Heirloom

Challenges of scaling Direct Air Capture to 1b tons

Shashank Samala

What drives us

Co-inventors

Invented by the world's leading experts in direct air capture and carbon mineralization

Dr. Jennifer Wilcox

On leave as Principal Deputy Assistant Secretary for Fossil Energy at DOE, Presidential Distinguished Professor of Chemical Engineering and Energy Policy at UPenn

Dr. Peter Kelemen

Arthur D. Storke Memorial Professor at University of Columbia, known for published research on CO2 capture and storage via in situ mineral carbonation, and engineered geological capture and storage of CO2

Dr. Phil Renforth

Associate Professor. School of Engineering & Physical Sciences, Institute of Mechanical, Process & Energy Engineering, Heriot-Watt University

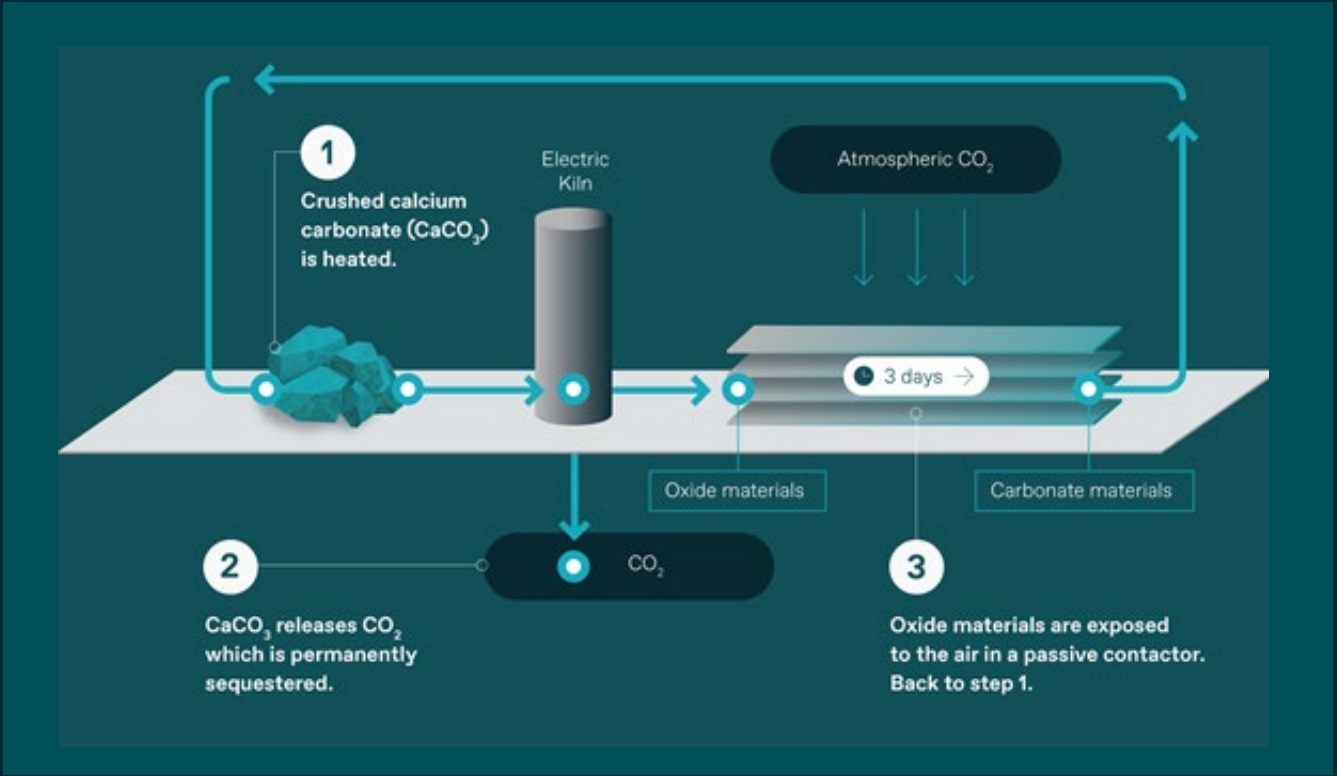
Dr. Noah McQueen

Contributor to 10 publications related to carbon removal, PhD at Clean Energy Conversions lab under Jennifer Wilcox at UPenn

