Advancing Torrefaction

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IBTC network
Combining efforts where advantageous

20 Members in Europe, Canada, USA and Asia

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Bringing together the performing companies in Torrefaction

- Promoting the uptake of torrefied biomass for energy
- All issues of common interest which are not under competition
- Regulatory Barriers, general permissions along supply chain
- Link to Policy
- Safety and Health
- First contact for everybody interested in Biomass Torrefaction
Amandus Kahl GmbH & Co. KG, based in Hamburg (Germany), plans, designs, and builds machines, plants, turnkey production plants for conditioning and compaction of various materials. The final products are destined for a range of industrial processes in the biomass, feed, food, chemical and recycling industry.

Besides AMANDUS KAHL, the companies SCHULE MÜHLENBAU, NEUHAUS NEOTEC and HEINEN FREEZING belong to the Kahl-Group (650 employees in total).

In recent years, numerous trials were carried out in our technology centre on the pelleting of torrefied wood and torrefied biomass as well as of steam explosion products in order to gain experience and data for upscaling the pelleting plant to a commercial scale (> 10 t/h) with flat die pelleting presses.

Amandus Kahl installed the pelleting line for Topell (NL) and it installs plants for other contractors in North America. Together with Neuhaus Neotec, Amandus Kahl carries out research work on the torrefication of wood and biomass pellets using a modified coffee roaster.
Arigna Fuels Limited

Arigna has played a small but significant part in Irish industrial history more or less continuously since the 15th century. The first briquetting plant of the Arigna Industry was built in 1937 and it used a pitch binder. After more than 20 years, a "Smokeless Briquetting Process" was developed in Arigna by using starch based binder in 1992. The Spion Lop Windfarm was commissioned in 1998, and was supported by the "Thermie programme", operated by the European Commission in order to support the demonstration of innovative energy technology. Arigna is nowadays the largest manufacturer of coal based smokeless fuel in Ireland. Renewables have centered the development of wind farms on the old opencast mine sites, back in 1990.
Located in Yverdon-les-Bains, the School of Management and Engineering Vaud (HEIG-VD - Haute Ecole d'Ingénierie et de Gestion du Canton de Vaud) offers ten Bachelor professional programs in engineering and business management. Moreover, the Institute offers detailed and engineering science-based research about combustion, biogas, torrefaction and characterization of biomass.

The main activities in torrefaction concern:

- A laboratory-scale torrefactor
  - 5 kg/h Screw with electric heating since September 2012

- An experimental combustion facility
  - 50 kW experimental combustion facility since 2009

- An R&D Project with torrefaction pilot
  - 100kg/h Pilot with combustion tests started in 2015
The Nesa Solution® is active in the field of environmental solutions and specialized in thermal processes. In fact, it owns and operates a pilot plant where the processes of customers can be developed, confirmed and refined. Nesa has developed over the past 35 years many thermal treatment processes derived from one general concept: the thermal treatment in an accurately controlled process. The Nesa Solution®, as one of the leaders in multiple hearth furnaces, provides a full set of thermal solutions in the field of:

- Pyrolysis
- Incineration & Combustion
- Regeneration of Activated Carbon
- Waste
- Energy Recovery
The Torr-Coal Group has been developing its own torrefaction technology since 2005 initially focussing on wood and solid recovered fuel. From this point onwards Torr-Coal’s torrefaction technology has constantly been improved and optimised in terms of efficiency, consistency, reliability as well as environmental footprint. To date, the Torr-Coal Group is one of the few companies in the world who has mastered a consistent high quality biomass torrefaction process on a commercial scale. Furthermore TorrCoal continuously works towards torrefaction of other alternative biomass feed stocks and the upscaling of these alternatives to commercial size.

Mission

- To make the world cleaner and more sustainable by creating feedstock for valuable energy and chemicals production from local renewable biomass resources.

Vision

- A leading global provider of industrial plant-scale torrefaction systems for renewable biomass resources.
Mikkeli Development Miksei Ltd.

Mikkeli Development is located in Eastern Finland, 230 km from Helsinki. Our business focus areas are bioenergy, wastewater treatment, civil safety, digitalization and tourism. We are also very active in international networks, especially in the EU, Russia and China. Our mission is to help companies to locate and grow their business in Mikkeli. Mikkeli's mission is to:

- Sell and market industrial plots owned by the City of Mikkeli
- Develop business opportunities in our focus areas
- Have strong expertise to offer
- Provide guidance and expert support for potential investors for evaluating and establishing new business opportunities
- Have nearly 30 experts from various fields of business available at your service
CPL Industries

CPL has been making coal since the 1940s, with the production of their first Phurnacite plant. But since then, the company has grown to encompass a range of industries, from charcoal and activated carbon, to gardening and renewable energy. Their wealth of industry knowledge, combined with enormous manufacturing capabilities and a team of expert staff has helped to position CPL at the forefront of the European solid fuel industry. They also maintain a successful and growing European export business, exporting over 60,000 tonnes every year into major markets in France, Germany and Ireland.

CPL is focused on the future, with emphasis on developing technologies, notably in the field of torrefaction.
ECN develops innovative solutions for your specific sustainable energy requirements. It provides customised solar power solutions or assessing the energy-efficiency of your production process.

But the ECN researchers’ horizon is broader than this: their focus is not about research into sustainable energy sources only, ECN also does research commissioned by government authorities and companies into the impact of energy use and energy production on the environment.

The use of biomass as a sustainable feedstock to produce electricity, heat, transport fuels, materials and chemical feedstocks is an important aspect of the bio-based economy. Besides producing energy from biomass, ECN provides solutions in the following areas of biomass research:

- Use and characterisation of biomass
- Fractionation and pretreatment
- Conversions: torrefaction, gasification, combustion, pyrolysis
- Separation and reprocessing
- Product synthesis of energy, chemical feedstocks and materials
Engie Lab Laborec

ENGIE Lab Laborec is the Group’s research and expertise center for electrical power technologies. Located near Brussels and active in more than 60 countries, it employs 240 highly qualified specialist technicians. It focuses on streamlining production processes, distribution and electricity supply. Its work covers every link in the electricity value chain, from generation and transmission to supply, storage and end-user applications, with a special regard to the energy transition and the 3Ds (Decentralization, Decarbonization and Digitalization). This research work covers every centralized and decentralized form of electricity generation: fossil fuel, nuclear or renewable.

ENGIE Lab Laborelec structures its R&D work around three priorities:

• reducing effects on the environment;
• improving availability and maintenance;
• energy systems of the future;
Airex Energy

Airex Energy is an equipment supplier that develops torrefaction technology to convert biomass to biocoal.

- Spin-off of equipment manufacturer Airex Industries
- Backed by leading Canadian venture capital investors
- Unique technology on the market - CarbonFX cyclonic bed reactor
- Proof of concept in 2010 and pilot unit in 2011
- 2 tonnes/hr demonstration plant under construction – commissioning Q1 2015
- Strong partnerships with renowned Canadian R&D organizations
Bioendev AB

Bioendev is an engineering spin-off company originating from R&D at Umeå University, Sweden. Our mission is to develop and supply high-tech systems that enables the most efficient refining of biomass for use in CHP systems, conversion to fuels and production of green chemicals. As a first step to achieve this, we have developed a cost effective technology for producing torrefied and densified biomass. Our solution has superior process control, high utilization and produces a product with very high quality. Torrefaction has been the main focus of Bioendev since 2007, when a first flexible pilot plan was created. Today Bioendev has both a Pilot plant and an Industrial Demonstrations Unit in operation.
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