Subcommittee on Environment and Climate Change
Hearing on
"Clearing the Air: Legislation to Promote Carbon Capture, Utilization, and Storage"
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Mr. Sasha Mackler
Director, The Energy Project
Bipartisan Policy Center

The Honorable Scott Peters (D-CA)

1. Given your testimony and your response to questions from Ms. Matsui that passage of the bill might encourage additional investment in enhanced oil recovery (EOR), how would the bill nevertheless reduce carbon emissions?

RESPONSE:

The USE IT Act supports the technology development of carbon utilization and removal. Given this, the impact of the bill will be greatest on driving down costs of capture – including direct air capture systems – which will have a direct impact on carbon emission reductions and help scale these technologies as a climate solution. CCUS, including direct air capture, is an essential addition to other climate strategies because we are unlikely to have cost-effective options for zeroing out all sources of emissions from all sectors by 2050. In fact, the IPCC has concluded that negative emission technologies, such as direct air capture, and CCUS will be needed to meet climate targets. Further, direct air capture has the potential to achieve needed carbon reduction as according to a recent modeling assessment, the potential for carbon dioxide removal and storage using the technology is between 16 and 30 billion metric tons per year (in the 2070 – 2100 timeframe) (Giulia Realmonte et al. "An inter-modal assessment of the role of direct air capture in deep mitigation pathways." Nature Communications (2019) 10:3277. https://doi.org/10.1038/s41467-019-10842-5).

The USE IT Act is likely to have a small impact on incremental EOR investment (and other CCUS infrastructure generally). Because crude oil produced from EOR utilizing captured CO2 has a lower carbon content when compared to a typical crude oil, the climate benefits from the USE IT Act are two-fold: (1) improving the technologies to support lower cost carbon capture in the future and increase the ability for CCUS to scale as a climate solution and (2) reduced emissions from oil as a result of production from capture and EOR as compared to traditionally produced oil (EOR with geologically-sourced CO2, as well as non EOR oil). According to a Lifecycle Assessment published in Environmental Science and Technology (https://pubs.acs.org/doi/abs/10.1021/acs.est.5b00700), emissions from gasoline produced via EOR using CO_2 from CCS-enabled Natural Gas Combined Cycle power plant would be reduced by 72% on average relative to current baseline gasoline. Also, a study from the California Committee on Science & Technology estimates a 72% reduction in carbon

intensity from captured CO2 and EOR: https://ccst.us/wp-content/uploads/2015ccs.pdf

The reduction in other emissions – including methane, NOx, SOx, unburnt hydrocarbons and particulate matter – have not been quantified to the degree that CO2 has been. In particular the LCA published in Environmental Science and Technology quantifies total greenhouse gas (GHG) equivalents, so this takes into account the GHG potential of methane emissions. This study uses a full LCA accounting for reduction in emission from power plants during capture along with the emissions from the use of the gasoline from EOR. So, the calculated 72% reduction in GHG emissions accounts for elimination of emissions from the power generation which would occur to provide the CO2 for EOR. Interestingly, both of these studies came to 72% independently. It is important to note that the Environmental Science and Technology published a range of reductions (50% to 140% reduction). And it would be different for different oil fields and different power plant sources of CO2. This base-case number of 72% was calculated using standard models of Natural Gas Combined Cycle power plants published by NETL, and likely used freely available data on oil fields, possibly leading to similar numbers calculated.