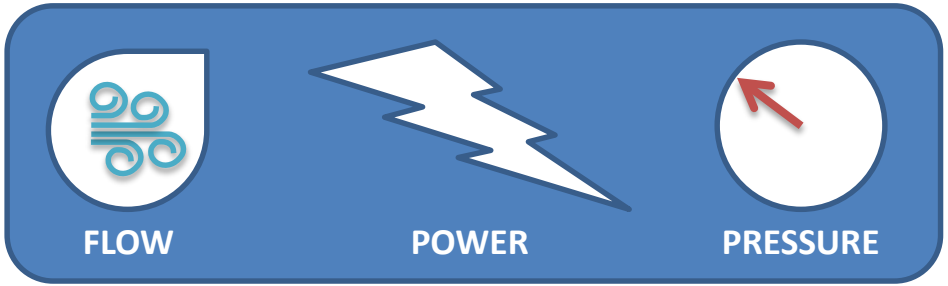


Air-Energy Auditing

What you don't measure, you cant improve!

What are the savings with an upgrade in technology?

How do we compare with best practice?



Develop an understanding of the system

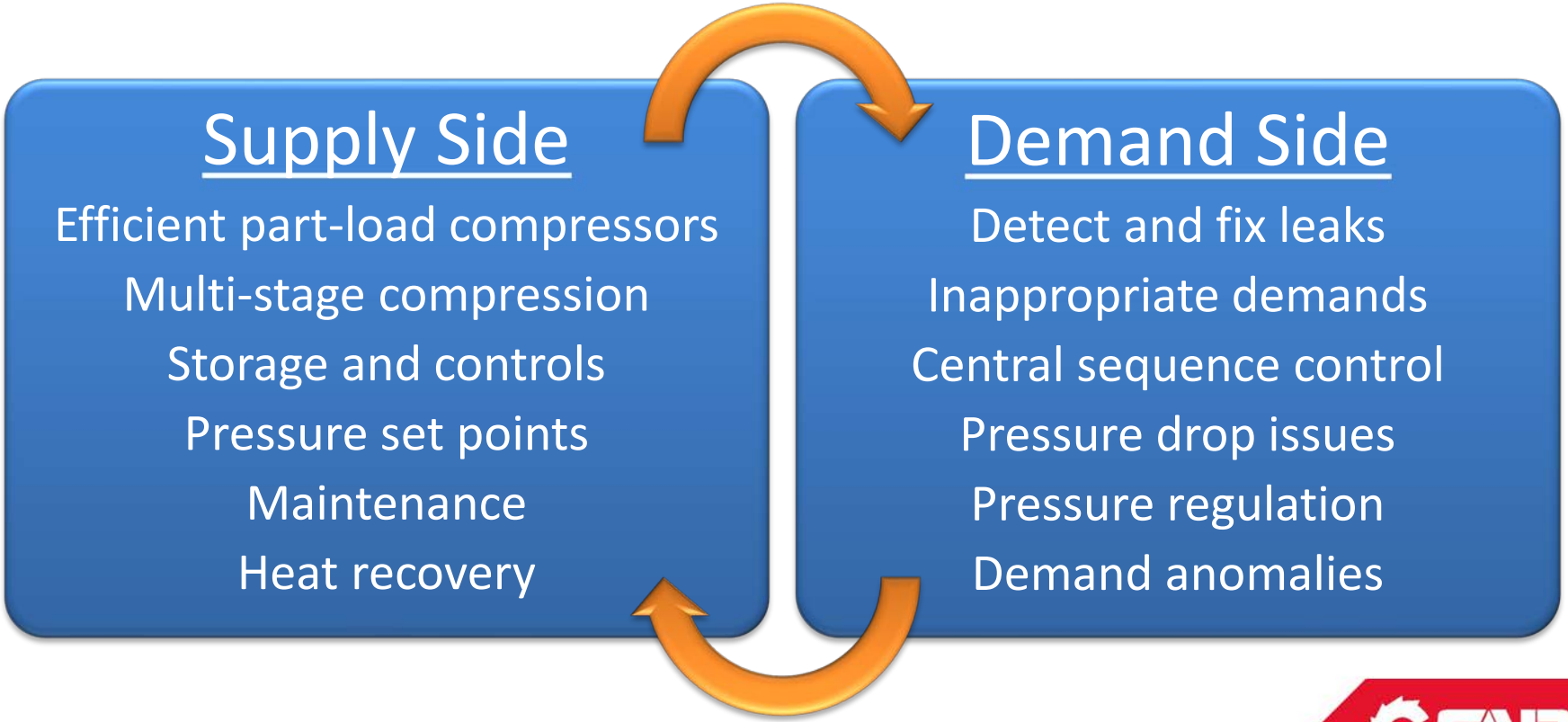
How much does it cost to operate your system annually?

