Cleantech Group

Flanders Cleantech 10

A LENS ON INNOVATIVE SMEs IN FLANDERS

2014

BROUGHT TO YOU IN COLLABORATION WITH:

FCA
Flanders Cleantech Association

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Acknowledgements, Disclaimer, and Copyright

There is a lot of work involved and support given for this report to come together. We would like to acknowledge and give thanks accordingly.

Firstly, the list and this report would not have been possible without our partner, Flanders Cleantech Association.

Secondly, the list would not have been possible but for the willingness of our advisory panel (see Appendix), who generously gave up their time to provide their inputs and opinions. For the avoidance of doubt, the final report and the companies have been featured in it, be that as part of the 10 or within the general text, is the responsibility of Cleantech Group and its methodology. The Advisory Panel and Flanders Cleantech Association performed an advisory role only.

Thirdly, many people at Cleantech Group made small contributions, but particular thanks are due to Amelie de Cartier, a Flemish native who is currently doing an internship at Cleantech Group.

Finally and most importantly, this report came about because of several individuals and their passion to assist the Flanders Cleantech community. They are Carine Van Hove, Managing Director at Flanders Cleantech Association, Sonja Van den Bergh, Management Assistant at Flanders Cleantech Association and Dirk Fransaer, Managing Director of the Flemish Institute for Technological Research (VITO) and Founder of Flanders Cleantech Association.

Thank you all.

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About Cleantech Group

Cleantech Group's clients—corporations, utilities, government agencies, and investors—recognize that innovating is crucial to business growth, yet can be challenging to pursue. The Company partners with its clients to accelerate innovation. With more than a decade of experience covering 18 sectors of resource technologies, Cleantech Group is uniquely positioned to guide clients along the innovation journey through three lines of business. The i3 platform allows subscribers to discover and vet companies, as well as explore technology sector trends strategically using proprietary real-time data. Cleantech Forums, held around the globe, convene investors, entrepreneurs, and international policy makers to examine trends, develop innovation strategies, and make deals happen. The firm's Advisory Services help clients design and implement corporate strategies for sustainable growth and innovation sourcing, and then market the results.

Details at: http://www.cleantech.com.

About Flanders Cleantech Association

Flanders Cleantech Association (FCA) represents the innovative cleantech companies in Flanders, which is located in the heart of Europe, and well known as the host region to the second largest chemical cluster in the world.

Topics covered are (1) sustainable energy, (2) sustainable chemicals, processes and materials, (3) transport and mobility, (4) urban development and sustainable construction, (5) rural development such as sustainable agriculture, and (6) air/water/waste/soil remediation.

FCA's companies are constantly looking for industrial and commercial partnerships to build win-win solutions for industry, organisations, and governments, which aim to accelerate the transition to a sustainable industry and society, and to yield ecologic and economic benefits. FCA provides them with a platform for international exposure.

FCA-companies can be grouped in 6 powerful Flemish cleantech sub-clusters:

- W3 – Wind Water Wave
- Bio-Economy Valley around the Port of Ghent
- Sustainable Chemistry cluster around the Port of Antwerp
- Smart Landfill & Urban Mining, Waste-to-Energy and Waste-to-Materials
- Energy-Efficiency for Smart Buildings & Cities
- Living Labs on Smart Mobility

For more information: www.fca.be

Foreword

Cleantech Group, in partnership with the Flanders Cleantech Association, is proud to present this report on Flanders cleantech innovation. The report was prepared to help Flanders SMEs active in clean technology innovation gain more international visibility, and to act as an invitation for the world's leading technology and innovation scouts to come and visit Flanders and discover innovation for themselves.

On the one hand, we have tried to provide you, the reader, with a general overview of the innovation company ecosystem in Flanders; on the other hand, we have highlighted several companies by name to illustrate the points made. The objective has been to characterize, not to be comprehensive.

With the 2014 **Flanders Cleantech 10 list**, we have gone one stage further and identified the 10 Flanders SMEs that seem to have the strongest admiration from the players who are active with, and knowledgeable of, Flanders clean technology. We do not definitively state that these 10 are the best or the top companies, but rather they appear to represent "consensus sentiment," according to the methodology we have used (as described in more detail on the following page).

This research fits neatly and squarely within Cleantech Group's mission to help international corporations, investors and financiers, as well as professional service firms and governmental agencies connect with cleantech innovation worldwide, and within Flanders Cleantech Association's mission to highlight Flanders companies for international linkages and opportunities.

We hope this report encourages you to spend more time discovering Flanders cleantech SMEs. We look forward to following the progress of these and all clean technology companies in Flanders in the years to come.

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Flanders Cleantech Association

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Research Analyst
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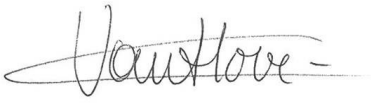

Carine Van Hove
Managing Director
Flanders Cleantech Association

An Overview of the Market Context

Flanders' investment into resource innovation over the past few decades has stemmed from the region's proactivity to address its future economic development prospects. As an industrial hub situated in the north of Belgium and adjacent to France, the Netherlands and Germany, the Flemish region is widely known for its infrastructure of ports and important trade and manufacturing sites. Antwerp in the region of Rotterdam-Nordrhein-Westfalen, for instance, is home to one of the largest chemical clusters in the world (second after Texas), and Ghent is one of the most important gateways for the biomass and bio-based industry in Europe. The region has a population of over 6 million (equivalent to the size of Ireland), with a concentration of approximately 500 people per square kilometre. Flanders' highly dense population combined with its intense industrial activities has precipitated entrepreneurs to invent solutions which decouple economic growth from its adverse impact on natural resources. As a result, there are many dynamic small & medium enterprises playing an important role in the resource efficiency value chain (from the upstream sustainable extraction of raw materials down to the provision of installation and maintenance services to improve industrial processes).

*Illustration of the artificial 'atoll' off the coast of Wenduine

Apart from the ultimate pursuit for resource innovation, Flanders has amongst the highest recycling rates in the world: more than 70% of the household waste produced in Flanders is collected separately in order to be reused, recycled, or composted thanks to major regional policies set out by The Flanders Public Waste Agency (OVAM). This Agency successfully discourages landfill and incineration in favour of waste prevention, reuse, recycle and composting.

The Government of Flanders is also committed to promoting various clean technology sectors through its **Flanders in Action Pact 2020**.[1] The Flemish Materials programme is an example of a Pact 2020 project which aims to foster smarter design and smarter investment in materials and to bring synthetic materials and metals into a continuous cycle.[2] The 'Electrical Driving Master Plan' is another program which the Government has implemented to enable sustainable mobility, reduce traffic emissions and promote environmentally friendly driving behaviour.[3] Today, over 600 public charging points are being installed across the region.

