

## OPPORTUNITIES FOR INDUSTRIAL CO<sub>2</sub> CAPTURE AND UTILIZATION IN THE US

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Carbon dioxide capture from flue gases has largely failed to gain traction due to their prohibitively high cost. One strategy to lower capture costs is to target capture from emissions with higher CO<sub>2</sub> concentration. This presentation focuses specifically on a sub-section of industrial CO<sub>2</sub> emissions, of which there are no carbon-free routes for the formation of products such as cement, glass, iron and other metals. Although these emissions do not represent the majority, unlike the electricity and transportation sectors, they are not replaceable with renewables or bio-energy routes, and in fact, their scale matches well with CO<sub>2</sub> utilization opportunities. A low-cost pathway, including separation, compression and transportation to currently available utilization opportunities has been identified. In particular, our cost model corrects for differences in exhaust composition, flow rate, and geo-specific utilization demand. A regional case-study for the US state of Pennsylvania reveals steel and cement manufacturing as the least cost options. Further, we find that transportation via trucks is generally the low-cost alternative compared to pipeline transport for small volumes on the order of 100 kt CO<sub>2</sub>/a. These results are presented in the context of other complexities such as the relative feasibility of extracting CO<sub>2</sub> process emissions from combustion emissions, theoretical maximum commodity outputs by region, and competitive-based commodity trading (regional and international) inspired by localized CCUS efforts.