Carbon Life Cycle Analysis of CO_2-EOR for Net Carbon Negative Oil (NCNO) Classification

Award Number: DE-FE0024433

Project Summary:

The goal of this project was to develop a clear, universal, repeatable methodology for making the determination of whether a carbon dioxide (CO_2) enhanced oil recovery (EOR) operation can attain Net Carbon Negative Oil (NCNO) classification. Specifically, the project sought to identify and frame critical carbon balance components for the accurate mass accounting of a CO_2-EOR operation, develop strategies that are conducive to achieving an NCNO classification, and develop a comprehensive yet commercially applicable monitoring, verification, and accounting (MVA) methodology.

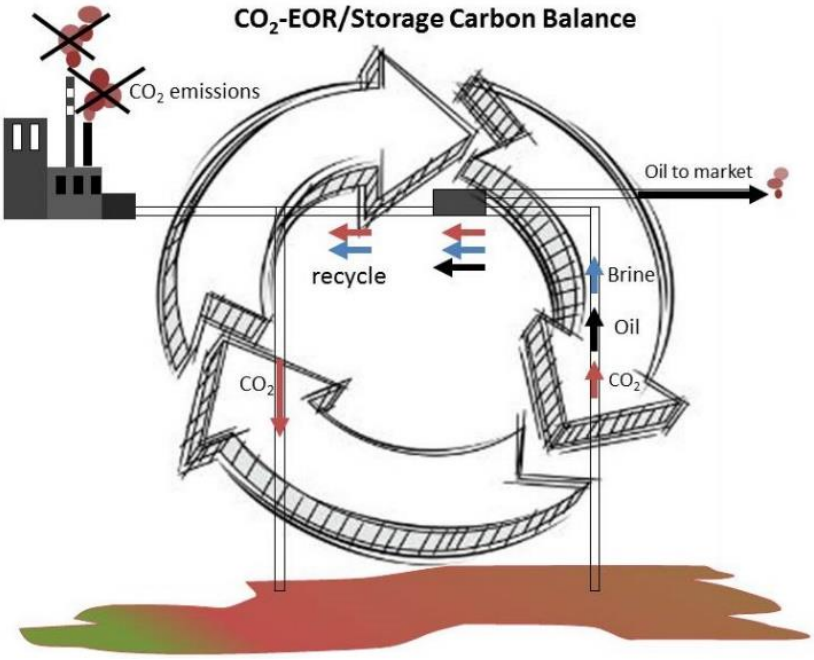

Figure 1: Carbon balance illustration for CO_2-EOR and carbon storage operations.

Prime Performer:
University of Texas at Austin

Principal Investigator:
Vanessa Nuñez-López

Project Duration:
1/1/2015 – 12/31/2018

Performer Location:
Austin, Texas

Program:
Carbon Storage

Project Outcomes:

This study demonstrated the variability of the net carbon balance of carbon capture, utilization, and storage systems. Net carbon balance not only varies among different EOR settings, but it also varies depending on the strategy selected to develop reservoirs with the same geologic setting. In addition, net carbon balance also varies significantly through time as projects mature. Results provide an understanding of the interplay between environmental performance and economic oil production. This understanding can assist in the co-optimization of CO_2-EOR and geologic carbon storage. Most importantly, this study serves as confirmation that CO_2-EOR can be operationally designed to both enhance oil production and reduce greenhouse gas emissions to the atmosphere.

Presentations, Papers, and Publications

Final Report: Carbon Life Cycle Analysis of CO_2-EOR for Net Carbon Negative Oil (NCNO) Classification (April 2019) Vanessa Nuñez-López, Ramon Gil-Egui, Pooneh Hosseininoosheri, Susan D. Hovorka, Larry W. Lake