Integration of the LPP Process with Clean Coal Combustion

One cleaner way to use coal in combustion devices is to take advantage of coal liquefaction technologies. When coal liquids are made, CO_2 can be simultaneously sequestered and the LPP Technology can use the coal liquids to fuel gas turbines. Such a process would take a traditionally "dirty" power source, coal, and render it "clean" for use in high efficiency combined cycle gas turbines, generating emissions levels comparable to natural gas-fired turbines. The conversion of syngas to liquids is a well-known process and has been utilized for many years. The LPP process transforms a wide variety of liquid fuels into a substitute natural gas (or LPP Gas™) which may be burned in conventional natural gas dry low emissions combustion hardware, precluding the use of water or steam, to achieve natural gas level criteria pollutants (NOx, CO, SO_2 and PM) emissions levels.

An Integrated Gasification Combined Cycle (IGCC) power plant uses a gasifer to partially burn a solid fuel (typically coal, petcoke, and/or biomass) to create a low-BTU syngas which is then burned in a specialized combined-cycle gas turbine plant to generate power. The syngas may also be used with a Fischer-Tropsch (FT) reactor to produce a range of liquid fuels, including gasoline, diesel fuel and naphtha. Typically the naphtha will comprise 25 - 40% of the total liquids produced, and it normally is of lower value than the other fuels. The conversion of syngas to liquids is a proven technology that has been in commercial use around the world for many years. However, before the development of the LPP Technology, only about 60-75% of the liquid fuel produced could be widely used as a clean fuel source, and none could be used in a dry low emissions turbine. The LPP System enables use of the 25-40% naphtha byproduct as a clean fuel source, completely changing the economics that have impeded widespread coal-to-liquid manufacturing in the past. By combining the LPP Combustion Technology with a gas-to-liquids (GTL) process, IGCC operation can be made much more flexible and dependable, and the overall economics can be improved.

Additionally, conversion of coal-to-liquids eliminates the need for the close proximity between the coal gasification plant and power generation plant, reducing costly expenses associated with transporting coal, since the coal liquids are easier and less expensive to transport than crushed coal. The coal gasification plants can be located closer to the coal source and converted to liquid fuel, which can then be transported to any gas turbine power plants that use the LPP hardware with their turbines.