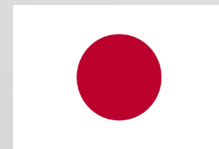




INTERNATIONAL BIOMASS  
TORREFACTION COUNCIL

A NETWORK OF  
BIOENERGY EUROPE

# IBTC reception



## 13th May TKP Garden City, Tokyo



## about us

The International Biomass Torrefaction Council (IBTC) is a Brussels based international platform founded in 2012, which brings together more than 20 companies from all over the world.

IBTC was founded by Bioenergy Europe (formerly AEBIOM) on the impulse of major torrefied biomass stakeholders who decided to join forces and create an international platform for companies with similar interests.



*“Many of the current barriers faced by the torrefaction industry cannot be solved at company level. Identifying common concerns and answering them collectively is the best way to bring torrefaction technologies to their full capacity worldwide.”*

Michael Wild  
IBTC President

# +20

members

- Producers
- Machinery Manufacturers
- Utilities
- Research Centers

# +5

Events organised every year

# 3

Continents represented

# +50%

of all torrefaction producers involved in IBTC

# 3

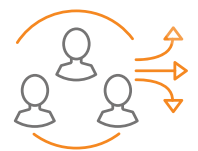
internal meetings every year

### our mission

- Promote the use of torrefied biomass by developing common position in non competitive matters;
- Take part in initiatives and projects dedicated to biomass torrefaction market development;
- Develop knowledge-sharing with members and assistance for new comers;
- Express the views of torrefaction industry towards key stakeholders, decision makers, financial facilitators and public opinion;

### our vision

- Torrefied biomass is one of the most advanced solid biofuel, with the potential to become a standardised commodity bringing alternative to fossils worldwide.
- IBTC has been establish to promote the use of torrefied biomass as an energy carrier and to assist the development of the torrefaction in industry.



## market deployment

With the ambition of becoming a commodity fuel worldwide, IBTC first objective is to create favorable market conditions for its members and to inform them on relevant business initiatives.

### what we do

- Monitor certifications and permissions for the product (ISO standardization of the product, REACH registration, IMO code, national legislation, etc);
- First-hand information on key initiatives and projects dedicated to biomass torrefaction market developments as well as fundings opportunities;
- Build performers' network in torrefaction and act as intermediary enabling burn sample supplies to interested consumers;



## networking opportunities

Facilitate exchanges among players involved in the field of torrefaction, is a real added value of IBTC. Members could participate to a wide range of events and activities all along the year that aim at creating a lively knowledge sharing platform. *“Knowing the evolution of the business, identifying potential partners and opportunities, discussing first hand information is a real added value in an emerging market like torrefaction.”*



### what we do

- Organise dedicated events along the year for stakeholders involved in torrefaction, creating relation by financial and consumers partners;
- Prepare study tours in order to initiate exchanges and business opportunities worldwide;
- Design webinars on technical, logistic and financial related topic;
- Propose B2B matchmaking during conference and event to offer genuine exchanges;

## market intelligence

Bioenergy, more than any other renewable energy sector, covers a wide range of materials and conversion technologies, a complexity that is key to address in order to get a clear overview of the sector, of its dynamics and of its potential.



### what we do

- Data collection on biomass and bioenergy;
- Monitor the latest market developments on torrefaction in specialised press;
- Update a database of relevant support schemes supporting bioenergy development worldwide;
- Commission studies in order to provide information to the business developers;

## our advocacy

Advocating for the interest of the European Bioenergy sector, including torrefaction, in Brussels is the core mission of Bioenergy Europe/IBTC since its foundation. In a context of intense legislative activities around Bioenergy until 2020, both Policy and Communication services are mobilised to ensure that the voice of the sector's players are heard.



### what we do

- Policy monitoring on sustainability, air emissions, heating & cooling, agriculture & forestry, renewable energy, energy efficiency;
- Direct advocacy including regulatory and communications efforts for the bioenergy sector;
- Developing projects for the promotion of bioenergy in Europe and of the reputation of torrefaction technologies on new markets;
- Building innovative communication strategies, marketing training and knowledge-sharing with members;





**Michael Wild**  
IBTC President

T: +43 676 611 76 22

E: michael@wild.or.at

Michael actively participated in the development of a methodology for energy planning and substitution of traditional fuels by renewables at the Austrian Institute of Energy Economics and represents the EU Energy Centre Bratislava at the European Commission in different European programmes.

He was responsible for building national and regional Energy Centres in Slovakia and the Czech Republic where he gained experience in energy policy, administration building and organisation setup, integration of national structures in international contexts and international (grant) financing.

