

## RECLAIMING ENERGY

Net Carbon Neutral, environmentally superior reforming of organic residuals into renewable natural gas (RNG), renewable hydrogen (RH<sub>2</sub>), Organic Fertilizer, Clean Water & Biogenic Carbon Dioxide & other alternative energies

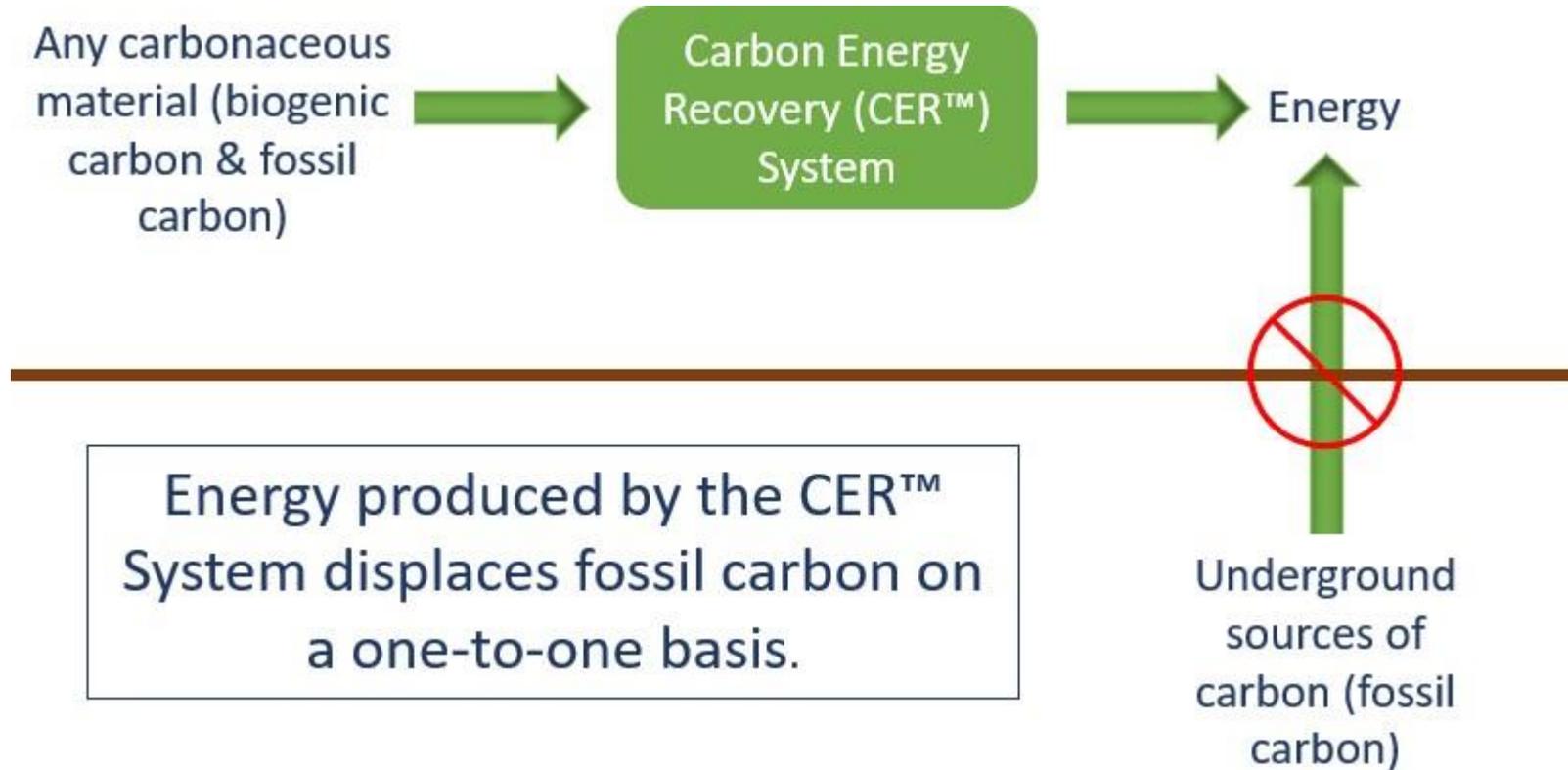


*The Solution is Clear. The Future is Clean.*

CONFIDENTIAL OVERVIEW

**BRADAM CER™ System Overview**  
**May 2023**

# Mitigating Carbon Emissions (Keeping Fossil Carbon in the Ground)



The BRADAM CER™ system plays a critical role in keeping geologic sources of carbon (fossil carbon) underground and helping restore the balance of the Earth's natural carbon cycle.

