6 tips to cut industrial and commercial energy costs

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Application Note

Energy losses are common in commercial buildings and industrial facilities. While there can be a number of culprits, such as air leaks or systems running inefficiently, many energy losses can be detected through inspection with thermal imaging.

Identifying and fixing these problems requires the right equipment—such as an advanced thermal imager, which identifies infrared hot and cold spots—and the proper training to understand where to look. This Fluke Thermography Find-It Guide highlights the top six sources of energy losses in commercial buildings and industrial facilities, and how to identify cost saving opportunities.

The tools of choice for industrial, commercial and building professionals.
Built tough for the job site and assembled with pride in the U.S.A., Fluke thermal imagers help you maximize project efficiency and insight. For your maintenance, inspection and troubleshooting tasks, trust nothing but Fluke.

1. Building envelopes

The building envelope includes a facility's structure as well as the climate controls within. The envelope separates the outside environment from the inside, and it's frequently imperfect.

What to scan

- **Roofs** In addition to looking for moisture issues, scan the roof surface and follow thermal differences to identify possible air leak entry and exit points.
- **Walls between conditioned and unconditioned spaces, including outside walls.** Significant air leaks tend to occur at the top and bottom of conditioned spaces, where air can enter or escape a structure.
- **Penetrations of the building envelope (pipes, conduits, chimneys, etc.).** Uninsulated or unsealed gaps often exist around roof and wall penetrations.
- **Door and window frames and seals.** Locate air leaks around windows, doors and casings caused by worn or missing seals or improper insulation. Repairs are often as simple as caulking or weather stripping.

Fast fact
According to the U.S. Department of Energy, improving the efficiency of a building's envelope can reduce energy bills by 15 % or more.

2. Boilers

The heart of steam and hot water heating systems, boilers consume and often waste a significant amount of energy.

What to scan

- **Refractory and insulation** In-service monitoring and inspection of refractory linings can be performed using thermal imagers.
- **Fan motors.** Check for impeded airflow, electrical unbalance, overheated bearings and failing winding insulation.
- **Pumps** Look for hot bearings, leaking seals and motor faults.
- **Valves** Thermal imagers can identify blocked valves that are nominally open and leaking valves that are nominally closed.
- **Electrical connections** Look for loose or corroded connections that increase electrical resistance and contribute to I2R losses.

3. Motors and generators

Overheating and malfunctioning motors and generators typically indicate mechanical or electrical inefficiencies that contribute to energy waste and sometimes failure.

What to scan

- **Airflow** In fan-cooled motors, restricted airflow can cause overheating, which can manifest on the entire housing.
- **Electrical unbalance** Look for load imbalance and single phasing which can contribute to unexpected loss.
- **Bearings** Thermal imagers can reveal bearing housings with abnormally high temperatures.
- **Winding Insulation** Look for higher than normal housing temperatures in areas associated with windings.
- **Electrical connections** Look for loose or corroded connections that increase resistance and contribute to I2R losses.

4. Steam heating systems

Steam systems are more common in industrial facilities than commercial settings, but some commercial buildings still use them for central heating.

What to scan

- **Steam traps** Check traps for proper operation through complete cycle.
- **Radiator coils** Check for obvious steam leaks in radiators and at all visible pipe and joint connections.
- **Steam lines and valves** Look for leaks, blockages and blowby at valves that are supposed to be "closed."
- **Condensers.** Look for outside air leakage, which reduces the condenser's vacuum performance and energy efficiency.

Did you know?
If a medium-sized trap fails open in a 100-psig steam system, it will waste about $3,000 per year.

5. HVAC systems

Heating, ventilation and air conditioning (HVAC) systems are usually some of the biggest energy consumers within commercial and industrial facilities.

What to scan

- **Ductwork and registers** Check for duct leakage and improper/inadequate installation.
- **Fans and blowers** Thermal imagers can help identify overheated bearings and components, and misalignment in couplings between the motor and fan.
- **Electrical connections** Look for loose or corroded connections, which increase electrical resistance and reduce energy efficiency.
- **Compressors and coils** If coils are blocked or cooling fins are clogged, improper airflow and heat exchange can take place, reducing system efficiency and component lifespan.

Pro tip
Buildings with constant-air-volume systems often have air leaks that can cause as much as 33 % energy loss. Considerable savings can be achieved with duct-sealing and insulation remedies.

6. Electrical systems

Many people don't realize electrical systems can actually waste money. As components degrade and resistance increases, energy losses mount.

What to scan

- **Distribution panels** Check for unbalance in circuits and loose, corroded connections at breakers, contacts, fuse clips, buss work, etc.
- **Transformers** If the temperature of one electrical leg on a transformer is significantly hotter than the others, that leg may be failing.
- **Lighting control circuits** Check all wiring splices and connections at fuses, switches, panels and fixtures.

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