Within ABEX initiated and established the first ever internet based trading platform for solid biomasses in close co-operation with an IBM software team. Building and operating supply chains of wood chips, Pellets and Palm Kernel Shell within Europe and from Asia, the Americas and Africa to Europe. Mr Wild has been involved in several initiatives to develop greenfield torrefaction projects in Ukraine, Brazil, Mozambique, US, Canada, diverse African countries and Indonesia. Was appointed as President of IBTC in 2012.

After all these years of experience he has gained excellent contacts in the “biomass scene” of all Europe, North America and Far East and Asia, research to implementation, industry to NGOs.



**Cristina Calderon**  
IBTC General Manager

: +32 2 318 40 34

E: calderon@bioenergyeurope.org

Cristina Calderón has been working for more than 7 years in Bioenergy Europe where she has coordinated and participated in many European projects. Cristina is the Director of the Market Intelligence Department, responsible for statistics and coordination of the publication of the “Statistical Report – A European Bioenergy Outlook”.



At the end of 2012, she actively participated in the creation of the International Biomass Torrefaction Council where she was nominated as General Manager. Cristina Calderón holds a master degree in mechanical engineering from the University of Valladolid in Spain. She speaks Spanish, English and French.

Contact point in  
Japan:

**Toshihide Kubo**

E: toshihide-k@newbio.jp



## about the companies

**Airex Energy** designs, manufactures and commercializes torrefaction equipment that converts biomass into biocoal pellets, a clean and renewable alternative to coal for electricity generation.

Established : 2014  
Employees : 15  
Employees: 90 (parent company)

### CONTACT DETAILS

#### **Airex Energy inc.**

2500 Bernard-Lefebvre  
Laval, Québec, Canada H7C 0A5

*Sylvain Bertrand*, Eng. MBA  
Chief Executive Officer  
(450) 661-6498  
sbertrand@airex-energy.com  
www.airex-energy.com

### MARKET OFFER

- + **Technology supplier**
- + Technology licensor
- + Production licensor
- + Long term contract for product supply
- + **Joint venture for production**
- + *Other: biocoal pellets supply for test burns (from 50 to 5,000 tonnes)*



## our solution

Airex Energy has successfully developed and patented CarbonFX, a new technology for biomass torrefaction that enables large scale production of value-added carbonized products such as biocoal, biochar and biocomposite, from a variety of feedstock, including sawmill by-products, forestland biomass and agricultural residues.

Biocoal, or torrefied pellets, is a clean and readily available drop-in replacement for coal for electricity generation. Biocoal has an energy content similar to that of coal, which enables a generating unit to operate at full load. It can also be co-fired with coal in any proportions, or replace coal completely - turning a coal-fired plant into a 100% renewable energy plant. Biocoal pellets can also be used to replace coal in coal-fired lime kilns.

Airex Energy operates a commercial-scale plant in Bécancour, Quebec, Canada, with an annual production capacity of 15,000 tonnes/year. The plant is essentially dedicated to the production of biocoal pellets for test burns at electricity producers.

Airex Energy and Gitxsan Development Corporation are developing a torrefied pellet production plant located in Hazelton, British Columbia, Canada. The plant will be in operation by Q1/2021 and will have an annual capacity of 100,000 tonnes.

- Torrefied pellets will be shipped by rail in bulk to the Port of Prince Rupert, British Columbia and transported to Japan by sea.
- A sustainable supply in excess of 600,000 m<sup>3</sup> annually of certified waste fibre is available within operational distances of the plant.
- The plant could be expanded to produce up to 160,000 tonnes/year.

## financial investors



- Cycle Capital Management is a pioneer among Canadian venture capital funds focused on the clean-tech sector and assets under management of \$230 million;



- Desjardins-Innovatech, with assets under management of \$1.6 billion, is a subsidiary of Desjardins Group, the largest cooperative financial group in Canada with \$260 billion in total assets.

# about the companies

## EXISTING

**Project** Becancour  
**Commissioned** December 2015  
**Size** 15,000 tonnes/y  
**Country** Canada  
**Feedstock** Sawdust, C&D wood

**Project** InnoFibre  
**Commissioned** 2015  
**Size** 1,000 tonnes/y  
**Country** Canada  
**Feedstock** Sawdust, C&D wood

**Project** CTRI  
**Commissioned** 2012  
**Size** 1,000 tonnes/y  
**Country** Canada  
**Feedstock** Sawdust, C&D wood

## COMMITTED TO

**Project** Hazelton  
**Commissioned** 2021  
**Size** 100,000 tonnes/y  
**Country** Canada  
**Feedstock** Sawdust, low-grade logs

## IN THE PIPELINE

**Project** Jacques Cartier  
**Commissioned** 2020  
**Size** 15,000 tonnes/y  
**Country** Canada  
**Feedstock** Softwood

**Project** Sacré-Coeur  
**Commissioned** 2020  
**Size** 35,000 tonnes/y  
**Country** Canada  
**Feedstock** Softwood

**Project** Surat Thani  
**Commissioned** 2020  
**Size** 35,000 tonnes/y  
**Country** Thailand  
**Feedstock** Rubberwood

## targeted users

The replacement of coal in coal-fired power plants: In order to satisfy the quantity requirements of power utilities, Airex Energy markets its CarbonFX equipment to biomass owners such as softwood lumber companies, wood product companies, sawmill operators, as well as producers of industrial-grade wood pellets.

