Objective
The objective of this IPRO was to research and compile information on potential future CO₂ environmental regulations, current CO₂ mitigation technology, and CO₂ sequestration techniques.

Key Tasks
• Research CO₂ mitigation technology for PC and IGCC power plants
• Learn about the current and future regulations and sequestration options
• Perform a technological and economic comparison of these mitigation strategies.

Obstacles
• Large amount of information on CO₂ mitigation available
• Team members had various amounts of background knowledge on the subject.

Results
• Research on various methods of CO₂ mitigation, including different vendors and technologies
• Techno-economic comparison of these methods
• Information located on regulations and sequestration options

Next Steps
Next semester’s IPRO will use this information to design a power plant that includes CO₂ mitigation technology.

Since 1910, the Earth’s temperature has been rising at a considerable rate. According to the World Meteorological Organization, the Earth’s maximum temperature was attained in the 90’s. This increase is believed to come from carbon dioxide (CO₂) emissions.
Sequestration

- There are three main types of sequestration: terrestrial, geologic, and oceanic.
- Geologic sequestration – CO\textsubscript{2} is injected into saline aquifers and depleted oil and natural gas fields or used for Enhanced Oil Recovery.
- Terrestrial sequestration – Forests and other vegetation are used to absorb CO\textsubscript{2}.
- Oceanic – CO\textsubscript{2} is injected into the ocean floor or absorbed into the water.

Regulations

- Currently there are no federal regulations on CO\textsubscript{2} containment.
- California, New York, New Jersey, and Hawaii have made laws limiting emissions in future years.
- State laws often require a cut to 1990 levels by 2020.

Major Vendors

- **PC Plants**
  - Alstom
  - Fluor
  - MHI
  - Powerspan
- **IGCC Power Plants**
  - General Electric
  - Shell
  - Conoco/Phillips
  - MHI

Recommendations

- **PC - Fluor**
  - 90% CO\textsubscript{2} Capture
  - 27.2% Efficiency – Supercritical
  - $68/ton CO\textsubscript{2} avoided
  - Uses Mono Ethanol Amine solution
- **IGCC - General Electric**
  - 90% CO\textsubscript{2} Capture
  - 32.5% Efficiency
  - $39/ton CO\textsubscript{2} avoided
  - Uses Selexol