La reproducción de este artículo no busca un beneficio económico, sí apunta a un major entendimiento y comprensión del funcionamiento de equipos de aire comprimido. El artículo original se publicó en: US Department of Energy Compressed air tip Sheet #1 August 2004 Consulte al autor.

Determine the Cost of Compressed Air for Your Plant

Most industrial facilities need some form of compressed air, whether for running a simple air tool or for more complicated tasks such as the operation of pneumatic controls. A recent survey by the U.S. Department of Energy showed that for a typical industrial facility, approximately 10% of the electricity consumed is for generating compressed air. For some facilities, compressed air generation may account for 30% or more of the electricity consumed. Compressed air is an on-site generated utility. Very often, the cost of generation is not known; however, some companies use a value of 18-30 cents per 1,000 cubic feet of air.

Compressed air is one of the most expensive sources of energy in a plant. The over-all efficiency of a typical compressed air system can be as low as 10%-15%. For example, to operate a 1-horsepower (hp) air motor at 100 pounds per square inchgauge (psig), approximately 7-8 hp of electrical power is supplied to the air compressor. To calculate the cost of compressed air in your facility, use the formula shown below:

Cost ($) =

$$\frac{\text{(bhp) x (0.746) x (\# of operating hours) x (\$/kWh) x (\% time) x (\% full-load bhp)}}{\text{Motor Efficiency}}$$

Where:**bhp**—Motor full-load horsepower (frequently higher than the motor nameplate horsepower—check equipment specification)
0.746—conversion between hp and kW
Percent time—percentage of time running at this operating level
Percent full-load bhp—bhp as percentage of full-load bhp at this operating level
Motor efficiency—motor efficiency at this operating level

Example

A typical manufacturing facility has a 200-hp compressor (which requires 215 bhp) that operates for 6800 hours annually. It is fully loaded 85% of the time (motor efficiency = .95) and unloaded the rest of the time (25% full-load bhp and motor efficiency = .90). The aggregate electric rate is $0.05/kWh.

Cost when fully loaded =
(215 bhp) x (0.746) x (6800 hrs) x ($0.05/kWh) x (0.85) x (1.0) = **$48,792** .95
Cost when unloaded =
(215 bhp) x (0.746) x (6800 hrs) x ($0.05/kWh) x (0.15) x (0.25) = **$2,272** .90
Annual energy cost = $48,792 + $2,272 = **$51,064**

Typical Lifetime Compressed Air Costs in Perspective—Costs Over 10 Years Assumptions in this example include a 75-hp compressor operated two shifts a day, 5 days a week at an aggregate electric rate of $0.05/kWh over 10 years of equipment life.

Fuente: U.S Department of Energy
Energy Efficiency and Renewable Energy
EERE Information Center 1-877-EERE-INF (1-877-337-3463) www.eere.energy.gov