We appreciate the California Air Resources Board’s convening a December 11, 2019 workshop on Carbon Neutrality: The Role of Carbon Capture, Sequestration, and Options for Utilization. In addition to providing important information on the role of CCUS in assisting California in meeting its goal of achieving carbon neutrality by 2045, CARB asked participants to consider the following questions:

1.     What are the biggest barriers to near-term deployment of capture technology, and what actions can industry and policy-makers undertake to overcome these barriers?

2.     How can existing infrastructure be transitioned to process, transport, store and monitor CO2?

3.     What are the tradeoffs between reducing fossil fuel combustion versus relying on carbon capture and sequestration for achieving our deep decarbonization goals?

We encourage CARB to actively engage with a broad coalition of stakeholders in developing responses to these questions. As a start, we offer the following responses to each question. These responses are not intended to be comprehensive. Rather the responses reflect some initial thoughts on the posed questions that should be further explored through further engagement:

1.     What are the biggest barriers to near-term deployment of capture technology and what actions can industry and policy-makers undertake to overcome these barriers?

We believe that manyu CCUS technologies are technologically mature and ready for large-scale deployment today, as evidenced by the multitude of projects that operate around the world today. The primary reason we do not see projects like that in California today are cost (partially addressed now through the LCFS for certain project types), uncertainty as to the regulatory pathway and timeline, lack of detailed understanding of deep subsurface CO2 storage potential in some areas, and lack of a CO2 pipeline network to link CO2 sources with storage sites.

The state of California and CARB staff have been instrumental in amending the LCFS regulation and in authoring the CCS Protocol, which helps incentivize deployment of capture technology in the fuels sector.  Now that stakeholders have had a chance to review and assess the LCFS and related documents, CARB should solicit feedback to further improve the Protocol from a scientific and functionality standpoint, while retaining the important safeguards for secure, permanent storage.

Capture technologies require a significant upfront investment.  Before the investment community becomes comfortable with investing in a project, it requires some guarantee that a project will generate a return, which under the LCFS would be in the form of credits. CARB could consider ways to monetize the credit capacity of a project, before the project is complete, and generating LCFS credits. Project proponents would be permitted to engage in the advance sale of LCFS credits based on a project’s design capacity. These advance sale credits would be guaranteed by the project proponent and would be restored during a fixed period post project start-up. It is possible that a sunset provision would be included anticipating that broader adoption will eventually provide sufficient comfort to investors.

Furthermore, we suggest CARB consider convening a workshop to address whether the regulatory gap referred to in 2010 California Carbon Capture and Storage Review Panel technical advisory committee report on carbon dioxide pipelines still needs to be addressed (TECHNICAL ADVISORY COMMITTEE REPORT, Carbon Dioxide Pipelines, August 10, 2010).

Finally, incorporating the CCS Protocol into the Cap-and-Tradw system would broaden the eligible project types under California’s climate programs, although the associated revenue stream may not be sufficient at present by itself to make projects economical. However, the reform is time sensitive, since the Federal 45Q tax credit requires eligible projects to have begun construction on Jan1, 2024.

2. How can existing infrastructure be transitioned to process, transport, store and monitor CO2?

Many existing large point sources of CO2 could have a large portion of their emissions captured with the right retrofit. These include power plants, refineries, ethanol plants, cement plants, chemical plants, and natural gas processing facilities.

Some existing pipelines, for example those that carry natural gas, could be repurposed to transport CO2. The technical specifications and circumstances under which this would be safe have been examined, but need to be compiled in a concise way.

Recognizing the fungibility of the CO2 molecules in a pipeline will ensure that there is a net CO2 capture and storage while avoiding the significant complications and costs of ensuring that the precise molecule of CO2 captured at a specific site is transported and storage at another specific location. Rather CARB should expressly recognize that book & claim accounting may be used to generate LCFS credits and recognize safe and secure CO2 storage.

3. What are the tradeoffs between reducing fossil fuel combustion versus relying on carbon capture and sequestration for achieving our deep decarbonization goals?

We do not see a fundamental conflict between the use of CCUS and achieving California’s deep decarbonization goals. In fact, the two are in synergy. The ambition level of California’s goals - in particular to achieve economy-wide carbon neutrality by 2045 - is such that use of all available decarbonization tools is the only prudent strategy. In what is essentially a risk management calculation, all technologies and means that can reduce emissions should be deployed in order to deliver what amounts to very large reductions in a very short timeframe. We see CCUS technologies as a means of drastically reducing emissions from fossil fuel combustion to the extent that it cannot be avoided, while other solutions that replace fossil fuel use with other energy systems continue to take hold.