Flanders also maintains significant targets for increasing the use of renewable energy sources (Belgium aims to have 13% of its own energy production from renewable energy sources by 2020). This has especially spurred innovation in various sectors but especially in the 'Blue Energy' or wind and tidal area. Despite its small offshore area in the north of Belgium, Flanders is a major European operator of offshore wind turbines (after the UK and Denmark), with approximately 400 MW installed to date and 185MW of new installed capacity in 2012 alone.[4] Belgium also has plans to increase its yield in the future by building an artificial island - an 'energy atoll' - which will use pumped hydro to store excess wind power in the North Sea.[5] Flanders also intends to start an elaborate deep geothermal network project in the provinces of Antwerp and Limburg.

[1]Flanders in Action Pact 2020
[2]The Flemish Materials Program
[3]Environmental Policy Plan , 2011 - 2015
[4]GWEC Global Wind Report 2012
[5]MIT Tech Review, A Manmade Island to Store Wind Energy

Key Innovation Sectors

Flanders is strong in some core innovation areas because of the inherent entrepreneurial impetus in the region to foster a resource efficient society. Moreover, Flanders' central location at the heart of Europe, the high density of knowledge clusters, and the low corporate tax rates and other financial incentives has attracted considerable talent and innovative companies to the region.

This section will offer insight into Flanders' innovation and touch on a number of key categories (such as Recycling, Mobility, Water and Wind), though it does not encompass all of the promising innovation themes in the region. Additional sectors ripe with activity and worth uncovering include Energy Efficiency (e.g. **Nozon Technologies**, **Caloritum, E.Van Wingen**), Smart Grid (e.g. **EcoFinity**, **Elster Energy ICT**), Solar (**Liquisol, GPC Europe, Rytron, IKAROS Solar**), Agriculture (e.g. **AgroSavfe, Eco Treasures, Bioelectric, Santerra**), Air (e.g. **Typhoon**), Biomass Generation (e.g. **E-Rational**) and Energy Storage (e.g. **Blue Planet Hydrogen**).[6]

ADDITIVE MANUFACTURING

Flanders is a major European hub for the Additive Manufacturing (AM) space, with many leading companies working to accelerate not only gadgets in the prototyping phase but also mass produced products on an industrial scale. **KU Leuven LRD**, the technology transfer office (TTO) of Catholic University of Leuven, has a machine design and automation division which has prompted several innovative spinoffs including 3D printing companies **Materialise** and **Layerwise** (see page 20). The TTO also has an open source platform called **FabLab** where students and others can come together to share knowledge and use machines and software for free. **Sirris**, the industrial technological centre, runs several rapid manufacturing projects across Belgium and has formed a venture with KU Leuven called the *Composites Application Lab*, a knowledge centre which aims to help companies integrate composite materials into their products. **Additivemanufacturing.be** is the 3D printing network which aims to create new business models across various technologies such as stereo-lithography, laser cladding, 3D printing of metals or electron beam melting. One of its core members is the direct digital manufacturing specialist **Melotte**,[7] which is now producing precision parts for customers like Exxon and Dupont and is cooperating with a textile company in Qingdao, China to 3D print steering wheels.

*Picture of students using machines at FabLab-Leuven

ADVANCED RECYCLING

Given its long history of green waste management practices, it is no surprise that Flanders has a number of well-established corporations and SMEs innovating in the recycling sector (with technology focus areas ranging from recycling of complex materials to building materials out of steel slag and CO2). **Van Gansewinkel**, the large waste management group, has subsidiaries across the recycling value chain in Flanders including **EcoSmart** (waste removal services), **Coolrec** (electronics equipment recycling), and **Maltha** (glass recycling). In 2011, the company purchased Veolia's solid waste operations in Belgium, and uses the acquired landfill sites to convert waste materials into secondary building materials.

Important pioneers that are using innovative technology to exploit past landfill mines include **Indaver** and **REMO Milieubeheer** (a subsidiary of Group Machiels). REMO

[6] Companies in these categories can be found on FCA's website and/or Cleantech Group's i3 platform
[7] Melotte is owned by Picanol, the Belgian developer of high-tech products

for instance, has utilized its plasma technology to recycle materials through sequestration and valorisation of waste flows on its landfill site in Houthalen-Helchteren.[8] A multitude of other Flemish companies are focused on the closed-loop concept by using mineral waste for the production of raw materials, solvents or energy: examples include **Aitch group, De Neef Chemical Processing DNCP, RECMIX, a.c.k, Aqua Concept Benelux**, and **Ensartech**.

Within the scrap metal recycling category, one of Europe's leaders includes **Group Galloo**. With locations across Belgium, France, and the Netherlands, the company claims to recycle over 1.7 million tonnes of ferrous metals and 80 thousand tonnes of non-ferrous metals per annum. **Umicore**, the global materials technology group, also has a subunit specialized in recycling complex waste streams and has developed one of the first recycling processes to enable recovery of new generation batteries. Other smaller players in the metals recycling space include **Metallo-chimique** and **InsPyro** which are using innovative hydro and pyro metallurgical processes.

REMEDIATION

The presence of contaminated sites near densely populated areas in Flanders has spurred innovation in the reuse and repurposing of those sites. The redevelopment of brownfields has become engrained in the strategic policy of the region with the Flemish Brownfield covenant[9] mandating cooperation between government and project developer/real estate companies to jointly take on polluted soil. The Flemish investment company **PMV** also launched a public-private partnership for the development of a sustainable industrial estate on Eiland Zwijnaarde in Ghent.

Several Flanders companies are focused on the remediation of soil, especially from contaminated or polluted industrial zones. Examples include **DEC**[10] and **Envisan**[11] which are active in the sanitization of brownfields, while **Deep Green** and **TPStech** specialize in the thermal clean-up of polluted soil. **Bioterra** uses various on-site remediation techniques including grafting via bioreactor.

*TPStech's situ thermal desorption technology

EFFICIENT BUILDINGS

Flanders is increasingly focusing on improving the energy performance of their buildings (which accounts for more than one third of their primary energy consumption) as a means to enable greater economic growth. The European Institute of Innovation and Technology (EIT) (supported by the European Commission) chose Flanders as one of the core regions to locate its European expertise centre on smart and efficient buildings and cities. The **KIC InnoEnergy** program looks to foster companies that are innovating in sustainable design of buildings, retrofitting, and climate control among other topics. Key Flanders' innovators along these themes include **Fifthplay** (smart thermostats and energy management), **EcoNation**, (wireless technology to optimize daylight use), and **Vivixtum** (building insulation).

SUSTAINABLE CHEMISTRY

The Chemicals industry plays an important role in the Flemish economy, and so it is fitting that companies in the region are increasingly interested to bring bio-based products to the market. **Proviron** is a producer of specialty chemicals for different market applications like polymer additives, feed

[8] Closing the Circle an implementation of Enhanced Landfill Mining
[9] Brownfield Agreements
[10] DEC is a subsidiary of DEME (Dredging, Environmental and Marine Engineering)
[11] Envisan is the environmental subsidiary of dredger company - Jan De Nul Group

ingredients for animals, and solvents. Its patented product, proviplast, is 100 percent made from bio-based content and claims to be price competitive with alternatives.

