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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LOW-CARBON/NET-ZERO LNG OPTIONS FOR THE ENERGY TRANSITION

The Energy Transition will demand low-carbon fuels. This paper will analyze and compare three Liquefied Natural Gas (LNG) options:
1.Low Carbon LNG: LNG produced from natural gas with minimal greenhouse gas (GHG) emissions. Low Carbon LNG liquefaction will require some combination of e-drive for the refrigerant compressors, hydrogen fired gas turbine drivers, and carbon capture. Post-combustion carbon capture at point of natural gas fuel use is required to bring the lifecycle GHG emissions of natural gas-derived LNG closer to net zero.
2.E-LNG is a net-zero E-fuel where green hydrogen (from renewable energy electrolysis of water) is reacted with CO2 from direct air capture (DAC) or bioenergy carbon capture (BECC) to produce methane, which is then liquefied to provide a drop-in substitute for natural gas-derived LNG.
3.Liquefied Substitute Natural Gas (SNG) from biomass gasification is a net-zero fuel that is also a drop-in substitute for natural gas-derived LNG. This fuel is derived from gasification of biomass (with carbon capture) which produces carbon monoxide and the required hydrogen to produce a synthesis gas for methanation.
For Options 2 and 3, implementation of post-combustion carbon capture at point of natural gas fuel use will result in negative lifecycle GHG emissions. These could potentially be monetized as carbon credits. This paper will compare the three options in terms of lifecycle GHG intensity, power requirements, and cost per MMBTU of product.