How does your system vary? Daily, weekly, monthly, quarterly, annually?

Air-Energy Auditing

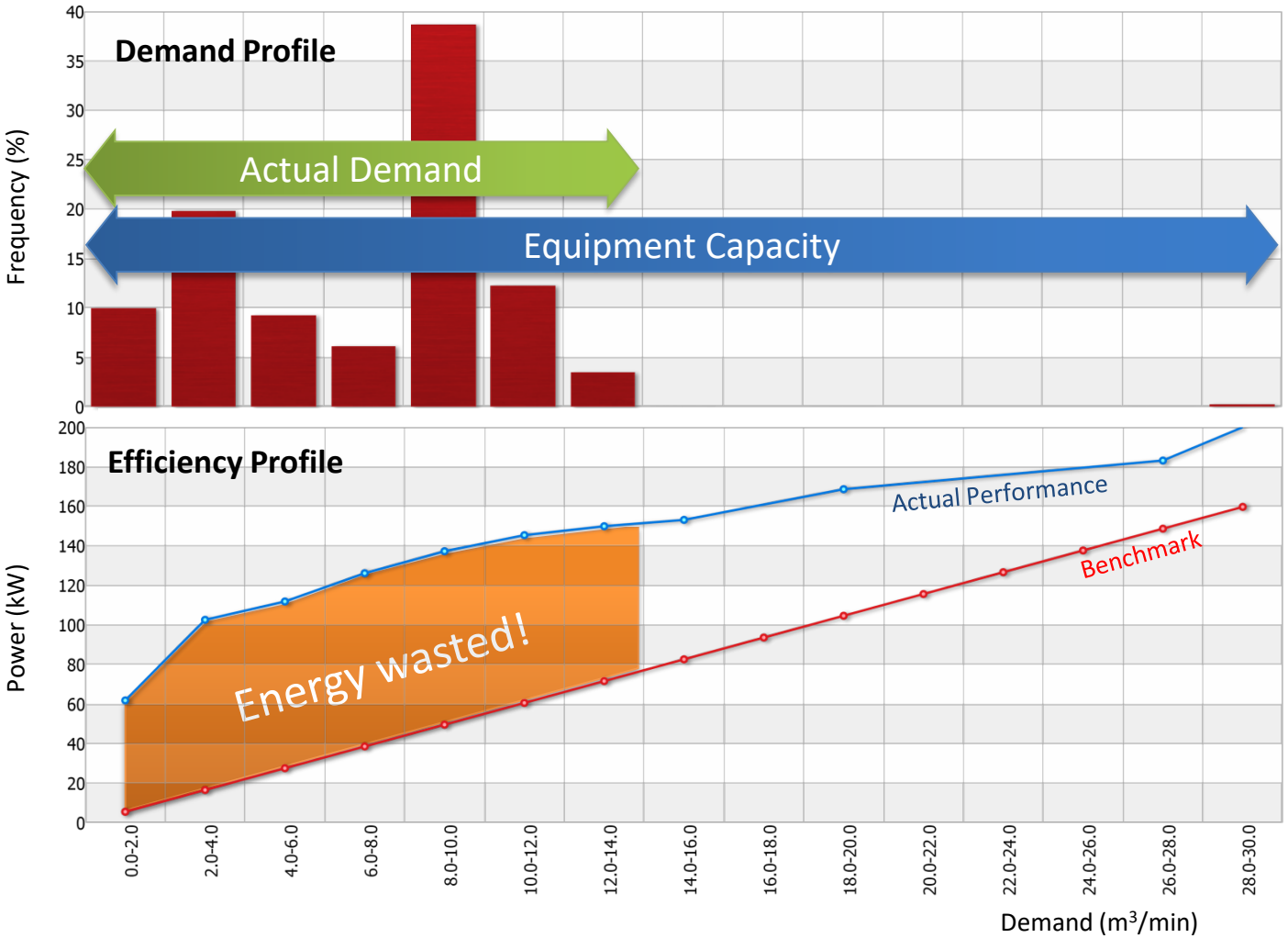
- Relatively simple and low costs
- Collect and log system data during typical operational week
- Determine equipment and capabilities
- Develop a baseline of demand and performance
- Review and confirm appropriate service regime
- Uncover compressed air issues (i.e. pressure or quality)

What are the Opportunities?