## value proposition

Benefits of using biocoal pellets to coal-fired power plant operators:

- Superior energy content: Energy content similar to that of coal, enabling a generating unit to achieve full load.
- Reduction of greenhouse gas (GHG) emissions: Coal is considered to emit approximately 1,000 tonnes of CO<sub>2</sub> equivalent per GWh of electricity produced. Biocoal pellets produced from woody biomass is considered to release approximately 70 tonnes of CO<sub>2</sub> equivalent per GWh of electricity produced or approximately 90% less CO<sub>2</sub> equivalent than coal. Biocoal combustion also reduces nitrogen oxides (NOX) emissions by 50% to 70% and sulfur dioxides (SO<sub>2</sub>) emissions by 90%, without generating toxic mercury emissions.
- Very low conversion cost: Biocoal's unique properties allow it to be easily integrated into existing systems for handling storing and grinding coal, without major changes or expensive conversion. The conversion of a coal-fired power plant to burn 100% biocoal can be completed in 3 months at a cost less than \$5M.
- Superior performance compared to conventional wood pellets: Biocoal pellets are water resistant allowing them to be stored outside in a pile where they can withstand the elements whereas wood pellets easily deteriorate under wet conditions. Wood pellets are also difficult to grind and require the addition of specially designed grinding and handling systems while biocoal is easily friable.
- Lowest cost alternative for producing base load and dispatchable electricity: Biocoal pellets are offered at a price equivalent to that of wood pellets on a per unit of energy basis.

Key advantages of the CarbonFX technology:

- Variety of feedstock: CarbonFX can process a large variety of feedstock including sawmill waste (sawdust, bark, shavings and woodchips), logging residue, low-grade biomass and agriculture residue.
- Homogeneous end products: The highly turbulent flow inside the cyclonic bed reactor allows an optimal heat transfer rate and ensures very homogenous end products.
- Cost competitive: The CarbonFX system is simple to manufacture. It doesn't require pressure vessels, biomass boilers, drum dryers, thermal oil heat exchangers or a waste water treatment system.
- Low operating cost: The CarbonFX operation is fully automated and highly energy efficient as the residual heat from the thermal process is used to pre-dry the biomass feedstock in an integrated system.

## about the companies

### IN THE PIPELINE

|              |                 |
|--------------|-----------------|
| Project      | Corrèze         |
| Commissioned | 2020            |
| Size         | 15,000 tonnes/y |
| Country      | France          |
| Feedstock    | sawdust         |

## additional information

### *An experienced management team*

Airex Energy is a spin-off of Airex Industries, a private company founded in 1975 that specializes in commercial and industrial dust-handling and energy efficiency systems. Airex Energy can count on the support of its parent company for technical know-how, product engineering and manufacturing capacity. The leaders of the company all have over 25 years of industry experience in R&D, product development, manufacturing operations and business development in the energy, biofuels, technology and wood processing industries.

### *A strong base of intellectual property*

Airex Energy has developed two inventions to date related to its proprietary torrefaction process. A first patent has been granted in the U.S. and Canada for the technological innovation at the heart of its CarbonFX system. A second PCT patent application was filed in May 2012 to protect the overall concept of the CarbonFX system and patents in the U.S., Europe and Canada. The U.S. patent was granted in March 2017 while the others are still pending.

### *R&D partnerships with recognized leading organizations in the forestry and biotech sectors*

- FPIInnovations, the largest research center on forest products in the world;
- Resolute Forest Products, the largest newsprint producer in North America;
- Innofibre, a research centre specializing in the development of cellulosic products;
- The Technology Centre for Industrial Residues (CTRI);
- Canada's Natural Sciences and Engineering Research Council and Engineering (NSERC);
- Natural Research Council of Canada (NRC);
- Québec's Consortium for Research and Innovations in Industrial Bioprocesses (CRIBIO);
- Natural Resources Canada.

