Integrated Biogas Alliance

“Complete Organics Diversion to Biogas Solutions”
IBA Vision

Become a global market leader providing *totally integrated biogas solutions* for any organic waste stream

- De-risk projects for financing and implementation
- Optimize project design and minimize costs
- Decrease cycle time to revenue
- Improve operating performance and ROI
- Deploy world-class reference plants around the world
IBA Board & Members

**CHRIS** Maloney, Global Head, Organics Diversion | Zenviro Tech
**BRAD** Douville, President & CEO | Greenlane Renewables
**PIER** Paolo Cella, CEO | Entsorga
**THOMAS** Runde, CEO | Tietjen
**ENZO** Losito Bellavigna, CEO | AB Group (Partner)

IBA Partners

**TOM** Bachman, CEO | Symbiont
**JOHN** Haeckel, CEO | Clean Fuel Partners
**WILL** Charlton, CEO | Digester Doc
**JORDAN** Solomon, CEO | Ecostrat
**AMIR** Akbari, President & CEO | Anessa
**FILIPPO** Briani, CEO | Hydrotech
**PETER** Schumann | Schumann Tanks

* Chair
IBA Value Proposition

- Industry leading companies w/over 285 years of combined experience
- Proven technologies w/strong history of competing in global markets
- Fully integrated platform solution for any Ag or biowaste feedstock
- Operational offices on 4 continents in 46 locations
- Global supply chain to deploy anywhere in the world
- Key industry partnerships provide turnkey execution and financing
- Lowers risk for owner/investors and EPCs
- Single design and installation package
- Optimizes the economic, agronomic and environmental value of the organic waste
- Integrated performance guarantees
- Integrated service offering
Waste Feedstocks

- Processed Food Waste
- Dairy
- Municipal Solid Waste
- Swine
- Chicken Liter
- Green Waste
- Energy Crops
- Palm Oil Waste
- WWT Sludge
- Yellow Straw
Integrated Biogas Alliance

Turnkey Scope of Supply

- Project Development
- Capital Proforma
- Development Performance Guarantees
- Operations Training
- Budgetary Costing for Investors
- Engineering & Design
- Operations Training
- Commissioning
- Systems Integration
- Plant Operations
- Service
- Equipment Procurement & Logistics
- Plant Optimization Software
- Installation Supervision
- Start-up
- Spare Parts
- Project Development Capital
- 3D Plant Rendering
- Performance Guarantees
- Construction
- Proforma Development
- Feedstock BMP Testing
- Feedstock Sourcing & Risk Mgmt.
- Project Financing (Equity & Debt)
- 3D Plant Rendering
- Commissioning
- Systems Integration
- Plant Operations
- Service
- Equipment Procurement & Logistics
- Plant Optimization Software
- Installation Supervision
- Start-up
- Spare Parts
- Project Development Capital
- 3D Plant Rendering
- Performance Guarantees
- Construction
- Proforma Development
- Feedstock BMP Testing
- Feedstock Sourcing & Risk Mgmt.
- Project Financing (Equity & Debt)
Anaerobic Digestion (AD)

- Headquarters in Chicago, USA
- A global leader in AD technology and systems
- 100 installations around the world*
- 35+ years of experience
- Global execution capability
- Dry and wet AD systems
- Modular and scalable – up to 2000 m³
- Concrete and steel designs
- Operational office:
  - ✓ Chicago | Shanghai | Milan* | Mexico City
- Flagship project at CR&R facility in Perris California

zenvirotech.com
Biogas Upgrading & Conditioning

- Headquartered in Vancouver, Canada
- One of the world's leading biogas upgrading and conditioning companies
- 30+ years of experience
- 100+ installations in 18 countries
- Two of the largest biogas upgrading installations in the world (Germany and Canada)
- Only competitor to offer all 3 primary biogas upgrade technologies (Water-Wash, PSA & Membrane)
- World’s largest installation (Kuai/5,000 Nm3/hr.)
- Offices in key markets around the world

greenlanerenewables.com
Mechanical & Biological Treatment

- Headquartered in **Tortona, Italy**
- More than 80 plants built and in operation w/ total capacity of ~3 million tons
- Offtakes includes compost & refuse derived fuel
- Global Operations in:
  - Italy
  - UK
  - Greece
  - Croatia
  - Slovenia
  - Bulgaria
  - Kurdistan
  - Poland
  - Romania
  - Egypt
  - Morocco
  - India
  - Australia
- USA, Canada and China operations are managed through Chemtex International Ltd.
- Malaysia partnership with Bioessence Inc.
- Brazil operations through Versus Servicos Ltda

