CARBON-FREE GAS TURBINE

Abstract: A carbon-free gas turbine driven by the combustion of hydrocarbon fuels with oxygen utilizing the oxygen transport reactor concept to replace the conventional gas turbines in power plants.

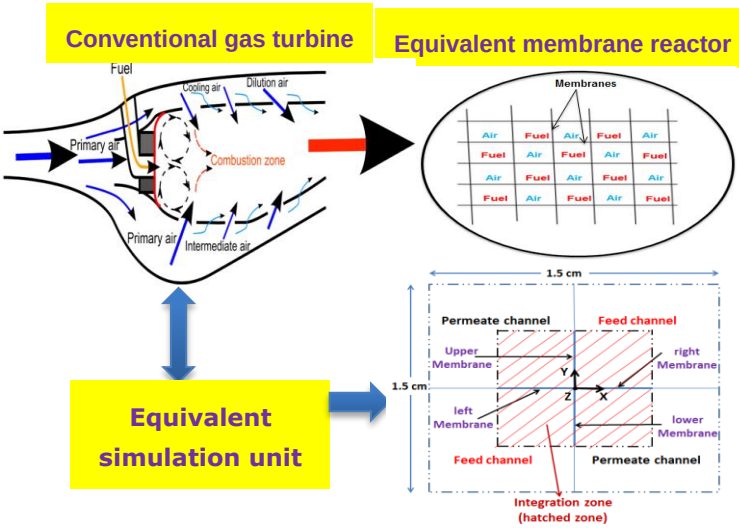
The Invention The proposed combustor is a carbon free combustor. The exhaust gases contain only water vapor and carbon dioxide which can be easily separated and captured through cooling via a heat exchanger. It is compact since it combines the process of oxygen separation with the combustion process in one site. The proposed combustor avoids the complicated and expensive CO_2 separation methods and provides an economic procedure for carbon capture.

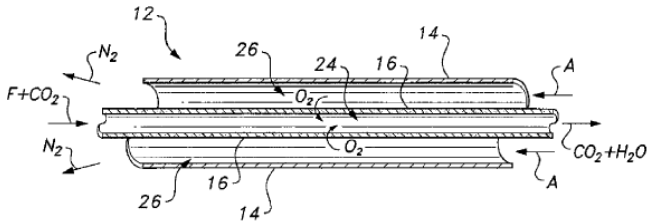
Market Need: The invention deals specifically with the target area of protecting the environment providing an improved carbon dioxide capture, and sequestration. It provides a development of the oxygen transport reactors for the combustion process in gas turbines. A complete design of the oxygen transport reactors replacing the gas turbine combustor is developed. Saudi Arabia can considerably contribute in reducing carbon emissions, thus, coping up with international obligations on cutting carbon emissions such as the 2009 Copenhagen regulations. The companies that can benefit from this study include Saudi Aramco, Saudi Electricity Company (SEC) and Saudi Basic Industries Corporation (SABIC) as well as private industries.

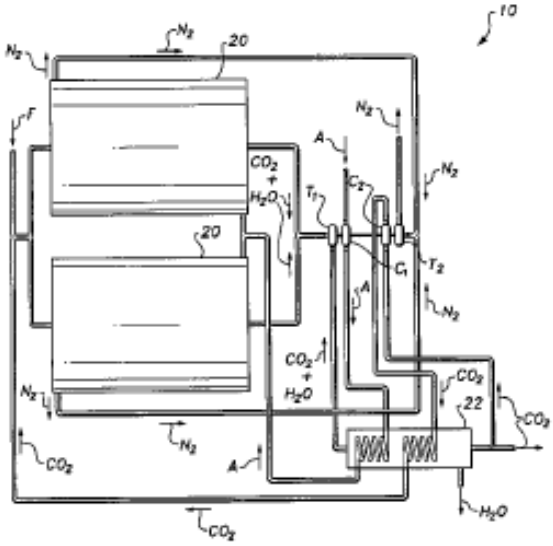
Competitive Advantage The carbon-free gas turbine avoids the complicated and expensive CO_2 separation methods and provides an economic procedure and, thus, improves the economy of carbon capture.

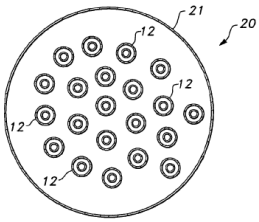
Readiness for Market / Looking for a Development Partner

The technology received funding from KACST TIC on CCS. Proof-of-concept and prototyping work are ongoing. Feasibility study is required by an industrial company. Additional results and data are needed to evaluate the technology and its economics. A commercial partner was searched. Probably joint work with the industry will help.









Patent Protection

This technology is protected by an issued US patent number US8117822

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