

## Numerical Modeling of Turbulent Biogas Combustion

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**Abstract** – The primary purpose of this research is to investigate the combustion properties of three different types of biogas using a 300 KW BERL combustor. Biogas is a renewable type of this fossil fuel; it is an intelligent fuel that offers an incredibly environmentally beneficial alternative to existing fuels.

In order to study the impact of the biogas compositions on the flow field prediction, we perform the calculation using the FLUENT code, which has been used to present the numerical modeling of turbulent diffusion flames by using the realizable  $k-\varepsilon$  model of turbulent flow interacting with a two-dimensional PDF combustion scheme. Some comparisons of biogas performance in turbulent diffusion flame mode and methane performance in conventional mode are shown, in addition to the 9-steps, GRI 2.11 mechanisms and experiment data are used to validate the case investigated.

**Keywords** – BERL Combustor; Biogas; Model  $k-\varepsilon$  Model; Turbulent Diffusion Flames; DO; GRI 2.1.