[entsorga.it]
Headquartered in Hemdingen, Germany
Grinding and separation experts for over 60 Years
Biowaste separation, AD-Feedstock Treatment
Applications include:
  Wood, Straw and Fiber Treatment | Alcohol + Ethanol | Bio Waste Treatment and Separation | Silage Disintegration | Compound Feed | Pet Food | Aqua Feed
2,100 grinding systems in operation worldwide
Turnkey process solution – or single machine
High quality, maximum availability and reliability
Global Partners in Europe, Turkey, Canada, South Korea, South and Latin America

Biomass Treatment

tietjen-original.com
Combined Heat & Power (CHP)

- Headquartered in **Orzinuovi (BS), Italy**
- 21 Markets w/ >1,300 plants deployed
- 1,700 MW installed
- Solution provider w/ single contact for customer - from design to service
- Ecomax: world class industrial CHP system
- Turnkey execution: plug & play installation significantly reducing costs and implementation risks
- One of the industries largest service networks specialized in gas engines: >300 field technicians
- High performance: average 98 % plant availability

gruppoab.com
Complete Design-Build Services

- Headquartered in Milwaukee, USA
- Organized for Design-Build with full in-house:
  - Engineering services - Professional Engineers spanning all disciplines
  - Cost Estimating and Procurement
  - Construction Management
  - Fabrication
  - Safety Coordination
- Experience in 49 states and 3 provinces
- 80+ Projects with over 35,000 scfm biogas upgraded
- Holistic and independent design approach
- Strong commitment to safety
Plant Operations & Maintenance

- Headquartered in Madison, USA
- Provide ownership support services for new and existing AD facilities
  - Preventive maintenance | purchasing/inventory management | safety | training | asset management
- Purchased, turned around and sold two facilities over past 4 years
- Currently manage 4 facilities for 3 owners:
  - 9 digesters
  - 3 of 4 run CHP, 1 converting to RNG
  - Operate separation at all
  - NCS system at one facility

cleanfuelpartners.com
Headquartered in Boise, Idaho

Only full-service R&D, lab testing, and consultation laboratory focused on AD in US

1,300+ BMPs performed on multiple feedstocks
- Highest production increase 5 to 50 MW (1000%)
- Average biomethane increases 30%-40%

20+ years experience: soil, water, and AD

Ability to R&D feedstock recipes to maximize ROI

Remote monitoring services to prevent crashes

Able to restore/accelerate methanogenic populations from failed or poorly performing systems

digesterdoc.com
Biomass Feedstock Supply & Supply Chain Risk Mitigation

- Headquartered in Toronto, Canada
- 20+ years experience
- 250+ feedstock studies completed for leading project developers, investors and governments
- >5 million tons of biomass supplied to customers
- Developers of US Standards for Biomass Supply Chain Risk [ecostrat.com/standards/] – to de-risk bio-project investment and facilitate project financing
- Leader of $50B Biomass Risk Ratings Committee composed of leading sector investors and lenders

ecostrat.com
- Headquartered in New Brunswick, Canada
- Servicing markets worldwide
- Assesses the financial feasibility of new biogas plants
- Feedstock optimization planning & modelling
- Integrated feedstock, anaerobic digestion, greenhouse gas emissions, and financial models
- Models the impact of changes to feedstock spanning several metrics
- Wet and dry digester simulations
- Sensitivity analysis on multiple variables simultaneously
- Powerful & immediate reporting

anessa.com
Advanced Water Treatment

- Headquartered in Padua, Italy
- Nearly 20 years of industry experience
- Numerous Fortune 500 customers around the world
- Over 200 installations world-wide
- Technology meets the most stringent environmental regulations
  - COD Reduction: 99.8%
  - TS Reduction: 99.55
  - TKN Reduction: 99.4%
- Broad service portfolio tailored to customer specific requirements

hydrotechengineering.com
Headquartered in Barleben, Germany
An industry leader for 21 years with a global footprint
Robust heavy duty tanks and roofs for heavy duty applications
Hundreds of anaerobic digesters installed worldwide
In-house trained assembly crews
2 branch offices (China – USA)
Up to 2,64M gallon per reactor
Diversity in materials/ accessories

Schumann-tanks.com