Tessenderlo Group is the large corporation which develops specialty fertilizers for the food, mining, and water treatment industries. **Beaulieu International Group** has a business unit that extracts granules and fibres from crude oil which serve as useful raw materials for floor fabrics. **Ecover** is a well-known Belgian producer of sustainable cleaning supplies, and an innovator in phosphates-free laundry detergent and products. The company acquired its UK counterpart Method in 2012 and has worked with another UK plastic recycling company, Closed Loop Recycling, to use waste plastic from the seas around the EU to reuse as new packaging.

MOBILITY

'Smart Mobility' has become a mainstream topic in the Flemish region as a means for reaching a low-carbon economy. Flanders has an open innovation hub called the 'Living Lab', which was developed to accelerate the adoption of electric vehicles. Over 70 corporations and research partners have been working together through this network, and five platforms have been created relating to mobility behaviour (**iMOVE**), charging stations (**Electric Vehicles in Action**), electric heavy duty vehicles (**EVTecLab**), smart electricity grids (**Olympus**), and EV fleets and smart microgrids (**Volt-Air**).[12]

There are companies across the mobility subsectors including those specialized in providing charging stations (and related apps and software) for electric vehicles such as **eNovates** and **beCHARGED** as well as traffic app companies like **Traficon** and **Be-Mobile**. In the transmission powertrains space, **Punch Powertrain**, has built a solar car (Indupol One) in 2013 using 429 small lithium ion battery cells and innovative structure through 3D printing.

*Example beCHARGED electric vehicle charging station

WATER INFRASTRUCTURE MANAGEMENT

There are several organizations in Flanders that have put in a great deal of effort to improve water quality, including by forming public-private partnerships on wastewater treatment infrastructure. **Vlakwa** is the water knowledge centre which is coordinating the whole industry (enterprises, researchers, and government). **Aquafin** became an established government vehicle for pre-financing and building infrastructure for sewage treatment plants. **Aquaplus**, a subsidiary of Aquafin, is now specialized in the international market - subcontracted to work with various municipalities and utilities on all stages of the wastewater cycle.

There are additionally a multitude of innovative water companies interested in serving industrial or commercial markets. **EkoPak** is a provider of water treatment for industrial equipment (such as high-pressure steam-boilers) and power plants. **Induss** provides a spectrum of water management services (e.g. water audits, environmental certificates) and has recently cooperated with **Purazur** (the daughter company of **DEME**) to establish a demineralized water production plant which supplies the industrial zone along the port of Antwerp.

[12] http://www.livinglab-ev.be/

Waterleau, Keppel Seghers, Pollet Water Group, and **De Watergroep** are just some examples of the leading engineering companies which provide a variety of services across the water value chain (including water infrastructure management) for both municipalities and industry and are operating worldwide. Other key SME-innovators include **Opti Water Systems** (a software as service provider) and **Aaqua** (wastewater treatment plant engineer).

*C-power wind farm in Thornton Bank

WIND ENERGY

Wind farm operators and wind turbine manufacturers in Flanders are dominated by large established players such as **C-power**, which had developed the first offshore wind farm in the Thornton Bank on the North Sea (illustration to the right). Multinational corporations **Vestas**, **Alstom**, and **Deme** are also main wind farm operators off the coast of Belgium. Major suppliers of wind turbine parts include **ZF Wind Power**[13], the designer of wind gearboxes. The Colruyt family also invests heavily in wind energy (offshore farms), and now generates more power from renewables than it consumes. **Colruyt Group** has since 2012 been investigating ways to convert wind and solar power into hydrogen as a sustainable fuel that could be used at its distribution centres[14].

However, smaller, innovative companies are popping up with the strategy of providing consulting and maintenance services to the larger corporates. **REBO** provides construction services for offshore wind farms. **eCoast**, a spin-off of Ghent University, provides consulting services for marine and coastal projects. **GEOxyz** carries out underwater investigation to check sub-sea steel structures for corrosion, and, similarly, **DECO** provides diving services to marine contractors as well as jet-dredging apps to implement airlifts.

[13] ZF Windpower is a major business unit of ZF Friedrichshafen
[14] Colruyt Group

The Innovation Ecosystem

RESEARCH CENTRES

Flanders holds a number of prestigious institutions that promote technological solutions to stimulate sustainable development. **VITO** (the Flemish Institute for Technological Research) holds a smart grid test facility to enable research of various issues in a low voltage AC and DC system. It also processes images from satellites and aircraft for the purpose of global vegetation monitoring and other environmental evaluations. VITO together with **TNO** (the Netherlands Organisation for Applied Scientific Research) have initiated **Biorizon**, a centre currently attracting interest from biomass companies with the focus on bio-based materials for aromatics, chemicals, and coatings. **Imec**, a renowned research center in nanoelectronics (with a strong focus on graphene materials), offers a variety of services applied across the semiconductor value chain. **Energyville** in Genk, unites VITO, Imec and K.U. Leuven to cooperate in the research of renewable energy, smart grids and sustainable cities. It is also the action base for several smart grid industry associations including **Smart Grid Flanders**, **DERlab**, Global Smart Grid Federation as well as the **KIC InnoEnergy**. **OCAS**, the steel and metals institute (a joint venture between ArcelorMittal and the Flemish region), conducts third party R&D and has invested via its venture fund Finindus in several companies including **Calyos** (thermal management) and **Borit** (see page 14).

CLUSTERS & INCUBATORS

Greenbridge Science Park, based in Ostend, provides infrastructure, counselling, and financial resources to high-tech startups such as **Argus Technologies** (energy efficiency), **BIKE @ WORK** (transportation) and **Smartroof** (solar). The Greenbridge Demonstrator, embedded in the innovation and incubation centre, focuses on energy efficiency and now 'Blue Energy,' (offshore wind, hydro and marine power). **Greenville** is a new business centre for green organizations, providing offices, meeting rooms, and event spaces. The main building is the former Kempische coal mining center, with over 18 clean technology companies present. **COHESI**, the Flemish innovation platform for smart microsystems, focuses on translating mature research results into prototypes and has led to a number of spinoffs such as **Enconcore** (see page 17), **Ansem** (nano-electronics), and **Vubonite** (glass fibre composites). **The University of Ghent** holds a multidisciplinary centre involved in wind, waste heat recovery, 'blue energy', and energy efficiency. Additionally, the **Gen4Wave Energy Platform** was set up by Ghent University together with Flanders Maritime Cluster and Agoria Renewable Energy Club to support the development of wave and tidal projects.

Other clusters and accelerators are much more oriented around specific sectors. For instance, the **Ghent Bio-Economy Valley (GBEV)** is an open innovation centre focused on bio refinery. The organization is working with the Bio Base Europe pilot plant on the *BIOKATALYSE* project, conducting feasibility studies on biocatalysis to speed up chemicals processes.

