

Energy Management Services

Air Demand Analysis



Air Demand Analysis Improves Overall System Performance

Benefits of an Air Demand Analysis

- Significantly reduce energy costs by identifying and eliminating inefficiencies in your system.
- Reduce production scrap/waste by providing consistent pressure to production equipment.
- Cut air compressor maintenance costs by optimizing run time and reducing excess cycling.
- Reduce production equipment maintenance costs through improved air quality.
- Minimize downtime by reducing maintenance intervals of compressors.
- Reduce your carbon footprint with lower energy consumption.
- Help qualify for utility rebate programs to pay for system upgrades.

In the course of helping thousands of customers save millions of dollars through compressed air energy best practices, we've refined and improved conventional air audit techniques to develop our unique Kaeser Air Demand Analysis (ADA) program. No other approach to compressed air system analysis offers Kaeser ADA's unique combination of affordability, convenience, and comprehensiveness.

Suitable for analysis of large or small systems, Kaeser's ADA is an exceptional tool. With the data we gather, our compressed air specialists can identify

areas for improvement in both energy savings and air delivery.

Our field service experts have the knowledge, the experience and the tools to study true life-cycle costs – to evaluate your air system, and make solid recommendations that will reduce your energy costs up to 50% and often increase productivity.

Maintenance costs can also be lowered. In fact, our customers typically find that a properly operating system will reduce their preventive and trouble-shooting activities by as much as 30%.



An Air Demand Analysis measures your system performance and calculates energy consumption.

The Stakes are High

Now more than ever, operational excellence is key to remaining competitive. Improving production rates, raising quality and minimizing resource costs



are the drivers for competitive success. Your compressed air system impacts all three, and presents a great opportunity for improvement in your plant. But there are other important incentives to reduce energy consumption. From the consumers' perspective, the industrial "carbon footprint" is a growing concern, so environmental stewardship is also a strategic issue. According to the latest estimates, optimizing existing industrial motor-driven systems (including compressors) could reduce global energy consumption by as much as 7 percent. The efficient design of compressed air and other commercial/ industrial systems can go a long way in reversing current energy consumption trends and improve productivity.

Most compressed air systems operate inefficiently. Improper adjustment ... leaks ... artificial demand ... poor system design – all of these factors contribute to unnecessarily high energy costs. Many of these same systems cannot deliver the desired air volume at the needed pressures. This results in lower production rates and quality, as well as higher life-cycle costs. Our experience has shown that many facilities can realize savings up to 50% by studying and optimizing their compressed air systems.

Whether your motivations are financial or environmental, an efficient air system will deliver the right amount of air at the lowest life-cycle cost.

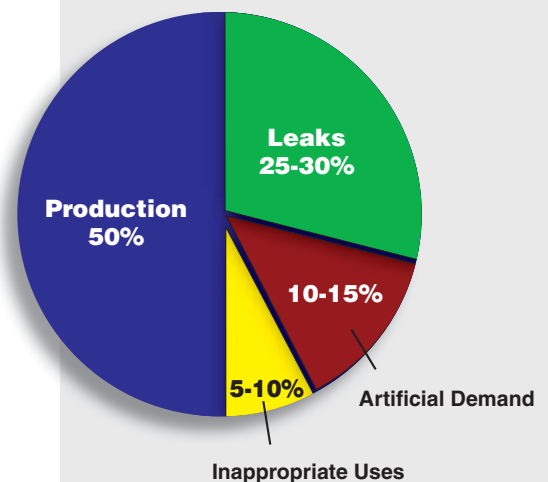
Kaeser is a leader in making the most reliable and energy efficient compressed air products you can buy. Still, we recognize that having energy-efficient components is only part of the efficiency picture, and that the greatest efficiency gains are often achieved through system design. For many years, we've been helping customers do just that: design better compressed air systems that are both dependable and energy-efficient. We've led the way in promoting proper piping, storage and controls, while others continue to focus merely on the initial capital cost of the equipment.

Department of Energy Findings

Compressors use as much as 10% of all electricity generated in the United States. The Department of Energy estimates that as much as half is wasted, with more than 25% of all compressed air lost through leaks (some air audit professionals have found overall leak rates as high as 50%!). An additional 15-25% is wasted through artificial demand and inappropriate uses.