Dr. Greg Dipple

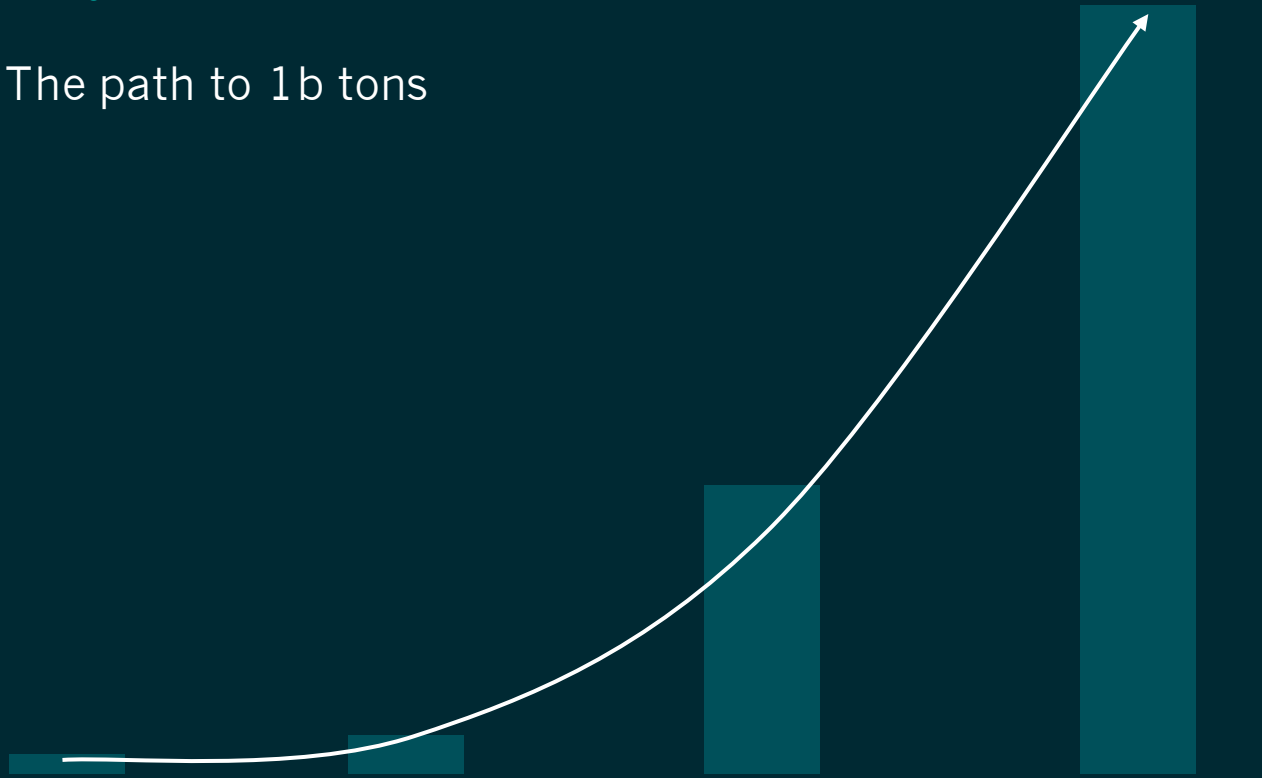
Professor, Geology in Earth, Ocean, and Atmospheric Sciences, UBC