*Photo of the BIOKATALYSE project

Flanders has a multitude of major Sustainable Chemistry and Advanced Materials clusters perhaps greatly influenced by the large number of multinationals involved in those innovation areas - namely Bekaert, Umicore, Solvay, Tessenderlo, Arcelor Mittal, BASF, Evonik among others. **FISCH**, the Flanders Innovation hub for Sustainable

Chemistry stimulates sustainable chemistry innovation in Flanders (such as the use of microalgae). FISCH, together with **Essenscia**, the Belgian Federation for Chemistry and life Sciences and **Blue Gate Antwerp**, the eco industrial park, are investigating the feasibility of an accelerator called **BlueChem** (potentially to be launched by 2016). Additionally, **Agfa Chemicals**, the large chemicals company, has an open innovation platform called Agfa-Labs, where it conducts joint research projects on materials and coatings.

NETWORKS

Flanders Cleantech Association brings together the Flemish cleantech companies and supporting actors in the international community, and is the primary information source and promotion channel on cleantech companies, clusters, and other organizations in a global context. **I-Cleantech Vlaanderen** is another major network which promotes cleantech activities through connecting companies and various other actors through networking and other communication tools. **Flanders Smart Hub**, is situated in Flemish Brabant, promotes cooperation between universities and businesses and seeks to attract local and foreign investment to the region.

GOVERNMENT AGENCIES

Thanks to government policy, the Flemish region has one of the lowest corporate tax rates in the EU and awards generous tax exemptions for employees active in R&D of innovative products and processes.[15] This, and the fact that various government agencies provide support to entrepreneurs, makes Flanders an attractive place for startups to reside. For example, FRX Polymers, the US headquartered flame retardant company, built its first commercial plant in Antwerp (in Bayer's manufacturing site) specifically because the city held many geographical benefits for the company.

Flanders Investment and Trade is the government agency which supports companies doing business abroad and foreign companies looking to set up or expand operations in Flanders. Additionally, the Flanders Enterprise Agency **Agentschap Ondernemen** is also a government agency in charge of enterprise policies in Flanders. **IWT**, the Innovation, Science and Technology government agency, helps Flemish companies and research centres to realize their R&D projects, offering funding, advice, and a network of potential partners in Flanders and abroad and also supporting the Flemish Government in its innovation policy.

VENTURE CAPITAL & PRIVATE EQUITY

The primary local investors that provide early and growth stage investment across various cleantech sectors include **Capricorn Venture Partners**, **LRM**, **Capital-E**, **Hummingbird Ventures**, and **Korys** (the investment fund of the Colruyt family). Other investors that participate across different innovation areas (including partial focus on cleantech) includes **Qbic Fund, Hefboom, Ventures4Growth**, and **GIMV**.

ParticipatieMaatschappij Vlaanderen (PMV) Innovatiemezzanine, and **Federale participatie en investeringsmaatschappij (FPIM)** are the major government backed venture capital organizations involved in cleantech.

Solvay and **Bekaert**, two large Materials Corporations, are also Flanders based investors who have made historical growth capital investments. **Finindus**, the investment company funded by multinational steel manufacturer **ArcelorMittal** and the Flemish Region, provide early stage and growth financing to companies in materials, material processing, and sustainable manufacturing.

Later stage investors include **Allyum**, a Brussels-based private equity and corporate finance advisory company, which invested in **Windeo** in 2011, the wholesale distributor and installer of micro wind turbine systems. **Indufin**, the investor in medium-sized enterprises, historically took a stake in **Waterleau Group**, the global player with a complete portfolio of water, air, waste treatment, and energy recovery applications.

[15] Flanders Investment & Trade, News, August 2013

Flanders Cleantech 10

On the ten pages that follow this one, we profile the ten companies who form this Flanders Cleantech 10. How we ended up with these ten companies is explained below.

METHODOLOGY

Who can qualify for the Flanders Cleantech 10 list?

Any independent, for-profit, Flanders-based cleantech company that is not listed on any major stock exchange and with revenues under €50 million (the limit set by the standard SME definition used by the European Commission).

What is considered cleantech?

From 2002 until today, our website has carried the same words, written by our founders, of which these are some of the most critical:

> *The concept of cleantech embraces a diverse range of products, services, and processes across industry verticals that are inherently designed to (a) Provide superior performance at lower costs, (b) Greatly reduce or eliminate negative ecological impact, and (c) Improve the productive and responsible use of natural resources*

However, what we have evolved is our taxonomy and the 700+ tags we use today to classify companies in this important area of innovation, organized under 18 top-level categories, as shown below. To see how these 18 break-down into sub-categories and how our commercial data platform, i3 (insight into innovation) is structured, please visit http://i3connect.com/tags/.

ADVANCED MATERIALS	AGRICULTURE & FORESTRY	AIR	BIOFUELS & BIOCHEMICALS	BIOMASS GENERATION	CONVENTIONAL FUELS
ENERGY EFFICIENCY	ENERGY STORAGE	FUEL CELLS & HYDROGEN	GEOTHERMAL	HYDRO & MARINE POWER	NUCLEAR
RECYCLING & WASTE	SMART GRID	SOLAR	TRANSPORTATION	WATER & WASTEWATER	WIND

How did this list come together?

In **Phase 1**, a long list of **130 companies** was built from both active nominations made by market "insiders", and passive nominations derived from Cleantech Group analyzing market data, including investment data from our own i3 platform. Based on a proprietary scoring system, used to identify those with the broadest base of support, Cleantech Group narrowed down the results to **a shortlist of 28 companies**.

In **Phase 2**, members of our advisory panel (see Appendix), were each given a defined number of chips to place against the shortlisted companies, to support certain companies' case to make the final 10. They were asked to consider the following two angles:

Uniqueness of Innovation/Technology - a measure of 'future potential' given what the company has developed to date and their belief that it has disruptive and exciting potential for the future

Market Traction - a measure of how excited customers are by their offering today

Borit

Manufacturer of sheet metal products and assemblies

CEO	Luc Wanten
Revenue Range	$500k - $2m
Sector(s)	Advanced Materials; Fuel Cells & Hydrogen
Tel	+32 (0) 14 25 09 00
Employees	12
Founded	2010
Location	Geel
Website	http://www.borit.be/

OVERVIEW

Borit aims to rapidly develop into a worldwide supplier of high-precision formed metal parts and assemblies.

Borit is a spin-off company of OCAS, an advanced metal research centre in Flanders, and Borit Leichtbau-Technik, a German technology development company. Borit manufactures and markets high precision sheet metal parts and assemblies using its proprietary 'Hydrogate' technology. This hydroforming press concept combines the accuracy and quality of hydroforming with the advantages of traditional press technology geared for mass manufacturing.

Borit has extended its offering and capabilities by developing and acquiring advanced laser cutting and laser welding capabilities, thereby enhancing its competiveness.

