

### Process design of IGCC gasifier using Aspen Plus

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An integrated gasification combined cycle (IGCC) is a technology that turns coal into the syngas to produce electric power which is spotlighted nowadays. It removes impurities such as sulfur dioxide and nitrogen dioxide from the coal gas before the combustion step and lowers the emission gases. Heat and the syngas generated from the combustion then pass steam turbines and gas turbines to produce electricity.

A gasification is the starting step of the IGCC and produces syngas composed of hydrogen, carbon monoxide, carbon dioxide, water and remained carbon with ash at high temperature over 700°C and high pressure condition. Gasifier produces syngas which is more efficient to generate power than other fuels. At this step, selecting the proper temperature to operate the system is important considering energy efficiency.

In this work, IGCC gasifier is designed using Aspen Plus to find the proper conditions for gasifier to work in efficiency and system to generate more electric power.