



## Mechanical/Environmental Sustainability Project

### Greenhouse Gas Emissions

#### Mission Statement

The goal is to quantify the amount of CO<sub>2</sub> that is currently being emitted from natural gas refineries and to investigate if the CO<sub>2</sub> emissions are being captured. Also to investigate the potential to utilize and store these emissions.

#### Synopsis

There is a notion that Natural gas is a cleaner, more environmentally friendly energy source than oil and coal. While it does burn cleaner than its counterparts, the majority of the contaminants (primarily carbon dioxide, hydrogen disulphide and mercury) are extracted and expelled during the refinement process. This results in lower local pollution at the combustion site, at the expense of heavy pollution at the refining, or "Sweetening" plant. EPA data shows that overall carbon emissions from natural gas are on par with the other major fuel sources.

EPA regulations mandate that the companies capture these emissions in a manner that "reflect the best current technologies and processes." One method is to utilize the carbon dioxide in a process known as enhanced oil recovery. The CO<sub>2</sub> is gathered through a process known as "post-refinement carbon capture" with chemical solvents that have a high affinity for bonding with carbon, usually an amine. The CO<sub>2</sub> gas is then injected into a depleted oil field, which increases the volume, and lowers the viscosity and surface tension of the remaining oil. This slurry is pumped to the surface and the oil is refined for consumer use, while the CO<sub>2</sub> is re-injected into the oil field.



Daniel Drzal  
Stacey Dufrane

Housatonic CC  
University of Hartford