Borit's capabilities fit closely to the needs of producers of fuel cell stacks, electrolysers, heat exchangers, cooling systems for battery packs of electric vehicles, and lightweight structural parts (e.g. for aviation). The company offers its customers full support throughout the product development cycle - from design and prototyping to pre-series and large-scale production.

Section of a Borit fuel cell bipolar plate

COMPETITIVE ADVANTAGE

Borit offers an alternative to traditional forming technologies such as deep drawing. Borit is capable of forming complex geometries with high repeatability, narrow dimensional tolerances, and with low residual stress which is beneficial for both the quality and yield of all processing steps.

The less complex and less costly tooling and development approach, which focuses on the most demanding details of a design, allow customers to move forward fast in their development process with a swift transition from prototypes to pre-series to production volumes.

Borit offers its customers the benefits of more extreme forming parts (resulting in higher product performance) at a lower cost and risk.

CUSTOMERS AND PARTNERS

Besides the links with Borit Leichtbau-Technik and OCAS, which continue to support Borit's development, Borit has established partnerships with major industrial suppliers of materials, coatings and sealing solutions in order to offer its customers a one-stop-shop solution.

Borit has succeeded in triggering commercial traction in Europe, North-America and Japan. Borit has opened an office in Yokohama (JP) in 2011 and in Cleveland, Ohio (USA) in 2012.

Borit is active across all fuel cell and electrolyser technologies and application areas and serves automotive OEMs among other players.

KEY PARTNERS	INVESTORS	SIMILAR COMPANIES
borit® Leichtbau-Technik GmbH	finindus materializing innovation	SALZGITTER HYDROFORMING; VARI-FORM; SCHULER

Powered by data from i3

DESOTEC Activated Carbon

Provider of solutions for air and water purification mainly based on activated carbon technology

CEO	Joost Desmet
Revenue Range	
Sector(s)	Air; Water & Wastewater
Tel	+32 (0) 51 24 60 57
Employees	100
Founded	1990
Location	Roeselare
Website	http://www.desotec.com/

OVERVIEW

DESOTEC Activated Carbon is an international developer, producer, and supplier of purification solutions primarily based on activated carbon technology. The company's solutions include the supply of a range of mobile adsorption systems, the design, construction, and startup of tailor-made fixed systems, and the recycling of used activated carbon. The AIRCON mobile adsorption systems are designed to purify gases using the AIRPEL range of products while the MOBICON systems are used to purify liquids with the ORGANOSORB range.

Applications for activated carbon include, amongst others: water treatment for human and non-human consumption (e.g. soil purification); filtration and purification of industrial processes, food, air, and gas; and personal and collective protection (e.g. gas masks).

DESOTEC's activated carbon samples

COMPETITIVE ADVANTAGE

DESOTEC has a large fleet of mobile interchangeable filters in Europe for the purification of liquids and gases (the aforementioned MOBICON and AIRCON). As such, the company develops and builds tailor-made installations – delivering added value and service to its customers. On the one hand, this mobility feature allows the company to offer a fast service and delivery of ready-to-use activated carbon solutions, avoiding on-site manipulation of carbon. On the other hand, the client benefits from a cost-efficient and eco-friendly solution.

CUSTOMERS AND PARTNERS

DESOTEC serves a broad range of industrial and utility customers. The company operates primarily in the European market and runs its activities in Eastern Europe through its local service center DESOTEC POLSKA in Gdansk and in Southern Europe through its local service center DESOTEC IBERICA based in Tarragona, Spain.

CURRENT ACTIVITIES

DESOTEC Activated Carbon recently developed and patented the mobile air treatment filter system, the AIRCON V-XL. The system consists of a fixed part, the AIRCONNECT, which is directly connected to the gas to be treated, thus making flexible connections superfluous. The AIRCONNECT system has a design which results in a click-and-start activated carbon filtration system for gas flow rates up to 55,000 m3/h per unit.

Since April 2013, DESOTEC and Aquafin, a water treatment company created by the Flemish Region, are developing BioMac, a water filtration plant. This project forms part of a European initiative that aims to test mechanisms to remove primary substances from domestic and industrial wastewater. Other contributors to the project are Vlakwa, the Flemish knowledge center for water and the University of Ghent.

KEY PARTNERS	INVESTORS	SIMILAR COMPANIES
Vlakwa	AAC capital PARTNERS	CABOT
Aquafin		Jacobi THE CARBON COMPANY PICA A JACOBI CARBONS COMPANY
		Norit leading in purification

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Ducatt

Designer of hardware and software solutions for the optimization of photovoltaic plants

CEO	Henk Coppens
Revenue Range	$0-$500k
Sector(s)	Advanced Materials; Solar
Tel	+32 (0) 11 559 300
Employees	12
Founded	2010
Location	Lommel
Website	http://www.ducatt.com/

OVERVIEW

Ducatt is a spin-off of Emgo, a manufacturer of drawn and blown glass. Ducatt (Dedicated Ultra Clear Anti-reflective Thin and Toughened solar glass) specialises in ultra-clear, ultra-thin, and low-iron glass which optimises the yield of various solar applications.

Ducatt initially focused on serving the crystalline silicon (c-Si) modules market but has now expanded into other applications such as photovoltaic thin-film modules, thermal solar flat collectors, concentrated solar power (CSP) systems, and even greenhouses.

Ducatt's Solar Glass

COMPETITIVE ADVANTAGE

Ducatt has developed the right chemical composition for solar glass which reduces both thickness and weight without losing strength and also maintaining high transparency. Ducatt's ultra-clear glass has a transparency of up to 95 % and a thickness down to 2 mm.

Ducatt's solar glass is multifaceted and can be applied to a variety of contexts. Ducatt's furnace provides low waviness, and therefore has advantages to thin film modules. The glass can increase break resistance and light transmittance while also reducing module weight and overall costs (watt-peak installed). Ducatt can also provide greenhouses with stand-alone power (two panes of thin glass are laminated together with solar cells in-between). Ducatt's transparent panels thus allow a large solar spectrum to be evenly spread throughout the greenhouse.

CUSTOMERS AND PARTNERS

For cutting, edge-grinding, and thermal toughening, Ducatt works with LiSEC, a German company specialising in the refinement of flat glass.

For product distribution, Ducatt has established a channel partnership with Groep H.Essers, a logistics service provider that operates a warehouse and a busy transport hub near Ducatt.

In March 2012, the Dutch company TULiPPS Solar incorporated Ducatt's 2mm single-layer toughened solar glass for its solar panels.

CURRENT ACTIVITIES

In May 2013, Ducatt acquired the glass division of the insolvent company, CentroSolar Glass, a producer of anti-reflective coated solar glass. Ducatt also modernized its production line to become partly automated, offering the ability to track the product remotely. The continuous inline production monitoring system can scan and track every single sheet of glass, making each sheet fully traceable.

