



## **Electrochemical Devise for Synthesis Gas and Liquid Fuel Production**

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**Summary:** A method for creating liquid fuels from carbon dioxide and water using a solid oxide electrolytic cell

**Description:** In response to increasing energy production requirements and the desire to reduce or eliminate pollutants from energy sources, new, cleaner fuel sources are being sought for a variety of applications, especially for transportation fuels. A known source of cleaner fuels includes synthetic fuels made from synthesis gas that are produced by gas-to-liquid conversion processes. However, standard methods (e.g., steam reforming of methane, coal gasification, or biomass gasification) are fraught with technical challenges and are not economically viable. This invention relates to methods for creating high value liquid fuels, such as gasoline, diesel, and jet fuel using carbon dioxide and water as the starting raw materials. This method combines a novel solid oxide electrolytic cell (SOEC) for the efficient and clean conversion of these feedstocks to hydrogen and carbon monoxide (synthesis gas), with the SOEC uniquely integrated with a gas-to-liquid fuels process. This process, when coupled with solar or wind based energy conversion devices, allows for the storage of intermittent energy in synthetic fuels.

### **Potential Areas of Application**

- Electrical Utility Companies
- Synthetic Fuel Production
- Solid Oxide Fuel Cells

### **Main Advantages of this Invention**

- Ready for commercialization.
- High efficiencies

**ID number:** 13015

**Intellectual Property Status:** US utility patent pending (application 14/213,879)

**Opportunity:** Seeking an exclusive or non-exclusive licensee for marketing, manufacturing, and sale of this technology.

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