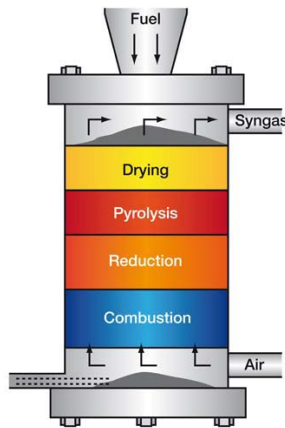


## Fixed-bed Gasifiers

Fixed bed gasifiers can be divided into three different categories:



- 1) updraft; 2) downdraft, and; 3) cross-draft.

An updraft gasifier has clearly defined zones for partial combustion, reduction, and pyrolysis. Air is introduced at the bottom and flows counter current to fuel flow. The product gas is drawn from the reactor at higher location. The updraft gasifier achieves the highest efficiency as the hot gas passes through fuel bed and leaves the gasifier at low temperature. The sensible heat given by gas is used to preheat and dry fuel. These gasifiers are best suited for applications where moderate amounts of dust in the fuel gas are acceptable and a higher flame temperature is required. In a downdraft gasifier, the feedstock enters from the top and gasification agent from the top or from the side. Product gas moves the same direction as gasification agent. The produced gas leaves the gasifier at a high temperature, and most of this heat is often transferred to the gasification agent. Since all tars must pass through a hot bed of char in this configuration, tar levels are much lower than the updraft type. The cross-draft gasifier is used mainly for the gasification of charcoal. Extremely high temperatures in the combustion zone (1,500°C or higher) are associated with this gasifier, resulting in material selection challenges. However, this type of gasifier may be implemented at small scales hence it is suitable for de-centralized implementation.