



Carbon Capture Project Fact Sheet

ALSTOM



EPRI | ELECTRIC POWER RESEARCH INSTITUTE

Commitment to Technology

The Pleasant Prairie Power Plant, located in the village of Pleasant Prairie in southeast Wisconsin, successfully hosted a demonstration project of new chilled ammonia technology that aims to achieve a highly efficient capture rate of carbon dioxide (CO₂) emissions from a coal-fueled generating facility.

Project Leaders

- Alstom Power, a leading global power equipment supplier, technology developer and operator
- We Energies, carbon capture project host
- Electric Power Research Institute (EPRI), led the industry research collaborative supporting the carbon capture project

Project Goals

- Demonstrate fully integrated CO₂ capture on the flue gas from a coal-fueled boiler
- Achieve high efficiency removal of CO₂
- Produce high purity CO₂
- Collect data and evaluate technology performance
- Investigate technology costs
- Advance carbon capture technology

Project Summary

Treating about one percent of the flue gas from one boiler unit, Alstom has operated the carbon capture pilot plant for over 7,000 hours. During this time, EPRI has conducted numerous field tests to independently evaluate the pilot plant performance.

What's Next?

- Validation-scale testing at American Electric Power's Mountaineer Plant
- 20 MW test, more than 11 times larger than the size of the Pleasant Prairie Power Plant test
- Demonstrate storage and capture

This technology has the potential to significantly reduce the cost of removing CO₂ from pulverized coal (PC) power plants and is targeted for commercial operation by 2015.

Project Results

- Had reliable pilot operation with 24-7 availability
- Achieved a greater than 90 percent CO₂ removal rate at design conditions
- Produced high purity CO₂ with low ammonia (less than 10 ppm) and water content (less than 2,500 ppm)
- Collected and analyzed empirical data on energy consumption – a key driver of cost; and the results validate the figures being used in commercial feasibility studies
- Proved that the chilled ammonia carbon capture system works successfully in the field on flue gas from an operating power plant

Carbon Capture Process: Three-steps

1. Flue gas cooling
2. CO₂ separation from flue gas
3. Solvent regeneration, producing concentrated CO₂ stream

After cooling and conditioning, the flue gas proceeds to the CO₂ absorber where CO₂ is absorbed through contact with an ammonium carbonate solution. The solution containing the absorbed CO₂ is pumped to a regeneration system. As this solution is heated under pressure, the absorption process is reversed and pure CO₂ is recovered. The solution without CO₂ is recycled back to the CO₂ absorber while the pure CO₂ from the regenerator is further compressed for eventual disposal underground.