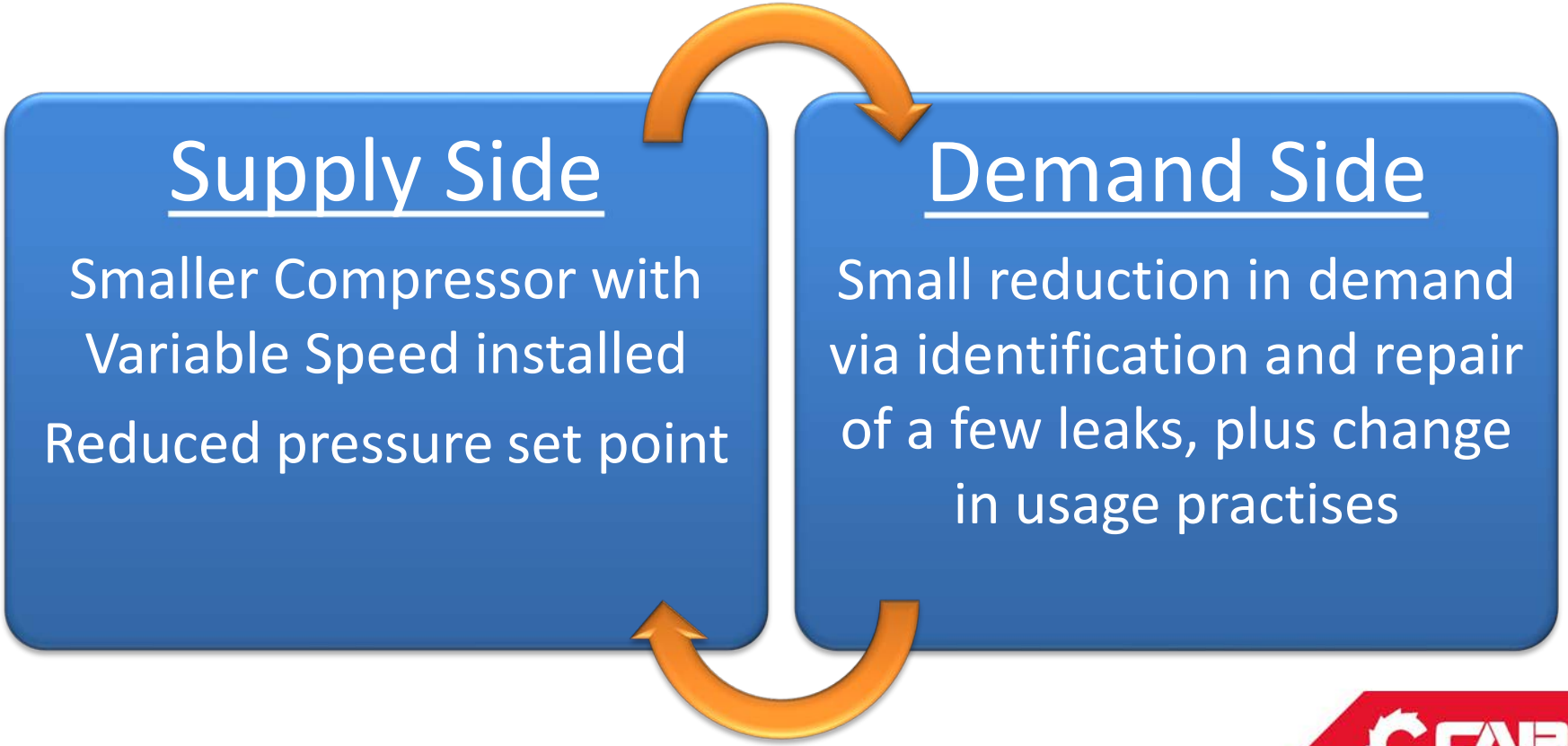


Case Study #1:
Simple Manufacturing Application

- Manufacturing facility seeking energy savings opportunities
- Only one compressor in operation
- Data logging and analysis undertaken
- Along with a demand-side review


Demand Profile
Frequency (%)
40
35
30
25
20
15
10
5
0
Actual Demand
Equipment Capacity
Efficiency Profile
Power (kW)
200
180
160
140
120
100
80
60
40
20
0
Actual Performance
Benchmark
Energy wasted!
0.0-2.0
2.0-4.0
4.0-6.0
6.0-8.0
8.0-10.0
10.0-12.0
12.0-14.0
14.0-16.0
16.0-18.0
18.0-20.0
20.0-22.0
22.0-24.0
24.0-26.0
26.0-28.0
28.0-30.0
Demand (m³/min)