The combustion of fossil fuels transfers underground geologic carbon into the atmosphere. This added carbon results in an imbalance in the natural carbon cycle which in turn destabilizes the climate.

# BRADAM CER™ - Carbon Energy Recovery Process

- **An Innovative Proven Solution to divert Post Consumer Residuals from residential, industrial/commercial, agricultural, wastewater treatment and biomass sources, away from traditional landfills or incineration and reclaim the energy stored in these resources and contribute to the future circular economy**
  - **Global Patents and Trade Secrets**
- **Highly Efficient, Environmentally & Economically Superior process**
  - Converts organic residuals into highly valuable Renewable Natural Gas (RNG) or Renewable Hydrogen (RH<sup>2</sup>)
  - On average, 1 metric tonne of carbonaceous material yields approximately  $\geq 12$  GJ of RNG or 121- 176 kg of H<sup>2</sup>
- **Investment Grade Projects ideal for 3P or Private structures**
  - Projects are supported by 20 year Off-take Agreements with petroleum & natural gas companies
  - Quality & Quantity of Energy Output insured by a world class insurance provider
- **System destroys PFAS (Forever Chemicals), and other persistent organics, hormones, antibiotics and pathogens (viruses and bacteria) commonly found in food, sewage, digestate residuals & MSW**

# Environmental Advantages of The BRADAM CER™ System



## NO Incineration

Resulting in a high-quality energy recovery and output.



## NO Toxic Air Emissions

Closed Loop System.



## NO Odors

A closed loop process combined with a negative pressure facility and odor suppression system eliminates odors from emitting from the building.



## NO Material to Landfill

Processes 100% of the feedstock into energy or useable by-products (water, aggregate & fertilizer).



## NO Grid Connection

The BRADAM CER™ System can run on its own energy – 100% off grid – if necessary.



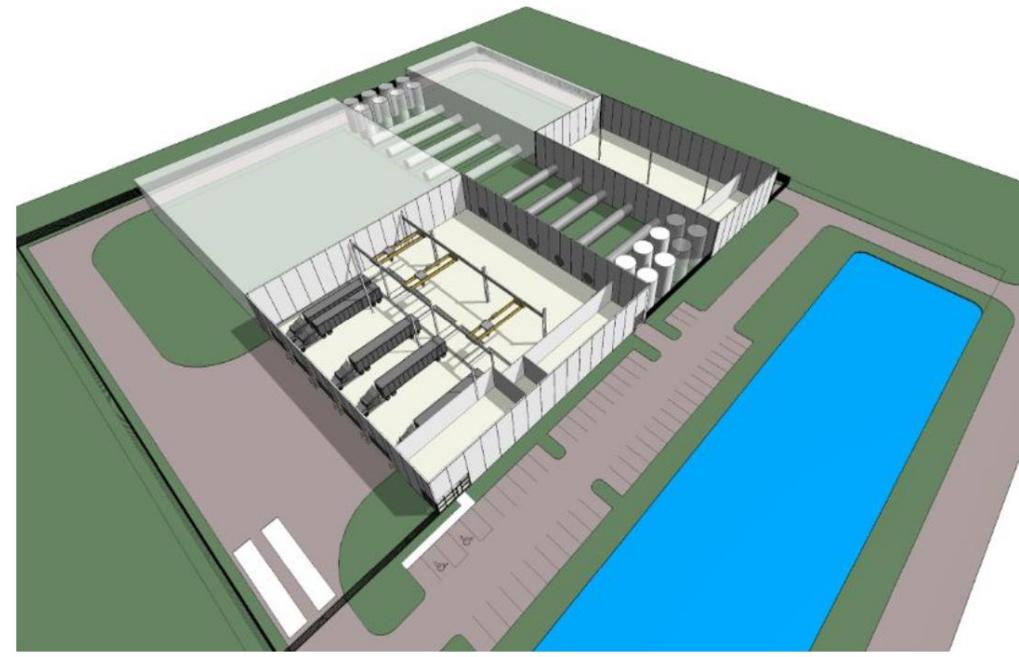
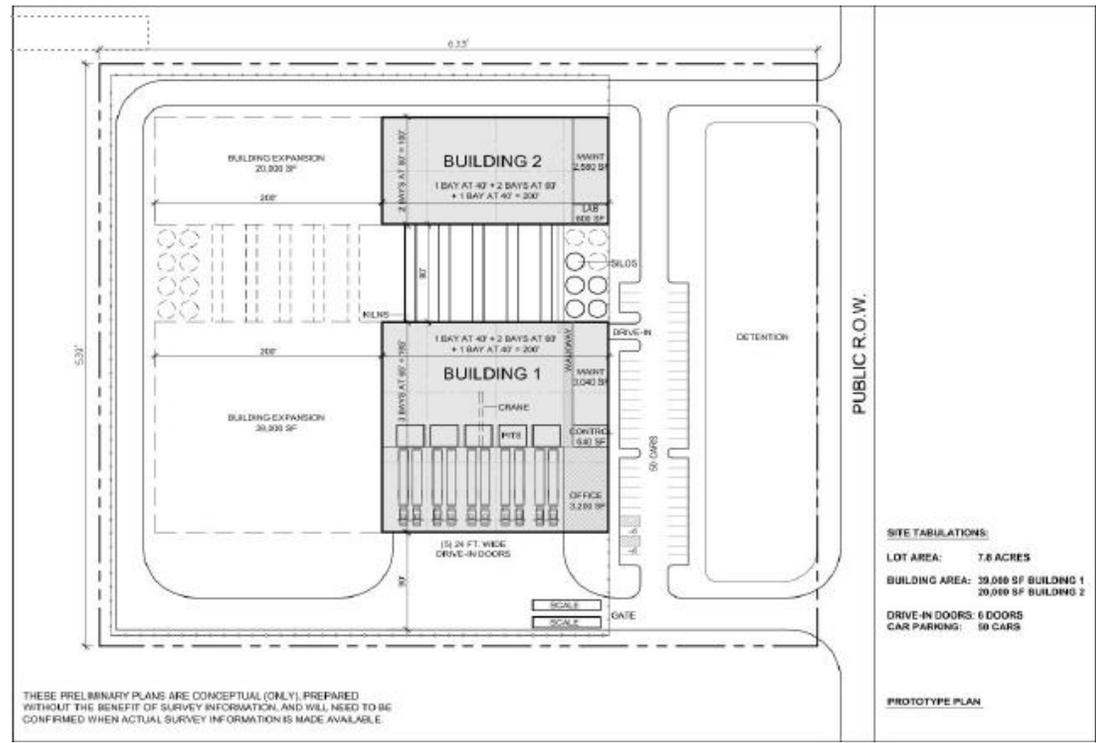
## NO Chemicals of Concern

