

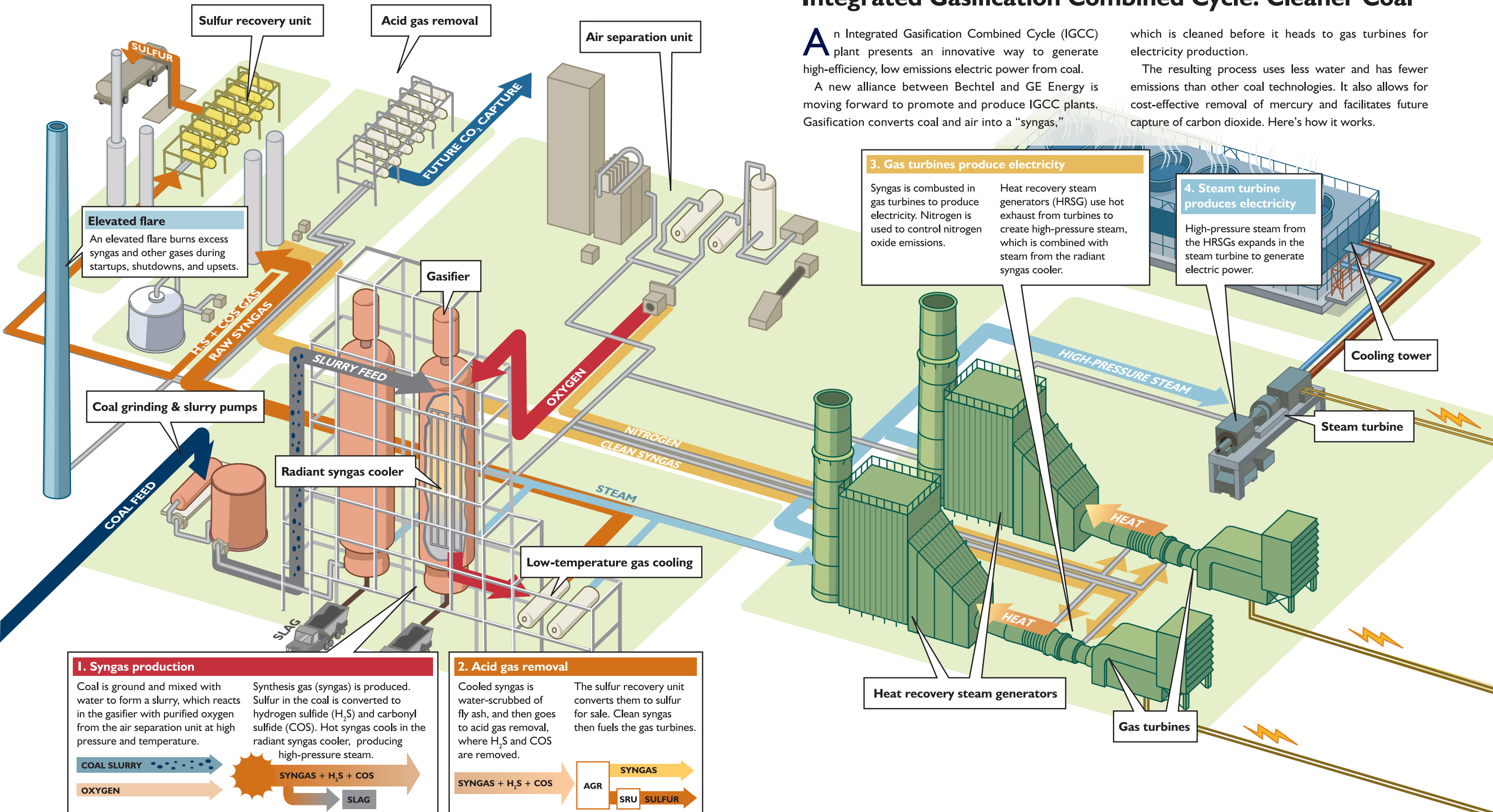
# DETAIL DESIGN

## Integrated Gasification Combined Cycle: Cleaner Coal

An Integrated Gasification Combined Cycle (IGCC) plant presents an innovative way to generate high-efficiency, low emissions electric power from coal. A new alliance between Bechtel and GE Energy is moving forward to promote and produce IGCC plants. Gasification converts coal and air into a "syngas,"

which is cleaned before it heads to gas turbines for electricity production.

The resulting process uses less water and has fewer emissions than other coal technologies. It also allows for cost-effective removal of mercury and facilitates future capture of carbon dioxide. Here's how it works.



**3. Gas turbines produce electricity**  
 Syngas is combusted in gas turbines to produce electricity. Nitrogen is used to control nitrogen oxide emissions.  
 Heat recovery steam generators (HRSG) use hot exhaust from turbines to create high-pressure steam, which is combined with steam from the radiant syngas cooler.

**4. Steam turbine produces electricity**  
 High-pressure steam from the HRSGs expands in the steam turbine to generate electric power.

**1. Syngas production**  
 Coal is ground and mixed with water to form a slurry, which reacts in the gasifier with purified oxygen from the air separation unit at high pressure and temperature. Synthesis gas (syngas) is produced. Sulfur in the coal is converted to hydrogen sulfide (H<sub>2</sub>S) and carbonyl sulfide (COS). Hot syngas cools in the radiant syngas cooler, producing high-pressure steam. SLAG

**2. Acid gas removal**  
 Cooled syngas is water-scrubbed of fly ash, and then goes to acid gas removal, where H<sub>2</sub>S and COS are removed. The sulfur recovery unit converts them to sulfur for sale. Clean syngas then fuels the gas turbines. SYNGAS, SRU, SULFUR