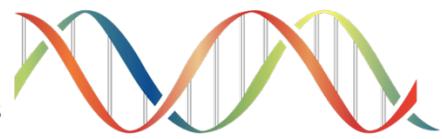




Community BioRefineries
The Epitome of American Innovation



By Scott Hewitt CEO and Vincent R. James Ph.D. CTO
Community BioRefineries,

Community BioRefineries as an *Electrical Power Hub* Can a Single Biorefinery Fuel AI's Data Boom?

By Vincent R. James, Ph.D. | April 4, 2025

Fuel Cells: The Hypercar* of Clean Power

Picture this: today's power grid is a wheezing steam locomotive—coughing smoke, rattling along, barely keeping up. Fuel cells? They're the electric hypercar* - silent, swift, and screaming into the future. These chemical geniuses ditch the dirty stacks, turning fuels like hydrogen or alcohols into power with oxygen, without the nasty emissions. The result? Electricity, water, and a whisper of waste. This isn't just clean—it's a lifeline for a planet on the brink.

(* A "hypercar" is a high performance, concept super car.)

The Fab Five: Fuels That Fight Back

The Community BioRefinery (CBR) unleashes five of its naturally acquired fuels, each locked to an amazing fuel cell:

- **Bio-butanol:** 36 MJ/kg of raw power. Runs **Direct Alcohol Fuel Cells (DAFCs)**—pipeline-ready and relentless.
- **Bio-Acetone:** Unique in its own right. Ignites **modified DAFCs** or hybrid setups.
- **Ethanol:** 26.8 MJ/kg of steady power. Fuels **ethanol-specific DAFCs**.
- **Hydrogen:** The clean king. Powers **Proton Exchange Membrane Fuel Cells (PEMFCs)** (~60% efficiency) and **Solid Oxide Fuel Cells (SOFCs)** - zero-emission royalty. CBR's hydrogen is from fermentation, not a petro-coproduct.
- **Lignin:** Plant-based "trash" turned treasure. Feeds **SOFCs** via syngas or direct burn, sealing the carbon circle.

This hybrid squad—DAFCs, PEMFCs, SOFCs—is a green revolution in waiting.

How is this possible?

CBR process creates multiple sources of direct and indirect electricity generation sources from its bioreactors:

1. Alcohols

- **Bio-butanol:** 60% of fermented sugars;
- **Bio-acetone:** 30% of fermented sugars
- **Ethanol:** 10% of fermented sugars

EXAMPLE: 1 million gallons nominal output creates 600K/300K/100K gallons, respectively.

Each alcohol can efficiently fuel electrical fuel cells.

2. Lignin: Recovered from all plant sources processed by the CBR.

Will enable fuel cell operation; however, its burning will create a trace carbon element not created via alcohol sources – but it is an available source.

3. Hydrogen: Principal 'waste' element created by CBR's bioreactors.

Perfect for fuel cell combustion/totally clean. Power generated from this source will be partially utilized to support 100% of CBR facility operations; all excess available to direct elsewhere.

Fuel Cells 101: A Crash Course

- **DAFCs:** Perfect for alcohols like Bio-Butanol, Bio-Acetone, Ethanol. Low-emission powerhouses for liquid fuels.
- **PEMFCs:** Hydrogen's fast lane—clean, quick, and efficient.

- **SOFCs:** Heavy-duty champs for Hydrogen and Lignin—built for the long haul.

One CBR, one multi-fuel beast.

Old Power's Dying Gasp

The grid's a fossil-fueled zombie: 43% natural gas, 16% coal, 18% nuclear. It's centralized, choking, and crumbling under AI's weight. Fuel cells? They're the decentralized defibrillator—no smog, no meltdowns, just pure, modular juice. Wind and Solar? Insufficient output without massive proliferation; not consistently reliable.

CBR: From Waste to Watts

One CBR devours local plant waste - corn husks and stalks (“stover”), hemp bits, rice and cotton stalks, sweet cane sorghum, etc. - and creates (for each million gallons fermented):

- 600K gallons of Bio-Butanol
- 300K gallons of Bio-Acetone
- 100K gallons of Ethanol
- *Plus:* Hydrogen and Lignin

That powers a hybrid power cell bank delivering:

- **1.92 MW** of net kick
- **16,819 MWh** per year

Enough to electrify 1,900 homes or 1–2 small AI data hubs. No grid? No problem - CBR's a lone wolf with teeth.