KEY PARTNERS	INVESTORS	SIMILAR COMPANIES
LiSEC	LRM Oxygen for growth	XYG
H.ESSERS	Capricorn Venture Partners	SCHOTT solar
TULiPPS Solar System Solutions	PMV	

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Econcore

econcore
economic core technologies

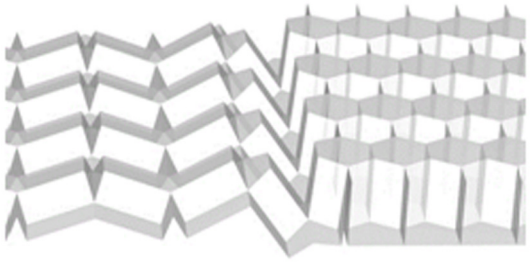
Developer and seller of engineered carbon and metal nano-structures

CEO	Jochen Pflug
Revenue Range	
Sector(s)	Advanced Materials
Tel	+32 (0) 16 3810 60
Employees	5
Founded	2005
Location	Leuven
Website	http://www.econcore.com/

OVERVIEW

EconCore (Economic Core Technologies) provides core technologies for the continuous production of thermoplastic (ThermHex) honeycomb sandwich panels and parts which are suitable for a variety of applications in several markets like packaging, automotive, building, construction, and furniture.

Econcore's technology was inspired by a combination of the know-how in the internal structure and properties of honeycombs developed for the aerospace industry and the automated production principles of the packaging industry. The folded honeycomb was originally developed at KU Leuven's research center. The company operates mainly through a licensing model of its product technology.



Honeycomb continuous fabrication process

COMPETITIVE ADVANTAGE

Econcore claims that the honeycomb cores provide three key advantages: fast and cost effective in-line core production; excellent mechanical properties, similar to lightweight aerospace honeycombs; and environmentally friendly – using recyclable materials (thermoplastic polymers and natural fibres). Additionally, thanks to the sandwich technology that enables Econcore to choose the layer and core material, Econcore can play with weight and cost properties, adapting its product to different demands.

CUSTOMERS AND PARTNERS

Some of EconCore's key licensing partners include Coroplast (North-American producer of corrugated plastic sheets for re-usable packaging), Risu GIFU plastic Group (Japanese plastics producer), Renolit Gorcell (manufacturer of plastic films for the automotive industry), Röplast Hexapan (a Turkish light-weight panel producer), Karton (an Italian producer of polypropylene sheets) among others.

CURRENT ACTIVITIES

EconCore is actively exploring automotive, transportation and building applications using advanced materials and hybrid sandwich systems. The company recently developed lightweight polyamide honeycombs which are able to resist higher temperatures compared to traditional thermoplastic sandwich cores. The PA honeycombs laminated with glass and carbon reinforced PA skin sheets deliver high performance to weight ratio and are being evaluated for exterior parts. Other developments include the ThermHex polypropylene honeycomb laminated with natural fibre composites, which offers minimal costs at high level of thermoformability. and is being qualified for automotive interior trim components. Furthermore, EconCore's new licensing partner (an undisclosed major steel maker) is starting a continuous thermoplastic honeycomb - metal skins hybrid sandwich panel production line for building and transportation solutions.

KEY PARTNERS	INVESTORS	SIMILAR COMPANIES
ITOCHU	ALLEGRO INVESTMENT FUND	nidaplast
	LEUVEN RESEARCH & DEVELOPMENT GEMMA FRISIUS FUND	TUBUS WABEN
	EconHP Holding	CCL

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EpiGaN

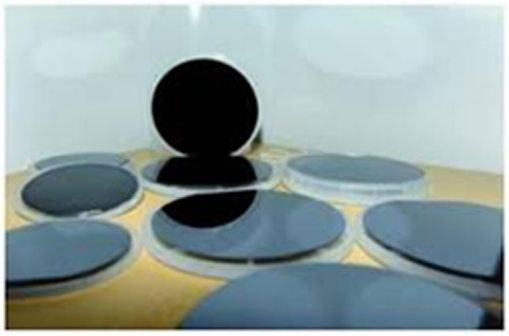
Manufacturer of Gallium Nitride on Silicon (GaN-on-Si) semiconductor wafers for more efficient power conversion

CEO	Marianne Germain
Revenue Range	$2m-$5m
Sector(s)	Advanced Materials; Energy Efficiency
Tel	+32 (0) 11 56 66 20
Employees	10
Founded	2010
Location	Hasselt
Website	http://www.epigan.com

OVERVIEW

EpiGaN, a spin-off of the research center imec, provides III-nitride epitaxial materials for top performance power and Radio Frequency (RF) devices. Gallium Nitride on Silicon (GaN-on-Si) is an enabler for clean energy generation and more efficient power conversion. The technology intellectual property was initially leased from imec, and has since become fully owned by EpiGaN.

EpiGaN's technology targets device manufacturers of power supplies for consumables, hybrid electric vehicles, solar inverters, RF power for base stations, smart grid, UPS (uninterruptible power supply) systems, and AC (alternate current) drives.



EpiGaN's epiwafers: GaN-on-Si 4" and 150 mm

COMPETITIVE ADVANTAGE

EpiGaN pioneered GaN-on-Si technology and fostered a lot of research in the field. Furthermore, EpiGaN offers its in-situ SiN process, used to passivate the electronic materials, i.e., to protect them against environmental degradation and hence enhance device performance and reliability.

EpiGaN's production unit (cleanroom facilities) is situated within the "knowledge triangle" of Eindhoven-Leuven-Aachen, an epicenter for innovation proceeding from the interaction between experienced companies, young entrepreneurs, and universities' research centres.

CUSTOMERS AND PARTNERS

In November 2011, EpiGaN joined the EU-FP7 project 'HiPoSwitch' which aims to develop more compact and more powerful energy converters to be used in ICT and solar inverter technology. This European Commission initiative covers the whole value chain, from GaN-on-Si epiwafers to GaN power device development to industrial applications.

EpiGaN also collaborates with ENIAC JU (a nano-electronics public-private partnership) on the E2COGaN project, which aims to demonstrate the benefits of GaN devices in micro-grid interfacing circuits for photovoltaic power generation and in grid-connected battery chargers for electric vehicles. EpiGaN is also the main supplier of GaN material source in a project with the European Space Agency (ESA).

CURRENT ACTIVITIES

In July 2012, EpiGaN successfully commissioned two new MOCVD (metalorganic chemical vapour deposition) reactors. EpiGaN uses the systems to commercialize up to 6-inch GaN-on-Silicon wafers for a range of power and RF electronics devices.

In Q3 2012, EpiGaN's first 600V grounded 150 mm wafers were delivered to GaN Integrated Device Manufacturers (IDM). It has also demonstrated 200mm epi wafers. Currently, EpiGaN is working on increasing its production capacity and tackling new markets in the US, Asia, and Europe.

