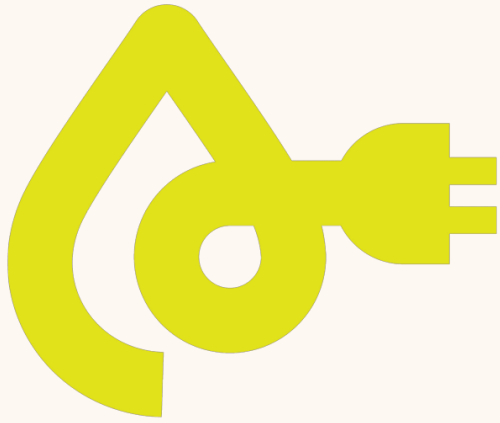




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Could AI Turn to Rocket Science for Power?

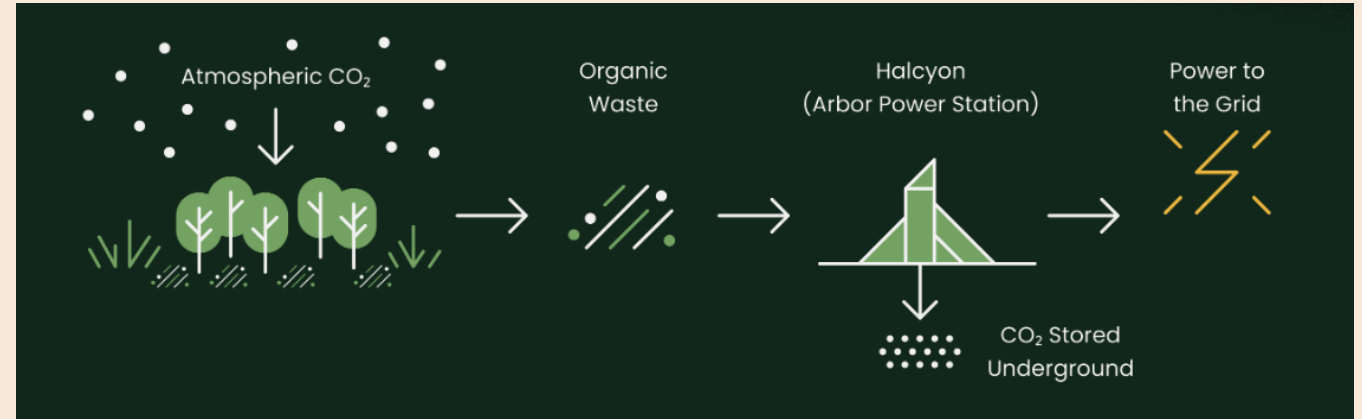


... one former SpaceX employee thinks so.



Two former SpaceX employees formed Arbor Energy to apply rocket science to an old idea: bioenergy with carbon capture and storage also known as BECCS.

A “vegetarian rocket engine”



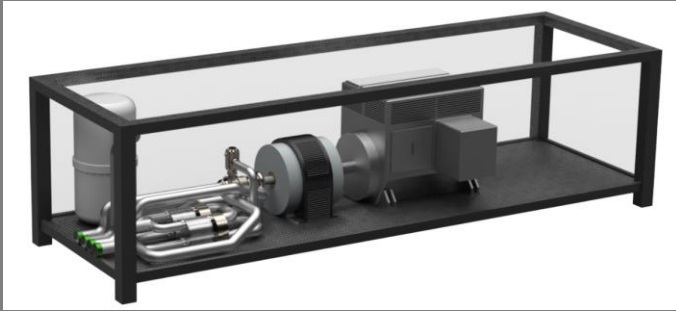
The Theory:

- Apply principals employed at SpaceX to develop rocket propulsion including reactor design, combustion devices, and turbo machinery.
- Combine that with advances in 3D printer and computer modeling.
- Replace rocket fuel with biomass.

The Desired Result:

- A streamlined and cost-effective BECCS plant that enables both carbon sequestration and power production.

Big tech looking for power solutions



The Arbor Power Station



1. **Arbor's technology leverages pure oxygen to burn biomass.**
2. **It plans to source the biomass from forestry waste - mostly from thinning operations.**
3. **The exhaust produced consists of CO₂ and water.**
4. **The water condenses as the exhaust cools and is removed, leaving pure CO₂.**
5. **The CO₂ is injected deep underground where it's permanently stored.**

- Last month Arbor entered into a deal with Microsoft to deliver 25,000 tons of permanent carbon dioxide removal starting in 2027.
- The project will also generate 5 megawatts of clean power annually. That isn't much, but it's sufficient to prove the concept.
- Doing both is critical to make the approach economical as the carbon capture helps pay to produce the power and visa versa.
- The Department of Energy has also selected Arbor as one of 11 projects to receive a combined total of \$58.5 million to develop a domestic carbon removal industry.



Quicker to deploy than nuclear



- Arbor's target price for the carbon capture is in the range of \$50 to \$100 per ton.
 - That compares to more than \$600 for Direct Air Capture (DAC).
 - Others approaches like advanced rock weathering is much less expensive, but at around \$300, is still far more than what Arbor hopes to achieve.
- If the strategy works, it could be an option to power data centers.
 - Instead of turning to nuclear, Arbor hopes it can offer a behind-the-meter solution that bypasses the grid interconnection logjam and offers a quicker solution to the 24/7 clean power needs of data centers.

There's just one problem with the approach.

See Next Slide

By 2030, the company plans to complete its first at-scale plant. The plant will generate 100 MW of electricity while simultaneously removing almost 2 megatons of CO2 annually.



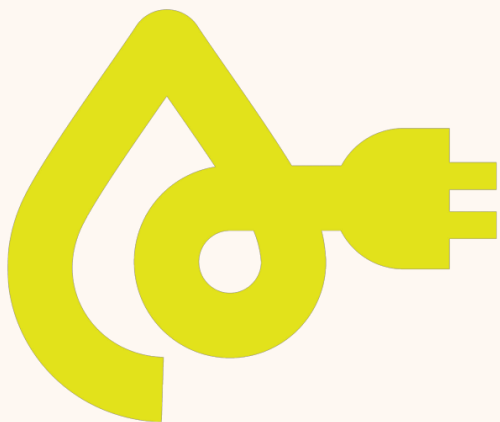
I'm an advocate for carbon capture and sequestration technologies, but in this case, it may be a "fly in the ointment" in Arbor's approach.

In a sense, by relying on the revenues from the carbon credits, it "double dips."

Clean or cleansed?



- Unlike nuclear, solar, or wind, Arbor's approach generates "dirty" energy.
- The "dirt" (CO₂) never enters the atmosphere because the integrated carbon capture "scrubs" it clean.
- The captured carbon is monetized via carbon credits which will allow companies like Microsoft to offset its carbon footprint.
- The question is whether those carbon credits constitute a legitimate offset?
- The answer depends on how much carbon would be emitted by the biomass if it were not used as fuel. In this case forestry thinning which may have a negative carbon footprint, but not necessary so.



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Unbiased and Unfiltered

- An honest assessment of the climate change effort.
- I cover what's working – but more important - the issues/roadblocks that the industry would prefer to ignore.
- A must-read for anyone with a desire to understand what's really going on with renewable energy and climate change.



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