GHG emissions along the Natural Gas and LNG production and supply chain

Introduction

The presentation will cover the key elements of the production and supply chain. The presentation will be accompanied by a more detailed publication to be shared at the conference.

Taking production first, the presentation will consider the GHG emissions arising on production of natural gas, its transportation, and any storage, and on ultimate use (i.e., on combustion). We will look at the production and supply chain in the US, Europe and SEA, and we will consider the laws and regulation applicable across production and supply chains, including any price on carbon (carbon tax or emissions trading scheme). In addition, the paper will explain the distinction between carbon dioxide removal (CDR) and carbon capture and storage (CCS) and use (CCUS).

In considering the production and supply chain we will state the mass of each GHG emissions estimated to arise, and the policy settings intended to avoid and reduce the emission of GHGs to the climate system. In this context, we will consider the use of capture and reinjection of CO2 as part of petroleum operations around the world, by reference to examples of where this is being done. We will distinguish the capture and reinjection of CO2 from enhanced hydrocarbon recovery, and from the injection of CO2 as part of stand-alone projects.

As a point of comparison, we will describe a parallel path of the use of bio-methane, including by reference to projects producing biomethane, including as feedstock for bio-LNG.

We will track natural gas through processing and treatment:

- into pipeline systems, and the GHG arising along the pipeline system, and the opportunities to avoid and to reduce GHG emissions, from the point of receipt into the pipeline to the point of delivery, including the avoidance or reduction of fugitive CH4 emissions; and

- to the production of LNG, and the GHG emissions arising on production and along the transportation chain, and the opportunities to avoid and to reduce GHG emissions from point of loading to the point of unloading, including the capture of CO2 on board LNG Carriers.

We will track the GHG emissions arising from the point of delivery and from the point of unloading, including how to avoid and to reduce fugitive CH4 emissions to the point of combustion. We will then consider point of capture technologies to capture CO2 emissions arising on the combustion of CH4, and the potential to store captured CO2 in the country in which the CO2 arises (the country of combustion), in the country in which the natural gas / LNG was produced (the country of origin) or in another country.

In considering these matters, we will consider the existing pilot projects, including capture of CO2 in Japan of CO2 arising from re-gasified natural gas derived from LNG exported from Australia, and the “return” of that CO2 to Australia for CO2 storage.

Conclusions

The conclusion will reference the long-standing belief of the author of natural gas as a transition fuel, and the need for the development of more natural gas resources. While natural gas is essential, so is the capture of CO2 along the production, transportation, and storage chain, and at the point of combustion. To illustrate the conclusion, the author will state the GHG emission profile without CO2 capture and storage, and with CO2 capture and storage.