# FutureGen: Clean-Coal and Near-Zero-Emission Power Generation Technology for the Gulf Coast

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## ABSTRACT

**Future, environmentally-benign U.S. energy production will rely on "clean-coal" electric power generation with near-zero emissions. To develop this technology, new power plant designs will be needed. FutureGen is a new, flexible-fuel power-generation technology based on gasification of coal, lignite, and petcoke. It will have a design capacity of 275 megawatts and will also produce hydrogen, essential for refineries, and 1 million metric tons per yr of $CO_2$. Approximately 1 billion metric tons of anthropogenic $CO_2$ $yr^{-1}$ is emitted in the Gulf Coast region. Geologic sequestration of anthropogenic $CO_2$ in the Gulf Coast offers a means of reducing emissions through injection of compressed gas as a super-critical fluid into subsurface brine-bearing formations for long-term storage. The Gulf Coast overlies an unusually thick (commonly >20,000 ft, or >6,097.6 m) clastic sequence containing highly porous and permeable sand layers, separated by thick, low-permeability shale beds. This sedimentary wedge provides hundreds of gigatons of potential storage of $CO_2$. An additional economic incentive for FutureGen-related $CO_2$ sequestration in the Gulf Coast region is the abundance of depleted oil fields. Injection of miscible $CO_2$ in these fields for enhanced oil recovery could result in the production of an additional 4.5 billion barrels of oil. Optimal FutureGen sites are near depleted oil fields and close to lignite fuel sources, pipelines, and refineries. Proximity to oil fields will reduce costs of infrastructure necessary to transport and sequester $CO_2$ and to market the hydrogen product.**