Destroys PFAS, other toxins, pathogens and invasive insects.

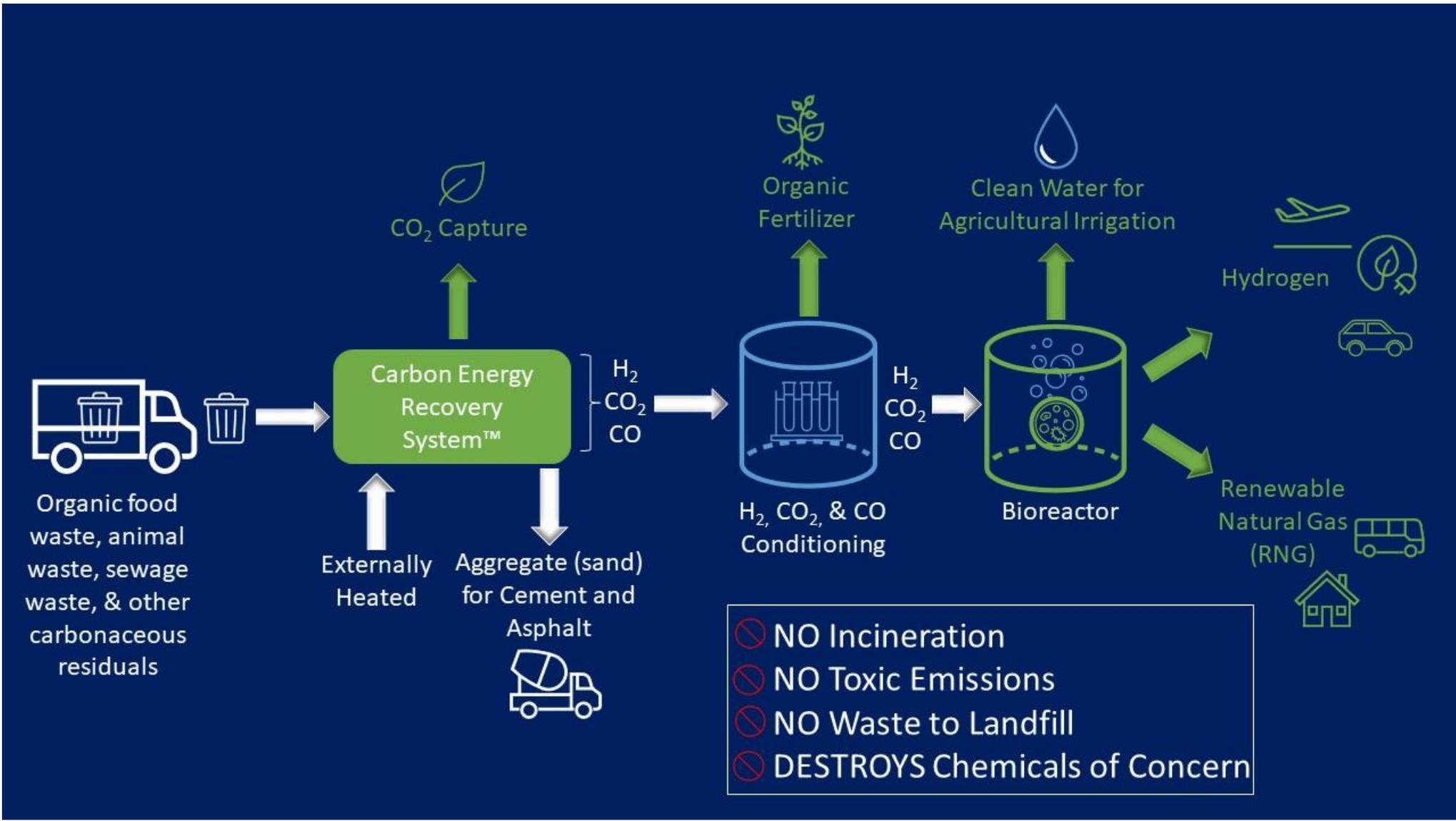
# BRADAM CER™ Facility – Artist Rendering



# BRADAM CER™ Facility – Artist Renderings



# BRADAM Carbon Energy Recovery (CER™) System



# Flexible Feedstock Options

## Converts any Carbonaceous Material into Useable Energy

- Singular or Mixed Streams

### ✓ Organic (Biogenic) Feedstock

- Food Residuals
- Spent Brewer's Grains (Ethanol Production, Breweries)
- Sewage Sludge – Primary or Secondary (Wastewater Treatment Plants)
- Animal Manure (Hog, Cattle, Chicken)
- Wood Biomass, Railway Ties, Bagasse, Sustainably Managed Residuals
- All Organic Residuals in Mixed Streams or Separate

### ✓ Non-organic Carbonaceous (Fossil Carbon) Feedstock

- Commercial, Industrial & MSW, including Non-Recyclable Plastics and Post Consumer Residuals, Coal Tailings, Bitumen, oil tailings

# Natural Gas, Electricity & Hydrogen by Feedstock

## 1 Bradam CER™ Process Line

Feedstock	Annual Tonnes Required	Natural Gas Production	Turbines – Electrical Generation
		GJ / Yr	Gross MW / Hr @ 14% De-rate from ISO*
MSW	97,500	1,750,000	24.50
Food	227,750	1,800,000	25.20
Wood	124,000	1,258,000	17.61

## 1 Bradam CER™ Process Line

Feedstock	Annual Tonnes Required	Hydrogen Production	Turbines – Electrical Generation
		kg / Yr	Gross MW / Hr @ 14% De-rate from ISO*
MSW	97,500	16,074,240	26.29
Food	227,750	16,388,736	26.80
Wood	124,000	11,374,000	18.60
Coal	361,398	63,306,960	103.52

\*Baker Hughes Nova 16 de-rated 14% for elevation or humidity = 13.8 MW per unit Simple Cycle + 30% in Combined Cycle = 17.9 MW / unit

