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A Combined Water and CO₂ Direct Air Capture System

CRADA 521

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Bernard P. McGrail

IWWC, LLC

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Abstract

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Pate McGrail

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Pacific Northwest National Laboratory
Richland, Washington 99354

Abstract

The primary objective of this project is to demonstrate the outstanding technical and economic performance of a transformational Hybrid DAC (HDAC) technology that simultaneously captures CO₂ and water from the air. Air is passed over a CO₂ selective sorbent to remove $\geq 85\%$ of the CO₂ from the air stream. The atmospheric water extraction (AWE) section of the unit utilizes a novel isothermal pressure swing regeneration cycle with desiccant beds thermally coupled by heat pipes that provide a passive heat transfer mechanism to “cancel” the heat of water vapor adsorption. By proving system performance through this demonstration project, our initial technoeconomic analysis (TEA) will be validated, showing that HDAC technology: 1) is deployable in many more locations with limited water resources, 2) improves the financial returns, and 3) reduces risks from volatility in the price of CO₂.

Pacific Northwest National Laboratory

902 Battelle Boulevard
P.O. Box 999
Richland, WA 99354
1-888-375-PNNL (7665)

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