This abstract will be presented during LNG2023 conference on 10-13 July in Vancouver, Canada among many other innovative projects, ideas and outlooks. LNG2023 will provide a unique platform for the global LNG industry and key stakeholders to discuss, debate, and showcase the latest industry developments and opportunities.

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R-GAS PARTIAL-OXIDATION (POX) REACTOR TECHNO ECONOMIC ANALYSIS FOR NATURAL GAS TO HYDROGEN CONVERSION

The R-GAS Partial-oxidation (POX) technology is an emerging POX technology with a Technology Readiness Level (TRL) 6. The R-GAS POX has been tested in a fuel rich mode with Natural Gas (NG) feed and oxygen as oxidizer. The R-GAS POX technology has unique technical features that differentiate it from other POX technologies in the industry such as: advanced burner design with rapid mixing burner elements, robust cooling approach to provide long life, recycle stream injector to recycle by-product hydrocarbon or wastewater streams to the POX unit, and reactor design with no large scale re-circulations (plug flow) that maintains the highest possible temperatures downstream of the injector for rapid reaction kinetics. Moreover, the R-GAS POX has an actively cooled liner that eliminates refractory for better transportability, minimal field installation, and most importantly operational flexibility (no pre-heat). The R-GAS POX technology unique technical features contribute to significant CAPEX/OPEX reduction on a Blue H2 plant.

The current effort presents two techno economics analyses (TEAs): The first TEA compares an R-GAS POX-based Blue H2 installation to an SMR-based Blue H2 installation and shows the tremendous CAPEX and OPEX advantages that the R-GAS POX has over the SMR in the cases of high-purity H2 production. The second TEA considers the integration of an R-GAS POX-based Blue H2 installation with an electrolysis-based green hydrogen installation and demonstrate