

82c Adapting Existing Technology to Build a Low Emissions Power Plant with Carbon Capture

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Integrated pollutant removal (IPR), a process that consists of a series of compression and condensation steps with heat recovery integrated into the boiler, has been developed through modeling and experimentation at the USDOE/Albany Research Center. This process, when combined with oxy-fuel combustion - pulverized coal combustion using oxygen enriched air – offers a route to integrating the removal of all pollutants from a coal combustion stream, including capture and storage of CO₂. Because little or no N₂ is present in this combustion “air”, the remaining gasses are condensable, making a product which is well suited for integrated pollutant removal. Oxy-fuel systems have the promise of reducing boiler foot-print and boiler construction costs.

Using off-the-shelf components and existing technology, the USDOE/Albany Research Center and Jupiter Oxygen Corporation, working together under a Cooperative Research and Development Agreement, built and operated a system that demonstrated proof-of-concept for the integration of oxy-fuel combustion and an integrated system for the removal of all pollutants. The results of the test showed that the system can capture SO_x, NO_x, particulates, and even mercury as a part of the process of producing liquefied CO₂ for sequestration. Economic estimates indicate that this process is competitive with air fired power plants when the cost of removing all pollutants and CO₂ are included.