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# Integration of Wind Turbines and CO2 Capturing Filter

**Wind turbine–integrated CO2 filter converts captured emissions into calcium carbonate for concrete production.**

Researchers at Purdue University have developed a system to capture CO2 from the air and use it to make calcium carbonate for cement or other applications. Large-scale carbon capture technologies are needed to slow climate change and ocean acidification and prevent global warming above 2.0 degrees Celsius. The Purdue researchers' technology uses a wind turbine to capture CO2 and provide the energy to a liquid filter system that absorbs CO2 by injecting polluted air from point sources or other air with concentrated CO2 into a water-calcium hydroxide solution. The carbon dioxide reacts with the calcium hydroxide, forming calcium carbonate, which can be used for concrete production, among other applications. This technology could have a large impact on "closing the loop" in concrete production, which accounts for 8% of global CO2 emissions. The researchers have also proposed installing the filtration component of the system in the exhaust of vehicles, which will capture concentrated CO2 streams.

**Technology Validation:** In a simulation, the energy transmission of the wind turbine was 78% efficient. The production of the prototype of liquid filter assembled with wind turbine system is ongoing.

**Advantages**:

- Reduces atmospheric CO2 concentration

- Traps other pollutants like NOx

- Slows climate change and ocean acidification

- Allows reuse of wastewater with high pH from different industries, including the corn processing industry

- Reduces demand for wastewater treatment

**Applications**:

**Technology ID**

2022-VELA-69834

**Category**

GreenTech/Carbon Management
GreenTech/Water & Resource Management
Energy & Power Systems/Power Generation

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**View online**

- $CO_2$ removal from the atmosphere

- Concrete production with reduced abiotic depletion

- $CO_2$ removal from transport exhausts and from industries' point of $CO_2$ emissions

Related Publications:
https://engineering.purdue.edu/ME/News/2024/reducing-greenhouse-gases-at-the-source-by-capturing-co2-in-a-liquid-filter

**TRL:** 2

**Intellectual Property:**

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**Keywords:** Calcium carbonate production, Calcium hydroxide, Corn process wastewater recycling, Direct Air $CO_2$ Capture, Green Technology, Hydraulic wind turbine