Heirloom's process



Scaling

The path to 1b tons



Challenges and risks to capturing 1b tons

Heirloom

Scaling manufacturing

Ecosystem

Renewable power

Geological storage

CO_2 transport

Permitting

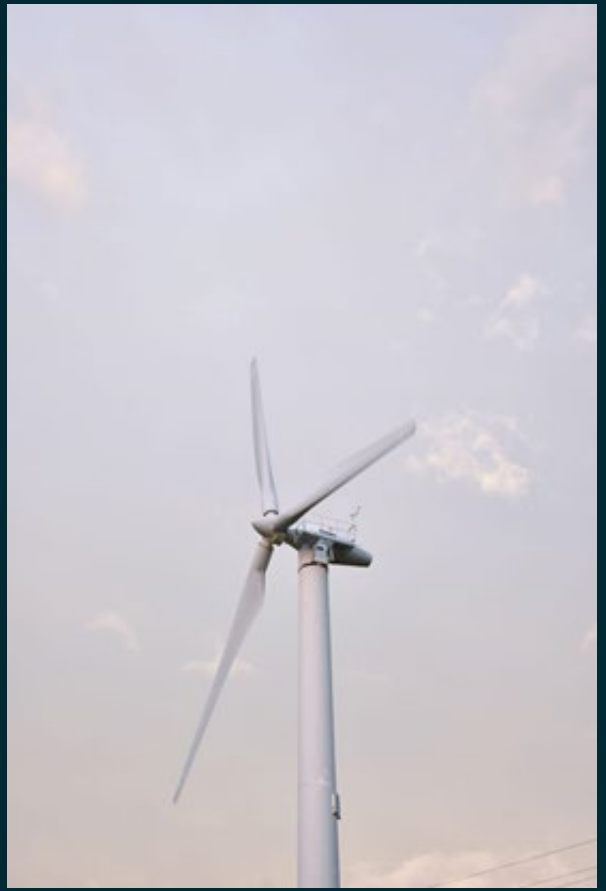
Community acceptance

Challenges and risks to capturing 1b tons

Renewable energy

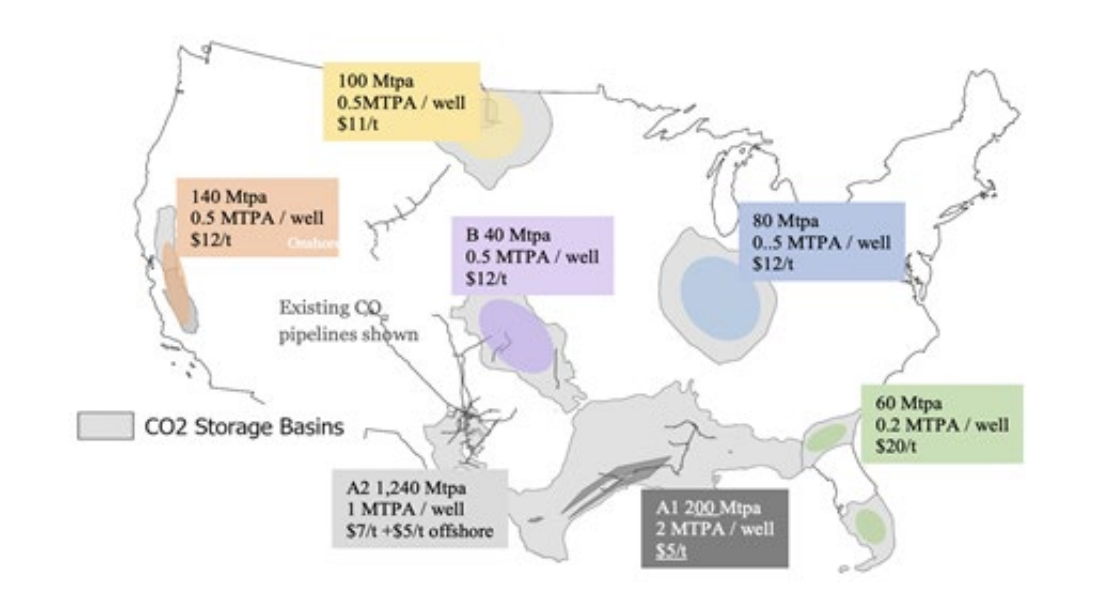
We need a lot of net-new renewables energy to power DAC. This needs to:

- Be truly additional
- Account for embodied emissions



Challenges and risks to capturing 1b tons

Geological storage and CO_2 transportation infrastructure



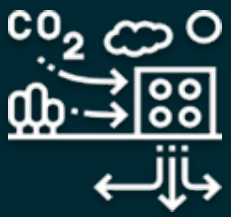
Geological CO_2 sequestration sinks with practicable storage capacity and full - life unit costs for storage
Source: Princeton's Net - Zero America study Annex I: CO2 Transport and Storage Infrastructure transition analysis, 2021

Challenges and risks to capturing 1b tons

Permitting

Class VI wells

EPA's
Class VI well permit



DAC facility

NEPA
review

Renewable power

NEPA
+ Federal + State
environmental review

= Permitting timeline for DAC is very uncertain

Challenges and risks to capturing 1b tons

Permitting reform

Class VI well permitting

EPA to have a specific time limit to assess State's primacy application over Class VI well

DAC facility permitting

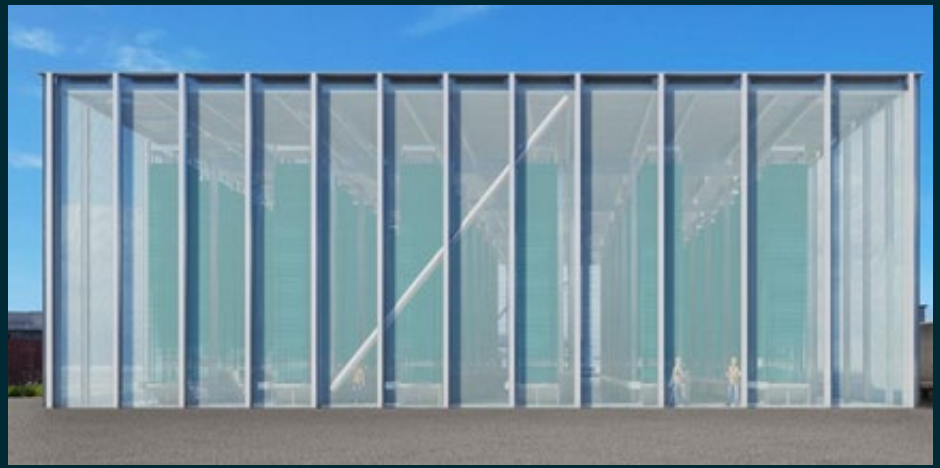
- President to designate projects of strategic national importance to prioritize permitting for those projects
- Maximum timelines for permitting reviews: 2 years for NEPA reviews for major projects and 1 year for lower-impact projects
- Ensure the DAC projects and associated infrastructure are eligible for the FAST 41 program

Challenges and risks to capturing 1b tons

Community Support

We need to educate the public on :

- The role CDR plays in the climate crisis
  - It's not a silver bullet
  - It's not a moral hazard
- What is DAC?
  - It's not CCS
  - It's not "cleaning the air" in an area



Render of Heirloom's first 1000t/y facility

Questions? Get in touch

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