## Sylvain Bertrand, Eng., MBA

### *Chief Executive Officer*

Education: Master of Business Administration (MBA), HEC Montréal  
Master of Energy Engineering for Industrial Equipment, ENSEEIHT in Toulouse, France

Bachelor of Mechanical Engineering, Polytechnique Montréal

Experience: Chief Advisor, Development and Energy Strategy, AbitibiBowater Inc. (2009–2011)

Investment Director, Multiple Capital (2005–2008)

Investment Manager, Innovatech du Grand Montréal (2002–2005)



Sylvain Bertrand has over 20 years of experience in finance, business development, and engineering. Before joining Airex Energy in 2011, Bertrand acted as chief advisor for AbitibiBowater's development and energy strategy, where he was responsible for developing new biofuel initiatives. He also served as investment director at Multiple Capital, where he managed a venture-capital portfolio for Collier Capital. From 2002 to 2005, Bertrand was an investment manager for Innovatech du Grand Montréal, a venture-capital fund specialized in tech startups. Bertrand's expertise includes evaluating, preparing, and executing investments in companies specialized in electronics and clean technology. He has also served on the board of directors for several technology companies and currently serves on the board of directors at Canbio (Canadian Bioenergy Association) and CRIBIQ (Consortium de recherches et innovations en bioprocédés au Québec).

## about the companies

**Bioendev AB** is a technology company manufacturing a unique and patented technique to refine solid biomass through a process called torrefaction. The refined solid biomass manufactured with the technology is called "biocoal" or "black pellets" and is an improved energy carrier with similar characteristics as fossil coal, as several biomass properties are significantly enhanced by the torrefaction process. Bioendev's mission is to provide companies all over the world with technology and solutions that enable a smarter substitution of fossil fuels with renewables. We sell torrefaction technology that enables a more cost-effective use of biomass in heat and power generation.

|                     |  |
|---------------------|--|
| Established         | 2007   |
| Number of Employees | 20   |
| Partnerships        | Umeå University  |
| Company Location    | Umeå, Northern Sweden                                    |
| Number of Patents   | 55   |
| Owners              | Umea Energy<br>Daiwa Energy & Infrastructure<br>Founders |

### CONTACT DETAILS

**Bioendev AB**  
Korsvägen 1  
913 35 Holmsund SWEDEN

*Johan Berggren, CEO*  
+46 70 589 96 36  
johan.berggren@bioendev.se  
www.bioendev.se

## solution

Bioendev offers a patent protected technology to refine solid biomass through a torrefaction process. The technology is proven in the largest torrefaction plant (16,000 ton/year) in Northern Europe built and successfully commissioned during 2016. A new 60 000 ton per year plant is currently under development in Northern Europe based on Bioendevs technology.

Bioendev's technology provides a very energy efficient process, over time stable product quality, ability to process a large variety of feedstock including sawmill waste (sawdust, bark, shavings) and, is highly scalable and has a small foot-print. The biocoal produced with Bioendev's technology have to date only received positive reviews when it comes to durability (dust), increased power in the boilers and lower emissions.

## company overview & ownership structure

Bioendev was founded in Umea in 2007, by Professor Anders Nordin and Ingemar Lindh, as a joint venture with Umea University and the Swedish University of Agricultural Sciences. The Company is currently owned by Umea Energy AB (45 %), Daiwa Energy & Infrastructure Ltd (40%) and the two founding scientists (15 %).

- The Company has a Pilot plant as well as an Industrial Demonstration Unit ("IDU") in operation. The Pilot plant, originally commissioned in 2012, is today used in a joint venture with the Government of Indian (GOI) to perform trials on leaching and torrefaction of agriculture by-products, primarily rice straw, in the state of Punjab. The project is financed 50/50 by GOI and Bioendev. Bioendev is also partner R&D projects together with the Swedish Government and RISE Research Institutes of Sweden.
- The IDU is the largest commercial torrefaction plant in Northern Europe (located in Holmsund outside Umea) with an annual capacity of 16 kton black pellets. The IDU has demonstrated proof of concept in a commercial scale and is used to produce samples to off-take clients (utilities and industries) and corporations already established in the bioenergy sector (pellet producers). Only positive reviews have been received.