# BRADAM CER™ Emissions Results from the Combustion of Syngas

GLOBAL STANDARDS FOR AIR EMISSIONS				
Parameter (Units)	EU Guideline	California Guideline	Ontario A-7 Limits	BRADAM A-7 Test
particulate matter (mg/Nm <sup>3</sup> )	9	16	14	0.34
cadmium (Cd) µg/Nm <sup>3</sup>	46	10	7	0.04
lead (Pb) µg/Nm <sup>3</sup>	n/a	140	60	0.63
mercury (Hg) µg/Nm <sup>3</sup>	46	60	20	0.14
dioxins & furans (2,3,7,8 TCDD eq.) µg/Nm <sup>3</sup>	0.092	9	0.08	0.002 (dl)
hydrochloric acid (HCl) mg/Nm <sup>3</sup>	9	27	27	0.59
sulphur dioxide (SO <sub>2</sub> ) mg/Nm <sup>3</sup>	46	56	56	8
nitrogen oxides (NO <sub>x</sub> ) mg/Nm <sup>3</sup>	183	202	198	40
organic matter mg/Nm <sup>3</sup>	9	n/a	56	1.214
carbon monoxide (CO) mg/Nm <sup>3</sup>	n/a	n/a	40	2.5

Emissions Test Performed by:



# Location Selection Criteria and On-Going Operations

## Ideal location

- **Logistically located close to feedstock (50 miles)**
  - Feedstock availability is key to the success of the project
- **Access to energy distribution infrastructure**
  - RNG/SNG can be exported to end user via NG pipeline
  - Electricity via the power grid or micro grid behind the meter
  - Hydrogen via the natural gas pipeline to be reformed to H<sup>2</sup> at user destination or used to produce electricity on site
- **Requires approximately 20 acres for a single process line facility**
- **BRADAM will liaise with local academia to develop a curriculum that will enable training and certification of the facility employees**
  - Electricians, millwrights, engineers, management, general labor and facility operators
  - BRADAM will oversee, monitor, provide technical support during start-up, commissioning and throughout long-term operations



# BRADAM Energies Facility Statistics

## Facility Operations

- 24 hours per day, 365 days per year continuous operation
- Diverts biogenic & fossil fuel material from regional landfills
- Produces renewable natural gas, hydrogen or base load electricity

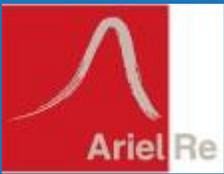
## Economic Impact

- Employs 100 full time employees, engineers, electricians etc.
- Creates 300+ indirect construction & fabrication jobs
- Contributes > \$40M annually into the local economy

## Environmental Impact

- Hydrogen ready – as energy transitions away from fossil fuels, renewable natural gas is currently the best economic off-take for the facility, a change to producing hydrogen is easily accomplished with the addition of some additional equipment
- Facility is Net Carbon Neutral, CO<sub>2</sub> is captured and used for carbon credit eligible products ( calcium carbonate, carbon black)
- All waste is converted to energy or useable by-products





# Facility Performance Insurance

## Coverage

### Start-Up Repair Cover:

- Policy Limit up to \$70 MM USD
- Coverage from Mechanical Completion thru Commissioning
- Designed to de-risk Project thus reducing EPC cost
- Estimated Premium \$5 MM USD

### Operational Cover:

- Policy Limit up to \$100 MM USD
- Coverage term 10 Years beginning at Commissioning
- Designed to de-risk the Project for investors and institutional funders thus reducing debt costs
- Estimated Premium \$4 MM USD

**Ariel Re – Lloyd's Syndicate 1910 (Ariel Re) of Lloyd's of London  
Rated A/A+/AA- (A.M. Best, S&P, Fitch)**

# BRADAM's Diverse Team

**Environmental Professionals, Engineers, Chemists and Entrepreneurs**

**Seasoned Executive Team with C-Suite Experience and 25 years + experience within their functional areas:**

- Waste to Energy
- Environmental Compliance
- Alternative Energy
- Facility Construction and Commissioning
- Supply Chain and Logistics



**Combined 12 Green Energy Projects – Pilot to Commercial Successfully Completed**

**To date BRADAM has been fully self funded**

# BRADAM's ESG Scorecard



## Environmental

Converting current residual material streams into energy and other useable commodities contributes to a circular economy and makes a positive contribution to the reduction of GHG emissions for BRADAM and its customers. BRADAM is the epitome of environmental responsibility.



## Social

BRADAM operates within the local, regional and federal labor laws and maintains the highest safety standards, working conditions, hiring practices, ongoing training and employee relations all of which are viewed as key to maintaining a stable and motivated workforce. BRADAM will be an active contributor to the communities where we work and operate.



## Governance

Although privately owned BRADAM maintains the highest standards in accounting practices. Annual third-party audits will be completed at the facility and corporate level. Audits will also be conducted at all locations including standard operating procedures, safety, environmental, maintenance and employee welfare.

# Contact Information:

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energies

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