There are typically two types of boilers in the industry that utilize a standby-mode strategy – auxiliary boilers and process boilers. Each boiler type has a very specific role but essentially performs the same function of providing steam on demand.

To understand boiler standby selection, it becomes a question of timing, or rather urgency. Think about your computer, a tool you use every day. Your computer’s operating system likely uses three standby mode selections: sleep, hibernate and shut down. We already know intuitively which mode makes sense for us. In much the same way, identifying your boiler’s role based on your needs, or rather your process needs, will help you select the proper standby mode.

There are three standby options:

**Cold Standby** is a vessel at ambient temperature. The boiler can be full of water or empty. If full, the vessel temperature must remain above 77° F to prevent the possibility of freezing. The boiler must not change temperature by more than +/- 100° F per hour (+/- 200° F/hr with welded and/or membraned tubes), otherwise damage to the boiler can and likely will occur. Consult your boiler manufacturer for guidelines specific to their units.

**Warm Standby** is a vessel at operating temperature (within 100° F of saturation temperature). This typically is achieved by using a lower-drum, steam-heating coil. Often, warm standby is the most effective way for an operator to maintain boiler availability as long as there is external steam to do so.

**Hot Standby** is a vessel at operating temperature and pressure. This is achieved through the use of the boiler’s integrated burner. There are several ways to utilize this strategy. The first would be to maintain the boiler at minimum load. Most often, this would be approximately 10 percent of its maximum continuous rating (MCR); however, this can be costly. Some operators utilize a small pilot burner along with a separate pony-combustion air fan just large enough to maintain the steam system’s pressure and temperature. This approach allows the boiler to be turned down even lower (approximately five percent MCR is a good rule of thumb).

If you use an auxiliary boiler, you likely utilize the cold-standby mode most of the time. This is a low-cost and easy solution; however, if the boiler is likely to be brought online to meet a certain steam-load demand, be sure to plan ahead. In this case, it is recommended to utilize a warm-standby strategy at the minimum.

Boilers are designed to be online and at a constant temperature. Transitioning from cold to hot on a frequent basis will lead to long-term damage due to thermal cycling and out-of-service corrosion or rust. Transitioning from warm to hot really does not change the temperature of the boiler all that much (less than 100° F in most cases) and, therefore, maintains the life of the vessel and significantly reduces maintenance issues and costly downtime.

Process boilers likely will use a warm- or hot-standby strategy to maintain redundancy and peaking when necessary. The mode selection will be determined based on urgency. If steaming requirements come in batches (also known as a batch process) where the boiler will go to full load for a short amount of time and then back to standby mode, then the time required for online availability will be key to your standby-mode strategy.

When evaluating warm standby versus hot standby, it is important to understand the economics as well as the process requirements. Emergencies or upset conditions will trigger a redundant process boiler to be brought online quickly. Depending on the boiler’s internal temperature/pressure and the steam line (process) requirements, interruptions can result due to a line-pressure reduction. Exploring the pros and cons of warm standby and hot standby will help to separate the economics of one solution and practicalities of the other. It may come down to minutes being the factor.

To learn more, watch the webinar titled Meeting Critical Steam Demands with a Varying Load. To locate a Cleaver-Brooks representative near you, visit cleaverbrooks.com.