

SUPPLIERS' TIPS

How can I lower the energy costs in my drying process?

A drying system is complicated and there are many aspects of it that impact energy consumption. There are electric motors that power material transfer equipment, fans, and other components and natural gas or propane that fuels the heat source. Energy consumption all boils down to the BTUs required to remove a given amount of water from solids at an established throughput rate.

With that said, here are some considerations with regard to reducing energy costs:

- Removing as much water from the material as possible upstream of the dryer will reduce the amount of energy needed to bring material to the final moisture content specification. The most efficient nonmechanical means is decanting as it uses gravity, which is a readily available, free energy source, to assist in water extraction. This method requires the material to be piled or spread out on a slightly angled grade where the water will flow away from the material. You can also use a mechanical process, such as a filter press or centrifuge. No matter the method, dewatering material prior to drying it further will result in a lower cost over time.
- Avoiding excessive dryer startups and shutdowns if possible is important because a drying system always runs the most efficiently when it can run for extended campaigns. When starting and stopping a system frequently, there's loss of efficiencies while the system is brought up to its peak rate and during shutdown — the system is operational during these times but not at its full potential.
- Recirculating exhaust air to the front end of the drying process, when applicable, is always a worthwhile means of reducing energy costs. The latent heat is the most valuable part of the exhaust air to recover for energy efficiency.
- Insulating key system components, such as the dryer vessel, baghouse, cyclone, and ducting, can also preserve energy. This is important when it comes to reducing energy losses to atmosphere and is necessary if any one or all of these components are exposed to the elements in cold climates (so as to prevent condensation from forming on inner surfaces, which can cause various issues).
- Performing proper and regular maintenance of the drying system and related equipment can ensure

safe and efficient operation. Important maintenance items can include periodic drying vessel and duct cleaning, regular filter bag changeouts, lubrication of all bearings, and replacement of worn belts.

Every aspect of the process contributes to the efficiency of the whole. Further, it would be worthwhile to hire your drying system manufacturer to visit the site and do an energy audit, perhaps every 2 years. The manufacturer possesses broad experience and intimately knows every detail of the drying system and may find issues that could improve the operating efficiency and reduce energy costs.

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First of all, taking a look at the material being dried or, rather, the required degree of drying is worthwhile: Material-specific application tests at a technical center may show that a higher final moisture content is acceptable, meaning the drying process can consume less energy to achieve the desired product quality.

From a systems engineering perspective, removing as much moisture as possible from the material using mechanical methods prior to the actual thermal drying process is generally advisable. Combining mechanical methods with thermal drying reduces the energy requirement for drying compared with a purely thermal drying process. This is because mechanical moisture removal in an upstream system (such as a filter press, decanter, or centrifuge) is more energy-efficient than thermal moisture removal.

However, saving energy and reducing costs during the thermal drying process itself is also possible. Some options to help save energy include drying under vacuum, for instance in a vacuum shovel dryer. Due to its physical properties, a vacuum atmosphere reduces the evaporation temperature of fluids, allowing the material to be dried in a gentler manner. The associated energy savings is a welcome side effect when using a vacuum dryer.

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