## about the companies

### MARKET OFFER

- + **Technology supplier**
- + **Technology licensor**
- + Production licensor
- + Long term contract for product supply
- + Joint venture for production

### PROJECTS

#### EXISTING

|              |                     |
|--------------|---------------------|
| Project      | <b>Bioendev IDU</b> |
| Commissioned | March 2016          |
| Size         | 16,000 tonnes/y     |
| Country      | Sweden              |
| Feedstock    | Sawdust, softwood   |

#### COMMITTED TO

|              |                                 |
|--------------|---------------------------------|
| Project      | <b>Holmsund Biocarbon Plant</b> |
| Commissioned | Q2 2020                         |
| Size         | 60,00 tonnes/y                  |
| Country      | Sweden                          |
| Feedstock    | Forest industry bi-products     |

#### IN THE PIPELINE

|              |                     |
|--------------|---------------------|
| Project      | <b>Samo BioFuel</b> |
| Commissioned | Q3 2020             |
| Size         | 100,000 tonnes/y    |
| Country      | USA                 |
| Feedstock    | Wood chips          |
| Project      | Stockton BioFuel    |
| Commissioned | Q3 2020             |
| Size         | 100,000 tonnes/y    |
| Country      | USA                 |
| Feedstock    | Wood                |

people at BIOENDEV

## our value proposition

We sell torrefaction technology that enables a more cost-effective use of biomass in heat and power generation. We help you capture the full potential of biomass.

## we offer

- **Conversion:** To convert a standard white pellet plant into black pellet plants by installing Bioendev's torrefaction reactor, burner and boiler. Bioendev takes full turn-key EPIC responsibility.
- **Greenfield Plants:** Together with a EPC-partners, Bioendev sell complete plants to refine biomass, in the range of 30-200 kton production per year, to white pellets producers, existing coal-fired power plants as well as new entrants on the market.
- **Trail shipment of biocoal:** Bioendev also produce and sell pellets from our Industrial Demonstration Unit in Holmsund, Sweden. There is also a possibility to perform test of new materials in the plant.



**Lars-Åke Svensson**

*Sales Manager*

After his master studies in Mechanical Engineering at Luleå Technical University, Lars-Åke Svensson has gathered substantial experience from leading roles within the fields of production management, project management and site management, both in Sweden and internationally. Lars-Åke's vast experience, gathered over more than 20 years, comes from several industries such as wood production, hard material production, forest machinery, sawmill industry, packaging and food technology.



**Johan Lilliehöök**

*Business Development Manager*

Johan Lilliehöök has an M.Sc. in Industrial Economics at Linköping University in Sweden. He has been working as an independent consultant since 2008 with assignments and representations for Bioendev, Renewable Fuel Technologies, Plantagon, Sustainable Lifestyle Scandinavia, Mobile Loyalty Holding and AB Torkapparater Sweden. For ABT he initiated and led a torrefaction project on the island of Gotland which got support from the Energy Authorities in Sweden, Vattenfall AB and 2 forestry groups. Prior to 2008 Johan worked for North American forestry companies MacMillan Bloedel, Harmac Pacific and Pope and Talbot as General Manager Europe selling wood pulp to the European paper industry.

## about the companies



**CEG** is an energy innovation company. Today, we create and realize sustainable energy solutions through biomass conversion by torrefaction. Simply put, we use sustainable resources to replace non-sustainable and expensive resources, that are cleaner and less harmful to the planet and us.

### CONTACT DETAILS

#### Clean Electricity Generation B.V.

#### Registered Address

Cruquiusweg 111 R  
1019 AG Amsterdam  
The Netherlands

#### Site Address

Units 1C & 1D  
Trafalgar Park  
Victory Road  
Derby DE24 8DX  
United Kingdom

[www.cegeneration.com](http://www.cegeneration.com)  
[info@cegeneration.com](mailto:info@cegeneration.com)

### MARKET OFFER

- + **Technology supplier**
- + Technology licensor
- + **Production licensor**
- + Long term contract for product supply
- + **Joint venture for production**



proprietary torrefaction technology  
torrefaction plants  
biocoal  
green electricity

## highlights

- Multiple 2019 customer trials involving >5,000 tonnes of biocoal pellets
- Constructing 157,000 tonne per annum biocoal facility in Estonia
- Commercial deployment of CEG's proprietary torrefaction technology
- Developing partnerships to develop further biocoal facilities

CEG's 2019 focus is to supply biocoal pellets for large-scale utility trials in Europe and elsewhere. During 2019, CEG will supply in excess of 5,000 tonnes of biocoal pellets for customer trials. These trials will allow CEG to secure long-term offtake for our commercial Estonian development and demonstrate the viability of CEG's torrefaction technology. CEG's first 2019 biocoal customer was successfully completed in March. 1000 tonnes of biocoal pellets for CEG's second 2019 trial have been produced and await dispatch. We invite interested parties to visit our facility in the UK, where you can see biocoal being produced.

## full scale plant in Derby, UK

CEG has a full-scale demonstration facility located in Derby, near the centre of England, a short 1.5 hour train journey from London. Derby employs 2 full-scale CEG reactors and a pelletisation line. CEG's Estonia development will employ 8 torrefaction reactors, identical to those in Derby.