Holistic Solution



Outcomes

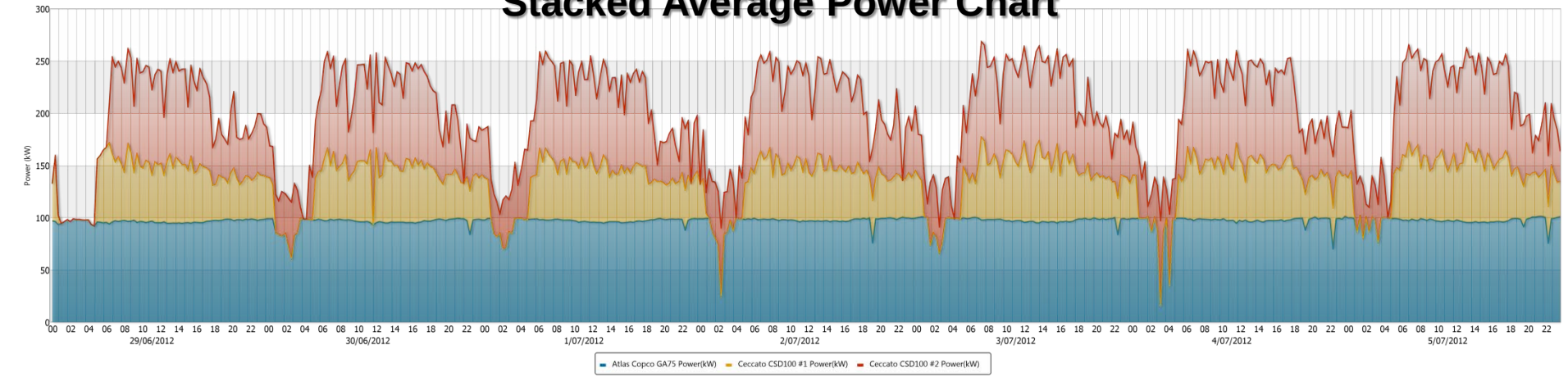
- Implemented solution saves $45k/annum in electricity
- Additional savings in maintenance
- Payback on total project cost within 1.7years
- More reliable equipment
- Delivers more stable pressure and less wear and tear on downstream equipment

Case Study #2:
Kilcoy Pastoral

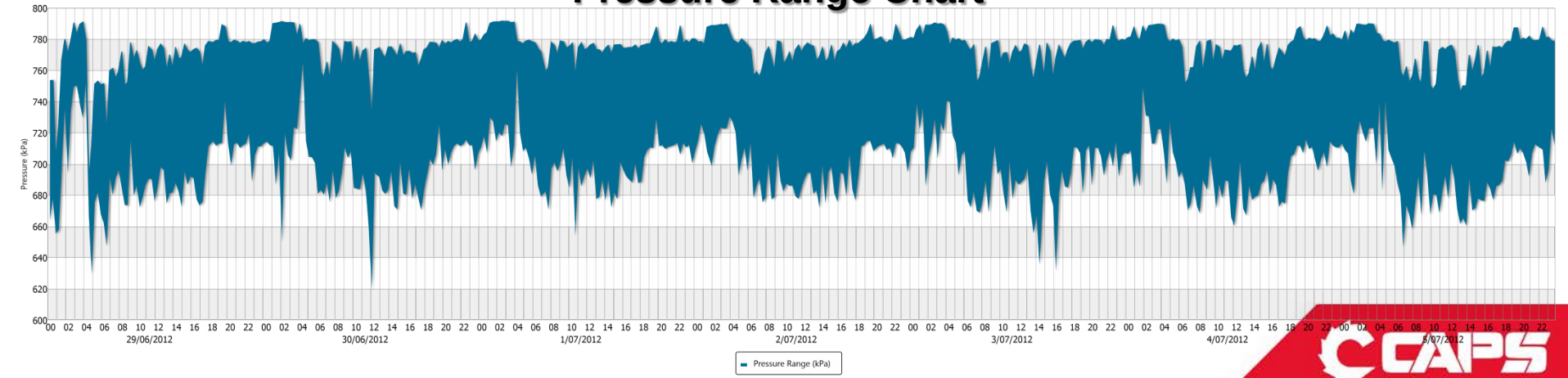
- Abattoir seeking compressor upgrade with energy savings opportunities
- Three compressors in operation (3 constant speed unloading)
- Data logging and analysis undertaken
- Project recommendations undertaken by client
  - One new large VSD compressor with two existing compressors used as top up
- Data logging for verification purposes confirmed savings