AI's Lifeline: Small Hubs

A one MW AI hub—hospitals, smart farms, cities - uses 8,760 MWh/year. One CBR:

- Fuels one fully, a second at 92%
- Runs ~3,200 NVIDIA A100 GPUs (with cooling)

It's edge computing's green guardian—local, fierce, unstoppable.

Bigger Beasts: Backup Mode

- **10 MW:** 87,600 MWh/year → One CBR = 19%
- **100 MW Hyper-scaler:** 876,000 MWh/year → One CBR = 1.9%
- **1,000 MW Mega-Hub:** 8.76M MWh/year → One CBR = 0.19%

Not the whole feast, but a vital bite.

From One to Many: The AI Power Play

One CBR lights up 1–2 small AI hubs—like a single torch in a blackout. But AI's hunger is a wildfire, and here's what it takes to tame it:

- **\$100M = 1 CBR**
 - 1.92 MW, 16,819 MWh/year
 - Powers:
 - **1–2 Small Hubs (1 MW each):** One CBR keeps a rural hospital and a smart farm alive—two lifelines from one root.
 - **19% of a 10 MW Center:** A 10 MW hub needs 87,600 MWh/year. One CBR's a spark; 5–6 CBRs (\$500M–\$600M) build a bonfire to run it flat-out—think a small city's AI brain fully lit.
 - **1.9% of a 100 MW Hyper-scaler:** At 876,000 MWh/year, one CBR's a flicker. Want the full blaze? 52 CBRs (\$5.2B) turn a hyper-scaler into a green titan—imagine a forest of biorefineries powering a tech empire.
 - **0.19% of a 1,000 MW Mega-Hub:** 8.76M MWh/year is a ravenous beast. One CBR's a crumb; 520 CBRs (\$52B) forge a clean-energy colossus—enough to fuel a futuristic metropolis.

This isn't a grid takeover—it's a rebellion for the fringes.

AI's Energy Doomsday Clock

In total, Data Centers gorged on 170,000 GWh in 2023. By 2028, they'll devour 470,000 GWh. One GPT-3 run consumes 1,287 MWh—scale that up, and the grid's a corpse. CBRs strike back with:

- Waste-fueled renewables
- Fuel cell focused ability
- Low-CO2 environment

Beyond Power: A Revolution

CBRs aren't just watts—they're warriors. AI gets clean juice. Farmers turn waste into dollars. Modular tech kicks centralized greed in the teeth. Big Tech eyes nuclear; CBRs plant seeds for a better now.

Rise Up: Build the Future

One CBR powers 1–2 AI hubs. \$100M ignites it. You—yes, YOU—can make it happen. Got a region, a startup, a vision? Hit me up. *Let's bury dirty power and fuel AI with guts, not guilt.*

Because AI's boom can't torch the Earth. Not on our watch.

A Paradigm Shift for Community BioRefineries

Here's how the CBR will make it happen:

While focus of CBR's alcohols output has historically been on its bio-butanol production capability, with its main consumer will eventually be the oil industry. To be of meaningful value to Oil, volumes of butanol must be such that it can, at least on a regional basis, be of a scale that can support replacement of ethanol blended and sold in that region. This scale of butanol production will require multiple CBR facilities dedicating their butanol production to this single requirement; this will not be possible for many years after full commercialization. Refocusing/reprioritizing bio-butanol applications in the interim is the best solution.

Why make the shift?

CBR business model is difficult for many to internalize and/or fully appreciate as it is dynamic and multi-faceted. Refocus of emphasis potentially beneficial in given economic and political environment. Accredited investors too often focus on one aspect of CBR capabilities, robbing them of the broader vision of CBR's full potential from a financial perspective.

With the creation and proliferation of Artificial Intelligence (AI), a significant requirement has developed for sources of electricity to be able to reliably power AI centers set to be built throughout the US. Current focus to power AI centers is to use small "mini" nuclear power plants (by rich folks, others), which may be suitable for the largest Data Centers but overkill for the medium and smaller Centers. The location flexibility of the CBR, along with the significant level of electricity it can produce, make it an ideal solution for near term requirements.

What about the other CBR products and capabilities?

All other manufacturing capabilities of the CBR will continue uninterrupted.

For more in-depth information please see our website. [Community BioRefineries](#)