Derby is presently 100% focussed on satisfying customer demand for biocoal pellets trials. Derby operates on a 24/7 basis. CEG's torrefaction reactors in Derby are full-scale and identical to the commercial design that will be installed in Estonia. The plant includes pelletisation facilities.

Derby also serves as a facility for the torrefaction of experimental feedstocks. CEG's Derby facility has experimentally torrefied a number of agricultural by-products and wood species. CEG invites potential partners to visit and trial torrefy biomass in Derby.

# about the companies

## PROJECTS

### EXISTING

**Project** Derby  
**Commissioned** /  
**Size** 2x 15,000 tonnes p.a.  
output of bio coal  
pellets between 21 GJ  
and 30 GJ

**Country** UK  
**Feedstock** local

### COMMITTED TO

**Project** Baltania  
**Commissioned** 2020  
**Size** 157,000 tonnes/y  
production plant

**Country** Estonia  
**Feedstock** Local, secured



## 157,000 tonnes per annum development in Estonia

CEG has purchased the land and completed site preparations for a 157,000 tonnes per annum biocoal pellet facility in Estonia. The facility will supply the Scandinavian power and thermal markets. The Estonia facility, names Baltania, will be commissioned in 2020.

LOIs for long-term offtake contracts are agreed. CEG awaits the successful completion of customer biocoal trials to convert LOIs into long-term offtake agreements. Once long-term offtakes are agreed, CEG will commission the Estonia biocoal facility.

## our projects

Additional large-scale torrefaction plants are being considered in Canada, Russia and Europe. We invite potential partners, investors, biocoal buyers, and biomass suppliers to discuss co-operation.

## investors

### Momentum Capital

Momentum Capital is an independent Dutch private equity office with a proven track record of successful investments. Our activities are international, with participations and partnerships in growth markets in Latin America, the United States and Europe. Providing capital with committed industry expertise, and our extensive network, we add value to our participations.

Our efforts created returns for our investors, as well as valuable assets for the community and society at large.

### Transformative Energy and Materials Capital (TEM Capital)

Transformative Energy and Materials Capital, LLC (TEM Capital) is a fund manager for the Transformative Energy and Materials Fund I ("TEM" or "TEM Fund"). TEM invests in mid to later stage companies where there is a clear view on how to achieve revenue expansion and profitability. TEM Capital's management team combines scientific, operational, and financial experience and takes an active role in the portfolio, aiming to bring not only capital but most importantly, effective growth strategies.

**Erik Huis***Chief Executive Officer*

Erik has a long standing international record of experience in and know-how of developing, managing, creating strategic partnerships and exits of industrial assets. Erik is a graduate of Temple University, Philadelphia, USA - Fox School of Business (MBA 1983).

**Stuart Paskett***VP Business Development*

Stuart began his career in the US analysing high-yield and distressed industrial credits before joining the portfolio management team of Climate Change Capital. Part of the portfolio management team responsible for raising CCC's 1 billion USD carbon fund. After deploying the fund's capital across a portfolio of more than 50 carbon mitigation projects, mainly focussed in Asia, Stuart assumed responsibility for commissioning projects in Central Asia. Stuart is proficient in Mandarin Chinese. Stuart has a proven ability to bridge financial and engineering mindsets. He has a degree from Wharton and an engineering degree from the University of Exeter.

**Niels Alexander Bot***Head of Research & Strategic Development Support*

Niels (MBA) fulfills a key role in achieving the ambitious worldwide growth plans of Dutch investment firm Momentum Capital. Over the past 10+ years his focus has been mainly on the strategic roll out and growth of companies in the energy and maritime sectors, with a special focus on Latin America and particularly Brazil. Currently he is involved in a number of renewable energy related companies within the Momentum group, including among others torrefaction company CEG BV, renewable energy solutions provider Primco BV and forest commodities supplier Parenco Hout.

## about the companies

### **National Carbon Technologies**

**(NCT)** is a developer and producer of renewable carbon products made from biomass. NCT has developed a proprietary production platform to make patented, high-performance products for large and growing end markets that include water purification, air purification, metals production, energy production, and agricultural crop production.

Energy Carbon. NCT has developed and produces commercially its patented Energy Carbon product for use as a drop-in replacement for coal. Energy Carbon has a typical calorific value of >30 GJ/MT, is highly durable, low in dust, water resistant, odor free, not self-heating, free of leachate concerns, and safe for transportation, outside storage, and use.

### CONTACT DETAILS

#### **National Carbon Technologies**

1 Imation Way  
Oakdale MN, 55128

James A. Mennell  
CEO  
612-599-5951  
jmennell@national-carbon.com

Mike Loreman  
Director Marketing & Sales  
281-889-9865  
mloreman@national-carbon.com

[www.national-carbon.com](http://www.national-carbon.com)



## leadership

NCT's production technologies were developed by industry thought-leaders including former scientific, technology, and engineering leads from the largest biofuel and bio-product companies in the world and carbon experts from leading research universities. NCT is led by an experienced leadership team whose members have led public and private bio-products, energy, technology, and laboratory companies.