KEY PARTNERS	INVESTORS	SIMILAR COMPANIES
SEVENTH FRAMEWORK PROGRAMME	LRM Oxygen for growth	IQE
eniac JOINT UNDERTAKING	Capricorn VENTURE PARTNERS	DOWA
esa European Space Agency	BOSCH	NTT AT

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LayerWise

Developer of metal additive manufacturing (3D-printing) products and technologies

CEO	Peter Mercelis/Jonas Van Vaerenbergh
Revenue Range	$5m-$10m
Sector(s)	Advanced Material
Tel	+32 (0) 16 94 64 00
Employees	50
Founded	2008
Location	Leuven
Website	www.layerwise.com

OVERVIEW

LayerWise focuses on metal 3D-printing for aerospace, industrial, electronics, medical and dental applications. Using Additive Manufacturing (AM), the company produces fully dense metal components – without material scrap and without the use of oil as applied in traditional metalworking. The digital AM approach challenges traditional metalworking and molding practices by producing complex, freeform parts in a single manufacturing step. This results in compact serial-produced parts offering increased capabilities while reducing weight and maintenance costs.

The AM technology selectively directs a laser to a metal powder bed. The metal particles are pinpointed by the laser melt and attached to the previous layer. By sequentially adding thin cross-section layers, the AM part gradually evolves toward the targeted geometry.

A 3D-printed jaw implant, manufactured by LayerWise

COMPETITIVE ADVANTAGE

The AM design flexibility allows enhanced part performance, reducing weight and eliminating scrap while obtaining a 'fit for purpose' object and skipping the assembly step. The object, made from an increasing variety of metals and metal alloy, is created as a monolithic part and can incorporate complex features such as conformal channels, thin walls, and internal features as well as parts up to 400+ millimetres.

Furthermore, the serial production process allows producing any prototype component in a seamless process of up to 50,000 parts, thereby resulting in cost reduction and eased maintenance.

In order to track possible developments in 3D printing, Layerwise's R&D team collaborates closely with the KU Leuven.

CUSTOMERS AND PARTNERS

Industrial applications typically cover serial-produced precision mechanics, process industries and complex circulation parts. Customers in medical and dental fields order standard and patient-specific implant structures. In addition, LayerWise partners with research organizations including European Space Agency (ESA) and Formula Group T (first 3D printed race car).

CURRENT ACTIVITIES

Recently, LayerWise opened a subsidiary in Connecticut to further expand its market reach in the US. LayerWise continues to push the boundaries of AM to further increase part size, precision, quality and speed. Through research expertise in engineering know-how, LayerWise regularly introduces high-density and high-atomic-number as well as lightweight and hard-to-work-with materials, including (alloys of) Tantalum, Tungsten, Titanium, and Inconel.

KEY PARTNERS	INVESTORS	SIMILAR COMPANIES
TNO innovation for life		OPTOMEC
SYLVANIA		ExOne
EUROPEAN COMMISSION		CAD TO METAL Arcam AB

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NovoPolymers

Developer and producer of polymer based films for encapsulation of PV solar cells in solar panels

CEO	Koen Hasaers
Revenue Range	$2m-$5m
Sector(s)	Solar
Tel	+32 (0) 3 820 1459
Employees	7
Founded	2008
Location	Puurs
Website	http://www.novopolymers.com/

OVERVIEW

NovoPolymers produces films primarily for the solar industry. The company has a comprehensive line of thermoplastic based encapsulant foils for both the conventional c-Si cell based and thin film PV modules. NovoPolymers claims to offer cost-effective components enabling efficiency increase for a range of solar cell technologies (i.e. crystalline silicon and amorphous silicon). The company's current technology (NovoVellum®) is based on thermally curable Ethylene Vinyl Acetate (EVA) sheets. The company is also innovating in EVA alternatives for both niche and mass PV cell applications.

Novopolymers' initial target customers were European PV module and thin film manufacturers, however the company is moving its focus to a new target market: China.

COMPETITIVE ADVANTAGE

NovoPolymers has a strong R&D focus and is continuously innovating to develop new materials, securing durability and increasing the power output of solar modules. The design philosophy of cost containment innovation, assures value added contribution throughout the PV supply chain. Part of Novopolymers' strategy is also to channel its global supply through local manufacturing and selection of local subcontractors.

CUSTOMERS AND PARTNERS

NovoPolymers focus customer needs are evolving from new module technologies (i.e. glass-glass modules, Metal Wrap Through (MWT)) to help increase value throughout the photovoltaic supply chain. Global module manufacturers, turnkey suppliers and research institutes collaborate with Novopolymers for their ability to deliver process improvements and save costs through innovative materials, manufacturing scale, encapsulation expertise and deep technical support.

CURRENT ACTIVITIES

Novopolymers targets new high end encapsulant solutions, and is in the final stage of testing glass- tailored films for launch early 2014. Novopolymers is focusing on the encapsulants with added value on the module performance. The existing development platform also enables applications in non PV, of which testing is ongoing.

Novopolymers' transparent sheets for PV use

KEY PARTNERS	INVESTORS	SIMILAR COMPANIES
iMT, imec, umicore	Capricorn Venture Partners, Gimv, Capital-E, sfpi fpim	evasa eva specialist

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Nutrients Recovery Systems

Producer of a technology that recovers phosphates and nitrogen from liquid waste streams

CEO	Carl Dewaele
Revenue Range	Pre-Revenue
Sector(s)	Water & Wastewater
Tel	+32 (0) 475 62 73 33
Employees	2
Founded	2011
Location	Waregem
Website	http://www.nuresys.org/

OVERVIEW

NuReSys (Nutrient Recycling Systems) has developed a technology to recover phosphate and nitrogen from wastewater. NuReSys has set up their production process so that waste water 'upcycles' first through an air stripping Reactor (in which CO2 is lowered while the pH is increased), and then a Crystallization Reactor to form pure STRUVITE crystals, composed of recovered ammonium-magnesium-phosphate. This end-product is a clean substance that can safely be used as a fertilizer in agriculture and horticulture.

The NuReSys technology has a wide array of application fields and can particularly be used in Waste Water Treatment Plants (WWTP), in the agro-industry; for the purification of dairies, anaerobic digestion, manure treatment, or leachate treatment.

Struvite Crystals resulting from NuReSys process

COMPETITIVE ADVANTAGE

As phosphate is recognised to be a finite source, NuReSys has found a business opportunity that matches an underestimated issue: phosphate is an element used as a fertilizer and that is consequently crucial to the future of the agricultural industry. NuReSys believes that there is a strong demand for recovered phosphate and claims that its process results in a cleaner product than traditional phosphate extraction processes. In addition, phosphate recovery is cost effective and in most cases, cost less than traditional removal techniques using metal salts. The struvite provides additional value and through scaling prevention, lower maintenance cost and a reduced P load.

