

Achieving Reductions in U.S. Greenhouse Gas Emissions



There Are 2 Methods to Capture or Reduce CO₂ Emissions from Coal Use

1. CO₂ Emissions Reductions:

- Can be achieved today by increasing the efficiency of a plant so less coal is used to produce the same amount of electrical output
- Higher Efficiency = Lower Emissions

2. CO₂ Emissions Capture and Storage:

- Can be achieved in the future by developing advanced coal systems with the equipment necessary to capture CO₂ before it is emitted from the plant

Reducing CO₂ Through Efficiency



Reducing CO₂ from Coal Use Through Efficiency

- Raising plant efficiency reduces the total amount of CO₂ (and other emissions) produced, thus reducing the amount of CO₂ that must be captured and stored.
- Some efficiency improvements are available commercially today, while others require continued research, development and demonstration (RD&D), for all technologies, including:
 - Ultra supercritical (USC-PC) pulverized coal and
 - Integrated gasification combined cycle (IGCC)

Opportunities for Reducing CO₂ from Existing Coal Plants

- Restore efficiency lost over time through wear and tear
- Improve efficiency beyond original design with technologies developed since the plant was built:
 - Steam turbine improvements
 - Combustion controls
- Improving the efficiency of an existing unit can result in CO₂ reductions up to 10% to 16%. An overall fleet improvement of 5% appears practical.

Opportunities for Reducing CO₂ from NEW (Future) Coal Plants

- Efficiency improvements can be achieved through more sophisticated power plant designs
 - Higher operating temperatures and pressures
 - Various measures to reduce waste heat
 - Less parasitic power consumption within power plant
 - More efficient turbines
- Higher efficiency is a lower cost approach than carbon capture and storage – a logical first step in reducing CO₂ emissions
- Today's best new units already have 18% lower CO₂ emissions than the average existing unit. New units in 2025 could be 30% below existing units