# Direct Conversion of Methane to Electrical Energy Using Microbes ID# 2016-4543

G. sulfurreducens

CO2

Oxidized

humic acids

Reduced humic acids



### TECHNOLOGY READINESS LEVEL 4-7

### Seeking

Anode

Investment | Licensing | Research

#### Keywords

- shale gas
- methane
- microbial fuel cell

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Electricity from Methane using MFCs

HCO.

CH4 CH3COO

AA/pES1-MATmcr3

## **Technology Summary**

The disclosed invention describes a process to capture methane and directly convert it to electrical current using microbial fuel cells (MFCs). The consortium used to generate the current was created from three microbial components. The first component, an engineered archaeal strain (Methanosarcina acetivorans) consumes the methane while the remaining two components, Geobacter sulfurreducens and a sewage sludge sample, perform the subsequent electron transfers that lead to current.

Sludge

(Paracoccus spp.)

# Application & Market Utility

Methane extracted from from shale deposits could be made into an energy dense fuel with decreased carbon dioxide emissions per unit energy. Current methods to exploit methane (Fischer-Tropsch processes) are too complex and require large-scale investment. MFCs are a lower cost, easily-portable alternative. MFCs provide a method to directly convert methane into electricity in a fuel cell. They provide a means to harness methane anaerobically, and capture methane at its source. This means less leaks from transportation, distribution, and storage.

## Next Steps

Prototype verified; seeking licensing oppurtunities.



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