Compressed Air Energy Cost Basics

The Department of Energy (DOE) has determined that air compressors are one of the largest users of electricity in industry. Although at one time the DOE considered electric motors as the largest user of electricity, savings through improved electric motor efficiency are dwarfed by those available through improving the compressed air system design and operation.

Energy savings through improved design and operation of the air system can range from 20-50%. Most facilities consider compressed air a utility on par with electricity, gas, and water. Unlike other utilities, few people know their cost per CFM. Here is a good way to find out…

Assumptions:

Motor Service Factor = 110%
Power Factor = 0.9
A typical compressor produces 4 CFM per 1 HP
1 HP = 110% x 0.746 KW/0.9= 0.912 KW
Therefore,1 CFM = 0.228 kW
At 0.06 $/kW/hr : 1 CFM = $0.0137/hr
Therefore, 10 CFM over 8000 hr will cost: 10 x 8000 x .0137 = $1096.

Standard plant system using Basic Air System Drawing

8000 hr per year operation

Electrical costs = 0.06 $/kwhr
Line pressure = 100 PSIG
Plant Demand (CFM) ; 400CFM
Air leaks (CFM) ; 20% ; 80CFM
Total Compressor Demand = 480 CFM Electrical Cost

400 CFM x 8000 hrs X .0137/hr = $43,840

80 CFM x 8000 hrs X .0137/hr = $ 8,768 TOTAL = $52,608

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Leaks are also creating enough additional load to mandate operation of both compressors.

- No Standby Unit
- No preventative maintenance can be performed on either compressor

The number of leaks required to create 80 CFM at 100 PSIG:

- Three, 1/8" air leaks = 78 CFM
- Or One, 1/4" air leak = 100 CFM