Plant Room Before

Stacked Average Power Chart

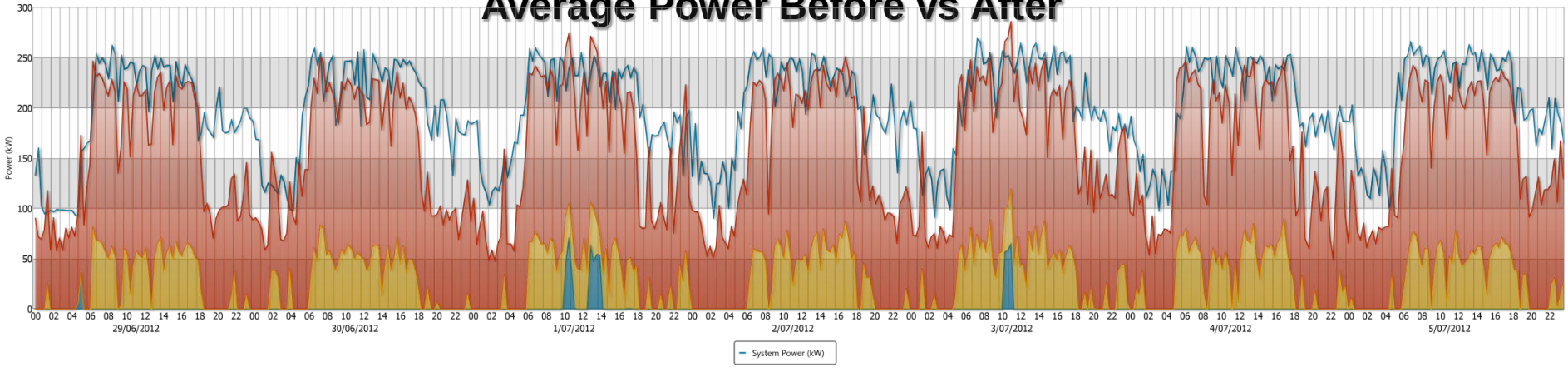


Pressure Range Chart

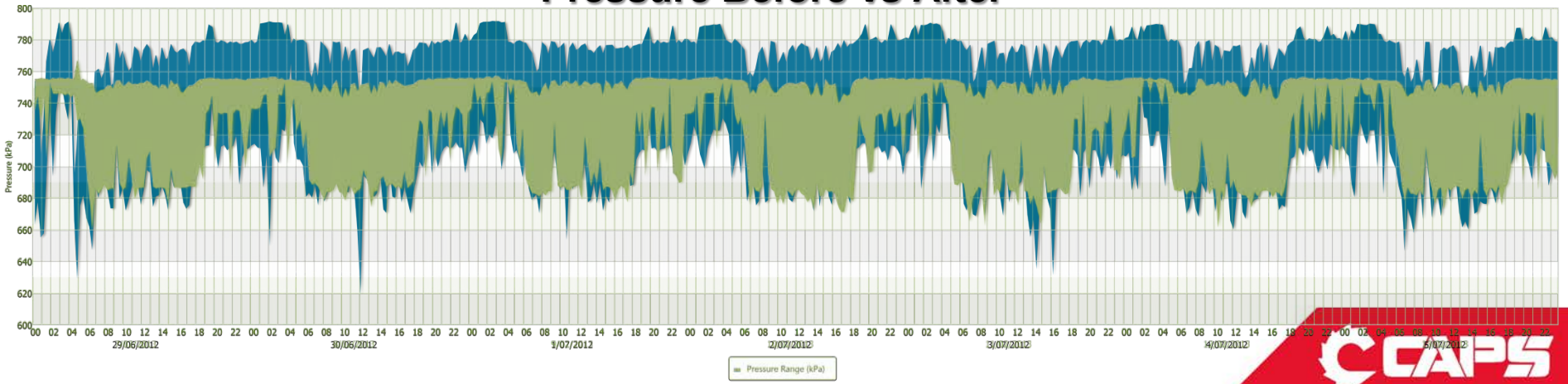


Plant Room After Upgrade

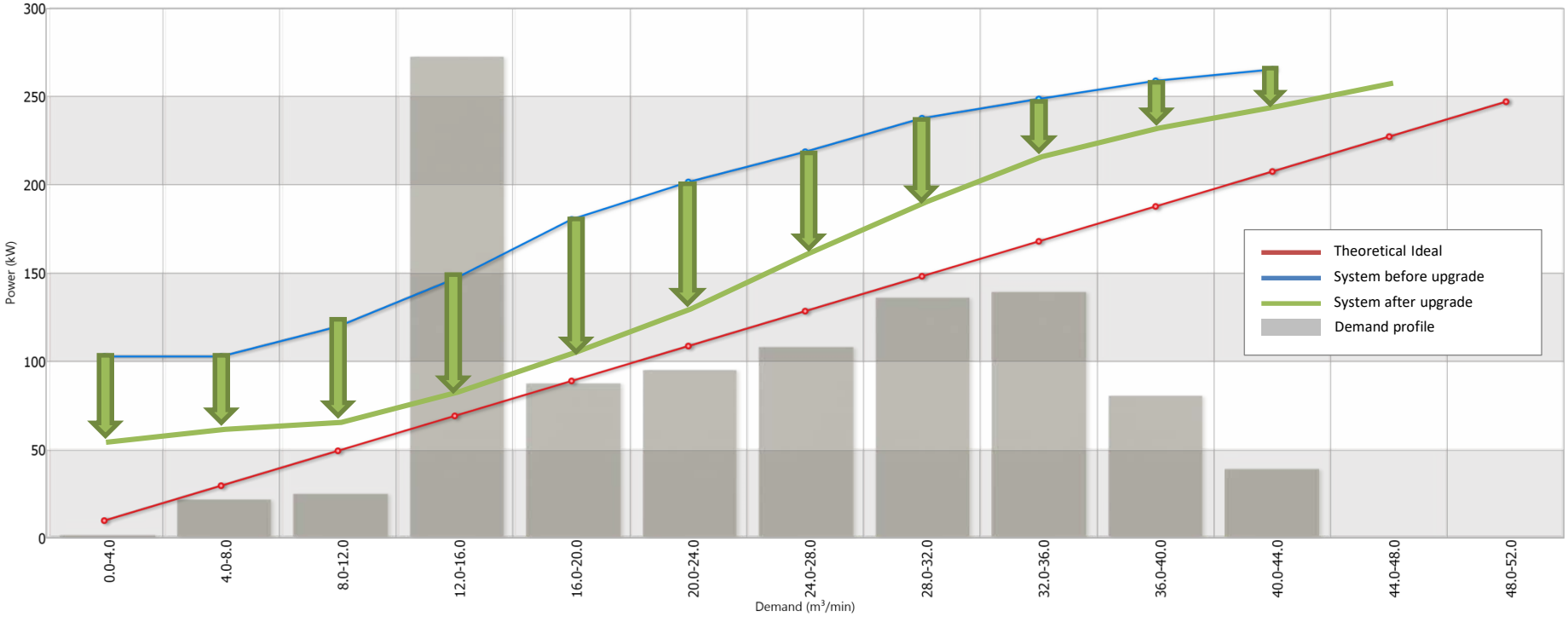
Average Power Before vs After



Pressure Before vs After



System Efficiency Improvement



Before/After Statistics

	July 2012 3 x 75kW Fixed Speed units	February 2013 1 x 160kW VSD + 2 x 75 kW fixed speed	Change
Average Flow (m^3/min)	23.8	26.2	+10 %
Average Power (kW)	201.1	159.6	- 20.6 %
Average Pressure (kPa)	744.8	735.7	- 1.2 %
Air Production Efficiency (kW/m^3/min)	8.4	6.1	- 27.4 %
Overall System Efficiency (kW/m^3/min)	10.1	6.8	- 32.7 %

- Slight increase in average flow
- Significant decrease in average power consumption
- Vast improvement on overall system efficiency
- Similar pressure control – additional room for improvement
- Savings in the region of $15,000 per month

Outcomes

- Implemented solution saves $15k/month in electricity
- Additional savings in maintenance
- Payback on capital cost within 2 years
- More reliable equipment
- Delivering more stable pressure and less wear and tear on downstream equipment with implemented air treatment component

In Closing

- Compressed air a very costly ‘invisible’ energy.
- Significant opportunities exist for substantial cost savings with fast payback on solutions.
- However, seek assistance from specialised professional services to properly identify and quantify opportunities.


THANK YOU
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