Power accounts for 70% of compressed air operating costs. When you consider that just one 100 hp compressor consumes \$50,000 in electricity per year* it becomes clear how much you stand to gain by improving compressed air system efficiency.

**Based on full-time operation at the US average cost for industrial electricity of \$.06/kWh*



Analysis that Goes Well Beyond the Basics

Kaeser Key Energy Credentials

- Our Systems Engineering Department includes DOE-certified AirMaster Plus specialists.
- We support the Compressed Air Challenge initiative to train industrial users in air system “best practices.”
- We were early advocates of the Compressed Air & Gas Institute’s initiative to develop a standardized compressor energy data sheet ... and to encourage other manufacturers to accurately assess the power consumption of their equipment.



Site Survey/Walk-through

The first step in an Air Demand Analysis is to become thoroughly familiar with your air system. We review all components of your air system:

- Compressors and their control type
- Clean air treatment equipment

- Intermediate storage and distribution piping
- Overall system controls

We also investigate cycles and trends in plant processes to see how they relate to system dynamics.



Your Kaeser field representative will visit your site to:

- Collect detailed information on your system components, environmental conditions, and physical layout.
- Gather input on specific problems your plant is currently facing, and discuss desired outcomes.
- Collect appropriate supporting graphical data such as photographs, schematic drawings and sketches.



Time-stamped data logging enables more thorough analysis.

Data Logging

To obtain a detailed, accurate picture of your compressed air demand and system dynamics, we install a variety of instruments and sensors customized to your unique system. Our approach creates a complete picture of system activity – including leaks, which are often most apparent during off-peak production periods.

Comprehensive ADA Analysis

Using our own ADA software, we identify waste and poor practices, such as leaks or artificial demand caused by operating at unnecessarily high pressures. It also shows energy lost to pressure drops in distribution piping.

We create detailed time-stamped charts from the recorded data. These are used to analyze your system from several perspectives, and offer insight into your operating activities and corresponding air requirements.

This step also helps identify deficiencies in the air supply, storage or piping along with any control issues.

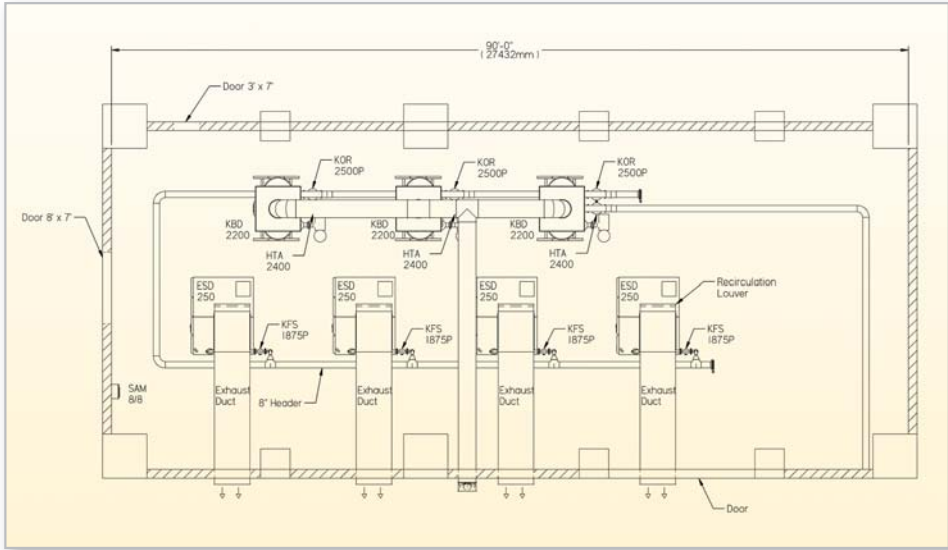
Kaeser Energy Savings System

We use our unique **Kaeser Energy Savings System (KESS)** software to simulate power requirements of different system scenarios. This helps identify solutions that will achieve the greatest efficiency without compromising pressure/ flow requirements or system reliability.