## industry-leading biocarbon production

NCT operates the largest advanced bio-carbon production facility in North America located near Marquette, Michigan. Since 2012, NCT has supplied biocarbon products by rail, ship, and truck to over 100 customers on a global basis that include utilities, industrials, municipalities and high value crop producers. NCT's patented on-line process controls and post-production quality laboratory and team insure delivery of on-specification products. NCT's Michigan plant has a small environmental footprint and strong sustainability profile and is PEFC, NSF, and organic certified. NCT has permitted, secured certified feedstock, and is actively developing over 500,000 tons per year of additional production capacity.

## industry-leading investment

NCT's commercial production capacity and proprietary process and product technologies result from over \$100 million of investment by sophisticated investors that include four publicly-traded companies, family offices, and a large private equity fund. NCT is debt-free and has secured growth capital to develop additional production capacity.

## industry-leading products

NCT's mission is to produce high-performing, inexpensive, and highly sustainable products. NCT's patented Energy Carbon product has the highest energy value of any commercial solid biomass fuel (>30 GJ/T) and is the only biomass fuel that has a higher calorific value than most coals resulting in no de-rating of capacity, lower transportation costs, and reduced storage requirements. Energy Carbon is highly durable, low in dust, water resistant, not self-igniting, and engineered for outside storage.



# about the companies

MARKET OFFER

MARKET OFFER

+ Long-term contract for product supply

PROJECTS

## EXISTING

|              |                            |
|--------------|----------------------------|
| Project      | <b>Mid-West (Michigan)</b> |
| Commissioned | 2012, Expanded 2015        |
| Size         | 75,000 tonnes/y            |
| Country      | USA                        |
| Feedstock    | Feedstock Woody biomass    |

## COMMITTED TO

|              |                         |
|--------------|-------------------------|
| Project      | <b>West Coast</b>       |
| Commissioned | 2021                    |
| Size         | 300,000 tonnes/y        |
| Country      | USA                     |
| Feedstock    | Feedstock Woody biomass |

## IN THE PIPELINE

|              |                         |
|--------------|-------------------------|
| Project      | <b>East Coast</b>       |
| Commissioned | 2022                    |
| Size         | 150,000 tonnes/y        |
| Country      | USA                     |
| Feedstock    | Feedstock Woody biomass |

people at NCT



### James A. Mennell

CEO

James A. Mennell has over 25 years of experience as a developer, board member, officer, advisor and investor for dozens of companies ranging from start-ups to some of the largest public and private companies in the world in the energy, bio-products, and environmental products sectors (including Cargill, Koch Industries, POET, 3M and GE). Mennell is the inventor of multiple patented bio-product and process technologies. He has founded, led, and grown bio-based product and energy companies from concept through investment and growth to sale or partnerships with publicly traded multinational companies and has helped develop billions of dollars of capital projects across North America. Mennell's experience also includes serving as President of the bio-based products unit of Cliffs Natural Resources, founding and leading The Environmental Law Group, and investing and serving on the board of directors of biofuels, bio-based products, software, and wind and solar energy companies. Mennell graduated as University Scholar (highest honor) from the University of South Dakota and received his Juris Doctor and Masters degrees from Duke University (with honors).



### Michael R. Loreman

Director of Sales and Marketing

Michael R. Loreman has over 35 years of experience in the energy sector with a focus on coal trading, coal investing/asset management, and environmental products trading. Loreman has started up and run coal and emissions trading desks at Koch Industries, Williams Energy, Citadel Investments, and DTE Energy, where he honed his expertise in logistics, risk management, fuel supply, and market analytics. At Citadel, Loreman started up a carbon emissions trading desk focused on the emerging European carbon market, and led Citadel's investment in the European Carbon Fund; and at DTE, he started up a carbon trading business focused on the US voluntary carbon market. Loreman spent his early career with Shell Mining Company and Zeigler Coal Holding Company in a variety of roles including lead roles in engineering, metals trading, coal marketing, business development, including leading market development efforts for Shell/Ziegler's ENCOAL coal beneficiation technology. Loreman is a graduate of the University of Idaho with a Bachelor of Science in Mining Engineering after transferring from Penn State University.

## about the companies

Based in the Seattle area of Washington State and founded in 1992, TSI designs and builds Finishing Lines for Wood Based Panel plants. The foundation of its business based on this technology and TSI is a recognized market leader in North America, particularly in the Oriented Strand Board (OSB) segment.

