



10 Things You Should Know About Gasification

- 1. Gasification converts domestic feedstocks into a very clean and usable gas.** Gasification is a process that can convert a wide variety of our domestic resources such as coal, lignite, biomass, and petroleum residues (such as petcoke from domestic refineries) into a very clean gas, called syngas, that can be used in many of the same ways as natural gas or oil to produce energy and other valuable and strategic products. This increases our domestic energy security and improves our foreign trade balance. In so doing, gasification can create high-paying domestic industrial jobs while slowing or reversing the migration of such jobs overseas.
- 2. Gasification is the cleanest of all commercial coal- or petroleum coke-based technologies.** When used for electric power generation or chemical production, gasification produces inherently lower air emissions than conventional coal- or petcoke-based technologies, along with lower collateral production of solid wastes and wastewater. Sulfur, slag (from ash components), and even carbon dioxide can be recovered as relatively pure or inert by-products with productive uses in applications such as fertilizers, building materials, and enhanced oil recovery. The state of Texas alone has identified at least 31 billion barrels of oil, with a wellhead value of several hundred billion dollars, which are recoverable using sequestered carbon dioxide for enhanced oil recovery.
- 3. Gasification helps conserve valuable water resources.** Gasification uses significantly less water to produce electric power from coal or petcoke compared to other combustion-based generation technologies (less than half as much when coupled with carbon capture). Water is becoming a scarce and valuable resource in many parts of our country and the world, and gasification helps conserve that valuable resource.
- 4. Gasification can readily remove contaminants in syngas to very low levels.** Because gasification processes are conducted at high pressures and use concentrated oxygen rather than air as a co-feedstock, they can be designed to remove contaminants in the syngas product to very low levels prior to any industrial use or to any combustion of the syngas as a fuel. These contaminant removal steps are inherently lower cost and higher efficiency than for most alternatives to gasification technology.
- 5. Gasification is a proven and reliable technology.** Gasification processes were originally developed in the 1800's. Modern gasification technologies have been proven for over fifty years at over a hundred global sites, including over a dozen gasification-based power sites. The first and the longest-running commercial coal gasifier in the U.S was built in 1983 by Eastman Chemical Company to produce chemicals from coal. Eastman's coal gasification plant also operates very reliably, with on-stream availabilities of 98-99%. The first demonstration-scale coal gasification-based power generating facility in the U.S. was built in 1984.

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6. Gasification costs are becoming increasingly competitive. Capital costs and cost of electricity for integrated gasification combined cycle (IGCC) power generation plants are less expensive than other coal-based technologies if carbon capture is required. Most of the leading gasification technology providers have recently formed alliances with major engineering and construction firms to standardize plant designs, reduce capital costs, and provide adequate overall performance warranties for new gasification plants.

7. Gasification provides the lowest-cost approach for capturing carbon dioxide. Carbon dioxide is a greenhouse gas that is often associated with global warming. Although there are no current U.S. restrictions on carbon dioxide emissions, there is increasing global pressure to enact such restrictions. Carbon dioxide capture from a gasification-based power generation plant requires significantly lower parasitic power losses (as %) and significantly lower additional capital costs (as %) than for any other current fossil fuel-based power generation plant (such as coal, oil, or natural gas-based combustion processes). Gasification-based processes are also easier and less expensive to retrofit after-the-fact to enable future carbon dioxide capture. Industrial gasification projects have the lowest incremental costs for carbon capture and storage because capture of any carbon dioxide in the syngas is typically required by downstream chemical conversion steps, thus incorporating some of the carbon capture investment into the base plant design.

8. Gasification is a very flexible and versatile technology. Gasification has potential to produce a wide variety of single or multiple products, including electric power, steam, chemicals, fertilizers, ultra-clean fuels, substitute natural gas and/or hydrogen. In fact, almost any basic product currently produced from refineries or from oil or natural gas conversion can also be produced from gasification. As an example of its versatility, the coproduction (polygeneration) of electric power and other products, such as chemicals, from gasification facilities can increase overall coal (or other feedstock) utilization and efficiency, can increase the overall value creation from a facility, and can create additional domestic jobs.

9. Gasification provides a clean viable source of hydrogen based on coal and other domestic resources. Gasification directly converts coal and water into hydrogen, while other coal-based technologies depend on first creating electricity from the coal which is then used to electrolytically separate hydrogen from water (a less efficient route than direct conversion). Gasification thus provides a feasible and economical route to produce hydrogen on a large scale from our abundant domestic coal reserves. Refineries are some of the largest users of hydrogen in our nation and can benefit from hydrogen produced by gasification of coal, lignite, and/or refinery by-products such as petcoke or heavy oil resids.

10. Gasification is already a part of your everyday life. Products that you use everyday are currently made using coal gasification, including such items as electric power, photographic film, toothbrush and screwdriver handles, mending tape, pain relievers, artificial sweeteners, automotive coatings, LCD TVs, and pharmaceuticals. Gasification is a reliable and environmentally-friendly technology upon which all of these products depend every day.