Formal Report

Your Air Demand Analysis from Kaeser isn't complete until we issue our final analysis and recommendations. This report includes a specific action plan you can use as a guide to system improvements. It outlines the recommended actions, their associated costs, as well as the projected energy cost savings.

Recommendations often focus on making adjustments to controls, storage, or piping rather than buying new equipment. Armed with these ideas, you'll be able to determine the most cost-effective system changes.



Accurate system drawings and schematics ensure proper pipe sizing and storage as well as adequate ventilation.

Measurable Results

Here are examples of recent ADAs we've conducted that delivered significant and immediate benefits to our customers:

- We identified a high leak rate – 200 out of 600 hp capacity – that was costing a food processor over \$80,000 per year in wasted energy.
- We identified poorly-controlled compressors in a corrugated paper plant, and were able to reduce energy consumption by 50% by adjusting and optimizing the existing controls.
- We greatly reduced the engineering and planning costs for a new paint manufacturing facility by collecting and analyzing information gathered from an existing sister plant.
- In a food processing plant, we found choke points in a piping system believed to be well sized. The customer was able to fix the problem and maintain proper pressure without purchasing new equipment as planned.
- A large newspaper publisher had multiple air distribution systems, fed by six compressors. Our ADA showed how the systems could be combined. After the recommended changes were implemented, a second ADA confirmed 27% savings in energy usage and an exceptional system efficiency level of 16.7 kW/100 cfm.
- An ADA of a large cement maker led to system changes that saved 20% at full production and resulted in a \$226,000 rebate from the local utility.



Proper air system controls improve efficiency and reliability. They can also record system information for further trend analysis.

Will my facility benefit from a Kaeser Air Demand Analysis?

- | | Yes | No |
|--|--------------------------|--------------------------|
| • Have we calculated the energy costs associated with our air system? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Do we have a pressure/flow/energy profile, so we know what is actually happening in our air system? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Do we know what our air demand is? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Have we ever measured pressure drop in our piping? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Have we ever tested for leaks? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Do we have secondary storage or controls separating air supply from distribution? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Do we have a stable supply of air at the required pressure at all points of use? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Have we eliminated high scrap rates or eliminated lower product quality caused by malfunctions in air-operated equipment? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Has adding compressors to a low-pressure problem improved system performance? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Have we contacted our local utility or energy service company to see if rebates or other incentives for energy reduction projects are offered? | <input type="checkbox"/> | <input type="checkbox"/> |

If you answered “no” to any of these ten questions, it’s highly likely your operation will benefit from a Kaeser Air Demand Analysis.



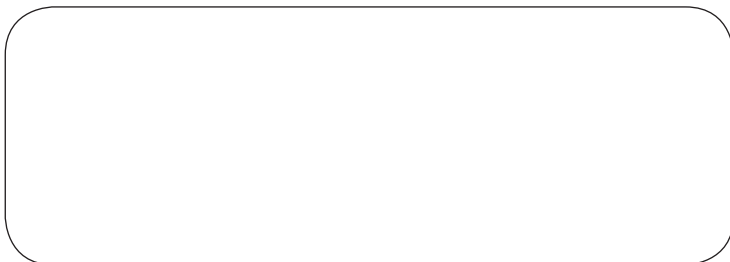
Take the Next Step

To start realizing energy cost savings, lower maintenance/repair costs, and increased productivity through a more stable supply of compressed air, contact your Kaeser distributor or dealer today about a Kaeser Air Demand Analysis. Or visit www.kaeser.com/ada for more information.

The Air Systems Specialist

We strive to earn our customer's trust by supplying high quality Kaeser air compressors and related compressed air equipment. Our products are designed for reliable performance, easy maintenance, and energy efficiency. Prompt and dependable customer service, quality assurance, training, and engineering support contribute to the value our customers have come to expect from Kaeser. Our employees are committed to implementing and maintaining the highest standards of quality to merit customer satisfaction. We aim for excellence in everything we do.

Our engineers continue to refine manufacturing techniques and take full advantage of the newest machining innovations. Extensive commitment to research and development keeps our products on the leading edge of technology to benefit our customers. With over 90 years of experience, Kaeser is the air system specialist.



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