

Bernoulli: method and apparatus for smart CO2 capture and urban electricity generation.

AI-controlled bladeless device captures CO₂ while generating urban rooftop electricity.

Researchers at Purdue University designed a device that captures CO₂ and generates electricity. The device is a bladeless turbine with CO₂ capture capabilities that uses artificial intelligence to improve its performance based on the current environmental conditions. The researchers envision the Bernoulli device being placed on building rooftops in urban environments to generate renewable energy and improve air quality. This application stems from the fact that buildings naturally facilitate wind acceleration as it flows over their edge and surfaces. Additionally, placing the devices on top of urban buildings allows them to be directly in areas with high CO₂ concentration from urban activities like driving and industrial processes. A key feature of the device is its AI driven control system that can predict wind patterns and CO₂ concentrations to maximize power generation and carbon capture efficiency. This is an invention that combines sustainable energy production with active air pollution mitigation that is suitable for urban deployment.

Advantages:

- Dual Functionality
- Urban Friendly
- Scalable
- Bladeless
- Low-energy intensive device

Applications:

- Clean Energy Production

Technology ID

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Category

GreenTech/Carbon Management
Semiconductors/Devices &
Components
Energy & Power Systems/Power
Generation

Further information

Parag Vasekar

psvasekar@prf.org

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-Air Quality Data Collection

-CO2 capture/reduction

-Green Buildings

TRL: 2

Intellectual Property:

Provisional-Patent, 2024-07-12, United States

Utility Patent, 2025-07-01, United States

Keywords: carbon capture, Civil Engineering, Clean Power, Green Technology, Mechanical Engineering, Rooftop Renewable, Smart Energy, Sustainable Buildings, Urban Air Purification, Urban Energy