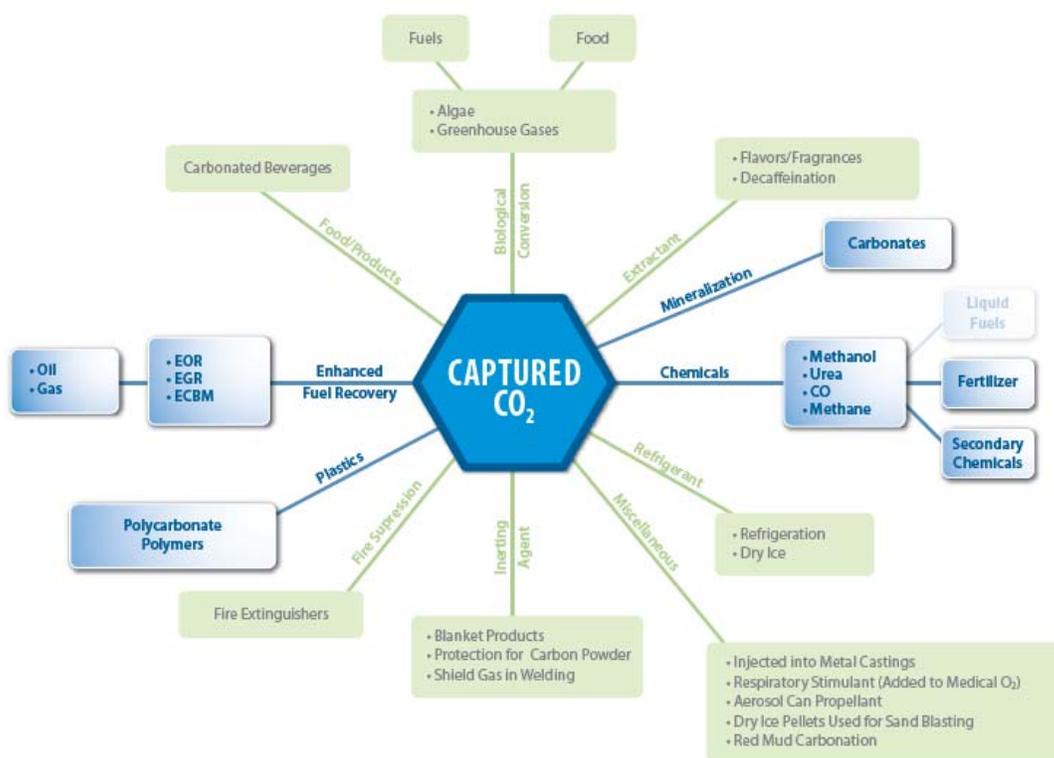


## Carbon Storage – Carbon Use and Reuse

While CO<sub>2</sub> is thermodynamically stable, it is still reactive under certain conditions that do not necessarily require intensive energy input. Therefore, using CO<sub>2</sub> as a feedstock for a variety of products is promising, particularly in conjunction with energy generated from renewable energy sources during off-peak hours. The Carbon Use and Reuse Technology Area seeks to support the development of technologies identified as having the greatest potential to help boost the commodity market for CO<sub>2</sub> while producing no additional CO<sub>2</sub> emissions. Doing this will require a comprehensive understanding of product markets, in addition to their conventional energy balances and life cycles. The figure below illustrates most of the current and potential uses of CO<sub>2</sub>. However, many of these uses are small-scale and typically emit the CO<sub>2</sub> to the atmosphere after use, resulting in no reduction in overall CO<sub>2</sub> emissions. Some of the more significant current and potential uses of CO<sub>2</sub> are highlighted in blue in the DOE-sponsored research within this Technology Area.



Recent studies of current and potential CO<sub>2</sub> use opportunities suggest that CO<sub>2</sub> utilization will not be effective as a tool to mitigate GHG emissions by itself—largely because the CO<sub>2</sub> demand induced by implementing these opportunities is projected to be only a small fraction of expected supply. However, when taken cumulatively, the sum of these options can provide a number of technological mechanisms to utilize CO<sub>2</sub> in a manner that has potential to provide economic benefits for fossil fuel-fired power plants or industrial processes.

CO<sub>2</sub> utilization through enhanced oil recovery (EOR) could also be pursued primarily as a means to help offset capture costs and thereby accelerate the implementation of geologic storage. While DOE supports this endeavor, the focus of research in this technology area is on CO<sub>2</sub> utilization approaches that offer benefits, such as:

- Improvement in energy efficiency (i.e., requires less power per unit of product than the conventional process).
- Replacement or reduction in petroleum feedstocks.

## Carbon Storage – Carbon Use and Reuse

- Low or no water requirements.
- Utilization and/or reduction of waste streams.
- Replacement of one or more toxic materials that require special handling to protect human health and the environment.

These additional attributes support DOE's mission to ensure the security of domestic energy resources, reduce the nation's dependency on foreign oil, and to protect human health and the environment. DOE will continue to build a portfolio of projects to develop a host of technologies that, in aggregate, will assist in achieving program goals. Key technology research within the Carbon Use and Reuse Technology Area includes:

- Polycarbonate Plastics
- Mineralization/Cements
- Chemicals