IEAGHG Information Paper 2017-IP50; CO_2 use and Reuse Research - 2017 NETL CO_2 Capture Technologies Review Meeting

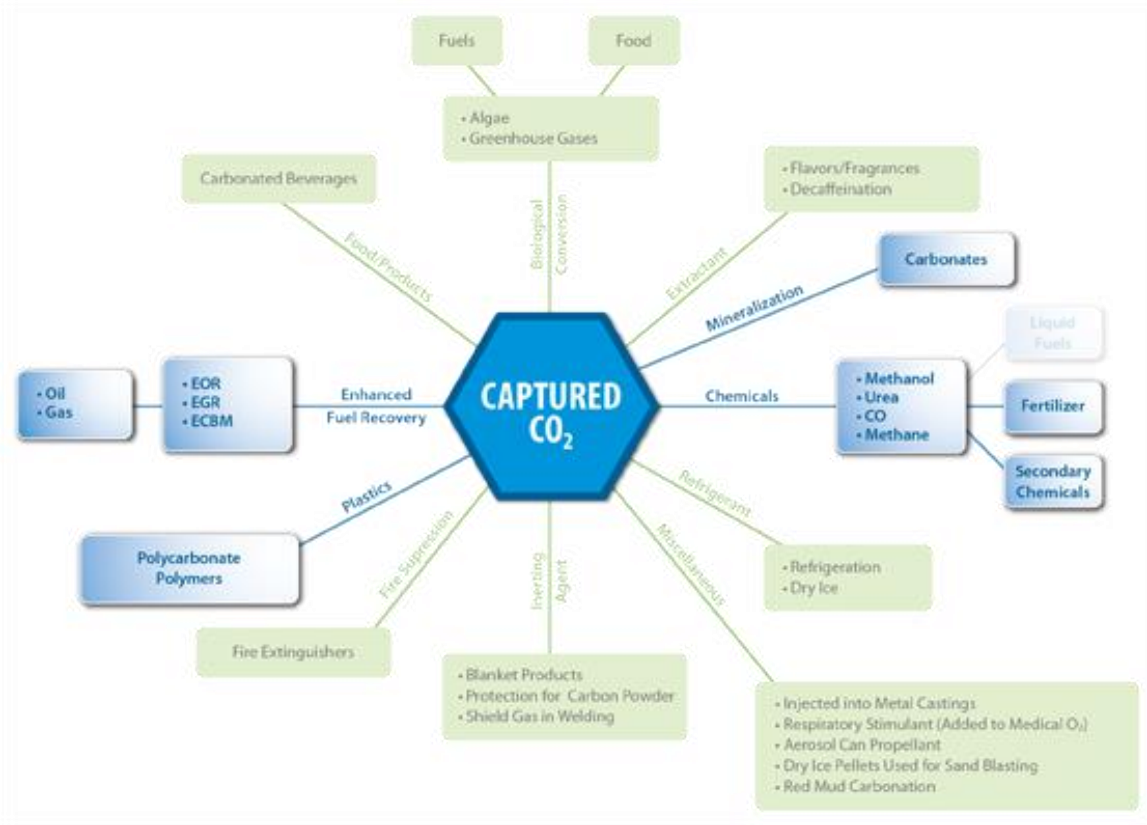

Figure: Opportunities for carbon use and reuse (NETL-supported research highlighted in blue) [1]

CO_2 can add some revenue to the capture process. Based on the supported program on Carbon Use and Reuse (see figure above), one of the sessions of the 2017 NETL CO_2 Capture Review meeting covered CO_2 utilization projects. Compared to the review meeting in 2016, the presence of CO_2 reuse projects has grown considerably.

Researchers are considering CO_2 as source for valuable products and highlighted the importance of lower footprint compared to traditional process. We can see that all funded projects will include a Techno-Economic-Analysis (TEA), although some of them without including capital costs on the calculations.

We saw three projects based on micro-algae technologies with different applications, two of them leaded by the University of Kentucky. Additionally, electrochemical conversion was included as one pathway for CO_2 conversion through a two-phases process.

As we can see in the table below, CO_2 Utilization is one significant area covered by DOE funding. Projects are based on low TRL technologies and identified as emerging technologies. Nevertheless, we look forward to see final results from those studies.

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[1] https://www.netl.doe.gov/research/coal/carbon-storage/research-and-development/co2-use-reuse

Project Title	Duration	Coordinator	Info	Website
Upcycled CO_2-Negative Concrete For Construction Functions	04/01/2017 – 03/31/2020	University of California Los Angeles	Utilize CO_2 by mineralizing stable carbonate compound to obtain a material with mechanical and functional properties as at least Portland cement	FE0029825
Electrochemical Conversion Of Carbon Dioxide To Alcohols	04/01/2017 – 03/31/2020	University of Delaware	The electrochemical process has two stages: one for the conversion to carbon monoxide and then this to C2-C3 alcohols	FE0029868
Nano Engineered Catalyst Supported On Ceramic Hollow Fibers For The Utilization Of CO_2 In Dry Reforming To Produce Syngas	07/01/2017 – 06/30/2020	Gas Technology Institute	In a reactor to be tested in two modes, packed bed and pressure-driven transport, the CO_2 will be used to produce methane and gas synthesis in a catalyst deposited in hollow fibers.	FE0029760
High Energy Systems For Transforming CO_2 To Valuable Products	05/01/2017 – 04/30/2019	Gas Technology Institute	Based on a direct electron beam (E-beam) synthesis (DEBS) process, the objective is to produce acetic acid, methanol, and carbon monoxide from the capture CO_2 within a coal-fired power plant and methane (natural gas)	FE0029787
Low Temperature Process Utilizing Nano-Engineered Catalyst For Olefin Production From Coal Derived Flue Gas	04/01/2017 – 03/31/2019	Southern Research Institute	Based on a catalytic process, the objective is to obtain ethylene from ethane and CO_2	FE0029570
A new Process for CO_2 conversion to Fuel		TDA Research	This is a sorbent-based, thermo-catalytic process to convert CO_2 captured from flue gas into syngas	
Microalgae Commodities from Coal-Fired Power Plant Flue Gas CO_2	10/01/2015 – 09/30/2017	MicroBio Engineering	The objective is to demonstrate algae biomass production using flue gas CO_2 with native algae and conversion to biogas and animal feeds	FE0026490
A Microalgae-Based Platform for the Beneficial Reuse of Carbon Dioxide Emissions from Power Plants	10/01/2015 – 09/30/2017	University of Kentucky Research Foundation	The outputs from this photo-bioreactor process will be the production of bioplastics and fuels	FE0026396
Beneficial Re-Use Of Carbon Emissions From Coal-Fired Power Plants Using Microalgae	06/09/2017 – 06/08/2020	University of Kentucky - CAER	This process is based on a combination of dual photobioreactor (PBR) and pond cultivation methods. The products will be protein-rich stream for bioplastics production, and a lipid feedstock and an aqueous carbohydrate flux to be used as for the production of renewable chemicals and fuels	FE0029623