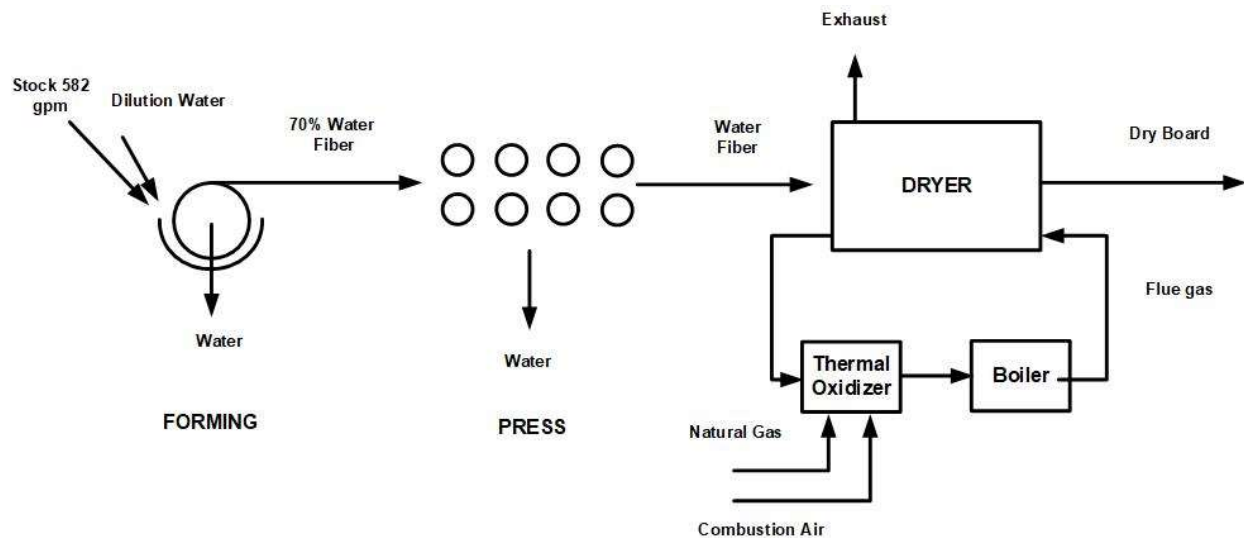


You are an independent consultant who has been contracted by a particle board manufacturer to conduct an energy audit of a mill and provide them with a report that describes opportunities for improving the efficiency of the mill. The report should make recommendations for proposed process modifications and capital improvements based on estimated relative economics of each of the changes. You asked the mill to provide you data from their process so that you can model the plant performance. Use the model to estimate energy losses by conduction, air infiltration/exfiltration, and process inefficiencies for current operating conditions. The model should also be used to conduct sensitivity (what if) analyses to estimate the effects of process modifications and capital improvements.

The mill provided you the following description and data:

A wet sheet of particle board is pressed and dried. On October 1, the wet sheet entered the dryer at a rate of 73,000 lb/hr at 49% consistency and 122°F. The dry board was at 190°F with a moisture content of 4.5%. The sheet was dried using combustion products from a natural gas burner along with recycled gases from the dryer. Natural gas was fed to the burner at 68,300 SCFH (standard conditions: 0°C and 1 atm). Combustion air was being fed at 22,500 SCFM, and the ambient conditions were 75°F and 80% relative humidity. The conditions measured for the dryer exhaust were 77,400 SCFM with  $T=310^{\circ}\text{F}$  and  $T_{wb}=152^{\circ}\text{F}$ .



A professional letter should be written to your client with the appropriate level of detail. Keep in mind that your client is a plant engineer with a mechanical engineering background and is not your professor. They want to know how they can improve their process, and they need to understand what you did so that they will have confidence in your results.

You may address your report to:

Clayton Wheeler, P.E.  
 Senior Process Engineer  
 Hwalek Industries  
 Orono, ME 04469