### CONTACT DETAILS

**TSI**  
220818 44TH AVENUE W,  
SUITE 201  
LYNNWOOD, WA 98036  
PHONE: (425) 771.1190  
FAX: (425) 775.8363  
E-MAIL: INFO@TSI-INC.NET  
WWW.TSI-INC.NET

### MARKET OFFER

- + **Technology supplier**
- + Technology licensor
- + Production licensor
- + Long term contract for product supply
- + Joint venture for production

### PROJECTS

#### EXISTING

|                     |                           |
|---------------------|---------------------------|
| <b>Project</b>      | <b>American Biocarbon</b> |
| <b>Commissioned</b> | Q3 2014                   |
| <b>Size</b>         | 2 TPH                     |
| <b>Country</b>      | USA                       |
| <b>Feedstock</b>    | bagasse                   |

## history & highlights

In the late 1990s TSI acquired a Dryer company with strong technology for Single Pass Rotary Dryers. TSI was able to leverage that technology into the OSB industry and within a few years "Single Pass" became the dominant approach to drying OSB flakes.

With the financial crisis of 2008 the OSB industry curbed almost all capital expenditure. TSI took advantage of this drop-off in their core market to explore other opportunities, resulting in their entry into the Industrial Wood Pellet sector. Now, with several large dryer projects completed and more on the way TSI is the undisputed market leader in the US for large scale pellet plants. As a result TSI has expanded their product range to include Emission Control equipment, Heat Energy systems and Construction Services offering a complete package "The Dryer Island" to clients.

TSI's latest development is in the field of Torrefaction. This process roasts wood chips in a low oxygen environment resulting in a high energy density product with obvious applications in the renewable energy business as well as applications in other industries such as advanced materials and soil amendment. This is an industry in its infancy and we tremendous but untested growth potential.

Throughout this 20+ year period, TSI has been responsible for many new ideas that improve the performance and serviceability of the systems they sell. For most clients productivity is paramount and TSI recognizes the importance of tempering new ideas with practical solutions; "Responsible Innovation", is the art of advancing the technology without undue risk to the client's business.

## tsi & torrefaction: key features

- Patented Process utilizing proven components in a new application.
- Scalable up to 30 tons/hour in a single reactor.
- Relatively simple design keeps capital cost ratio at a reasonable level
- Process classifies product ensuring an even level of Torrefaction for all sizes of chip (even fines).
- Designed as bolt-on adder to TSI Dryer Systems.
- Utilizes offgas (torrgas) from process as fuel for the burner making it heat energy positive. Surplus energy is channel to the dryer.
- Large cooling screw reduces product temperature to a safe level before exposing it to atmosphere.
- System can be controlled to precise levels of Torrefaction.
- Custom sizing and design to fit application requirements for optimum performance.
- Fully automated
- Technological due diligence assessments of any biomass conversion/processing technologies for investors.

# about the companies



## IN THE PIPELINE

**Project** American Biocarbon  
**Commissioned** Q3 2018  
**Size** 200,000 TPA  
**Country** USA  
**Feedstock** softwood bark

**Project** Thailand Project  
**Commissioned** Q4 2018  
**Size** 16 TPH  
**Country** Thailand  
**Feedstock** wood pellets

**Project** East US Biochar  
**Commissioned** Q4 2018  
**Size** 2.5 TPH  
**Country** USA  
**Feedstock** wood waste

**Project** West US Biochar  
**Commissioned** Q4 2018  
**Size** 2 TPH  
**Country** USA  
**Feedstock** wood waste

people at TSI



**James Sabo**  
*Sales Manager*

James Sabo is a Sales Manager at TSI. He has been with TSI for 5 years and during that time has helped develop their torrefaction technology as an experienced operator and designer. James has a Master's Degree in Mechanical Engineering with a focus on Energy and Fluids, which he received from the University of Washington in Seattle, WA USA. James has used his expertise in Energy and mechanical design to help refine the process calculations and overall mechanical design of the TSI Torreactor®. James is a Seattle native and enjoys outdoor activities such as hiking and backpacking and also enjoys snowboarding in the winters.



**INTERNATIONAL BIOMASS  
TORREFACTION COUNCIL**

A NETWORK OF  
BIOENERGY EUROPE

Place du Champ de Mars 2, 1050 Brussels, Belgium  
T +32 2 318 41 00 - [info@bioenergyeurope.org](mailto:info@bioenergyeurope.org)  
<http://ibt.bioenergyeurope.org/>



**New Bio Inc.**

*Your partner for stable sourcing of biomass fuel*

Toshihide Kubo  
E: [toshihide-k@newbio.jp](mailto:toshihide-k@newbio.jp)