CUSTOMERS AND PARTNERS

The company's current customers include Agristo and Clarebout Potatoes (potato processing plants); Milchunion (a dairy producer); and a Belgian pharmaceutical company, Genzyme. 250 ton per year of STRUVITE produced in Belgium are being bought by a fertilizer company for use in the agricultural industry.

NuReSys has completed projects around municipal waste water treatment for Aquafin and also has close relationships with Akwadok, an advisory firm for wastewater treatment owned by Wim Moerman, NuReSys' co-founder.

CURRENT ACTIVITIES

In May 2013, NuReSys opened its first WWTP plant in Belgium. In March 2014, a pilot plant was started up at Schiphol Airport, the Netherlands. In Apeldoorn, a plant will be built for the GMB-Imtech group, treating 70m³/h.

KEY PARTNERS	INVESTORS	SIMILAR COMPANIES
Akwadok BVBA	iwt	OSTARA
genzyme A SANOFI COMPANY		PAQUES
Aquafin		DUCTOR

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REstore

Provider of Automated Demand Response services to balance the grid

CEO	Pieter-Jan Mermans, Jan-Willem Rombouts
Revenue Range	$2m-$5m
Sector(s)	Smart Grid
Tel	+32 (0) 3 320 80 39
Employees	15
Founded	2010
Location	Antwerp
Website	http://www.restore.eu

OVERVIEW

REstore offers a Demand Response (DR) service to grid operators and Balancing Responsible Parties to offset supply demand imbalances. Its automated demand response platform FlexpondTM offsets imbalances with the same reliability and for lower-cost than polluting gas plants. Through these services it facilitates the integration of renewable energy on the electricity grid. The system curtails and enhances power consumption of industrial installations, therefore bridging the gap between the energy suppliers, transmission grid operators, and individual industrial players. Automated DR helps to balance the grid at a lower cost, offering maximized payments for reducible power and a lower carbon footprint.

REstore offers DR capacity in both the reserve and the balancing market. In the latter, the company allows intraday balancing with flexible power demand.

REStore's FlexpondTM software acts as a virtual opencycle gasturbine

COMPETITIVE ADVANTAGE

Compared to its competitors, REstore's Flexpond™ platform offers strong value optimization and high reliability with an industry leading response time. The DR service uses the intrinsic flexibility in industrial processes without risk to the facility or process itself. Furthermore, the DR service can be integrated without any additional investments or operational efforts.

On the one hand, Restore's system enables energy suppliers and transmission system operators to be more flexible with their supply. On the other hand, industrial customers get rewarded for making their flexible capacity available, reaching 5-10% annual savings on electricity bills.

CUSTOMERS AND PARTNERS

REstore focuses mainly on two types of markets:

1) Services for Power Consumers: REstore offers substantial DR payments to businesses to briefly curtail their power demand at critical times. REstore has recently worked with companies in the Water treatment and Sewage (i.e. VIVAQUA, water-link), Logistics (i.e. Vanden Avenne) and Food sectors (i.e. Crop's, Ardo).

2) Services for Utilities: REstore offers aggregated balancing capacity to major energy suppliers and European transmission grid operators by steering electricity demand. The company has already worked with Elia, EDF, and National Grid.

CURRENT ACTIVITIES

In November 2013, the company had surmounted the 100-MW threshold in flexible power at its disposal, thanks to the multiplicity of contracts signed with energy consumers and electricity producers. Soon, REstore will begin to house part of its activities in the IncubaThor, the new incubator building next to Energyville's Thorpark in Waterschei. The Incubator, an initiative of the K.U. Leuven, LRM, and the city of Genk, will be a business centre hosting businesses focusing on the 'smart energy' sector.

KEY PARTNERS	INVESTORS	SIMILAR COMPANIES
elia Powering a world in progress	LRM Oxygen for growth	ENERNOC
EDF	axe investments	Energy Pool Smart energy management
nationalgrid THE POWER OF ACTION	business angels netwerk vlaanderen	endeco ENERGY DEMAND CONTROL

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The Sniffers

Provider of emissions monitoring and related services

CEO	Hans Hooyberghs
Revenue Range	$10m-$25m
Sector(s)	Air
Tel	+32 (0) 14 31 88 88
Employees	125
Founded	1991
Location	Balen
Website	http://www.the-sniffers.com

OVERVIEW

The Sniffers detects and analyses all kind of leaks on piping sources and leaking equipment from industrial activities using a wide range of techniques. The company offers emission reduction management, pipeline and thermographic integrity inspections, and leak detection with TÜV[16] certified dogs.

The Sniffers provides three main software solutions to collect, monitor, and report fugitive emissions data: SFEMP (Sniffers Fugitive Emission Management Software), SNIFFLARE (flare loss management) and SNIFTRAP (steam loss management). Additionally, The Sniffers' Perseus, a Pipeline Information Management System (PIMS) offers to collect, monitor, and report pipeline data.

The company initially began with leak detection using dogs. Nowadays, The Sniffers developed a line of portable meter tools and infrared cameras to supplement the use of dogs. In 2013, the dogs obtained TÜV certification.

The Sniffers' leak detection tools

COMPETITIVE ADVANTAGE

The Sniffers offers a personal one-to-one service in order to satisfy its clients' project needs. This custom-made approach includes combining a variety of services and know-how to quickly deploy new techniques. The Sniffers tries to keep up with innovation, whilst using the latest proven techniques.

CUSTOMERS AND PARTNERS

With 20 years of experience, The Sniffers has built expertise in a considerable amount of refinery and petrochemical projects in Europe, Asia, central Asia, Latin America, Eastern Europe, and the Middle East. The company has over 200 clients around the world on more than 700 sites. An example customer includes Equate, the joint venture between Petrochemical Industries Company (PIC), Dow Chemicals, Boubyan Petrochemicals, and Qurain Petrochemical Industries Company.

CURRENT ACTIVITIES

In 2013, The Sniffers acquired the Dutch company 'Leak Consultancy', a specialist in infrared thermography, to expand its portfolio in thermography management. The Sniffers is aiming to roll out its pipeline services in the Netherlands, where it anticipates potential high demand.

The company has also extended in 2013 the contract for fugitive emission management with Gasunie, a gas infrastructure firm, which manages extensive high-pressure gas transport networks.

The Sniffers has targeted its activities in Europe and the Middle East, where they have noticed a great demand for their services. The company has strengthened its presence in the Gulf region by setting up a local structure and executing on several major projects for Takreer Ruwais in Abu Dhabi. Other expansion plans include South America and Eastern Europe.

KEY PARTNERS	INVESTORS	SIMILAR COMPANIES
Gasunie	The Carlyle Group	Polygon
Leak Consultancy Infrared Imaging	Creafund	Trition
		Alpine Water

[16] Technischer Überwachungsverein is a German organization that works to validate the safety of products of all kinds to protect humans and the environment against hazards.

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Concluding Remarks

Widely recognized for its human capital, R&D capabilities, trading ports, and governmental initiatives, Flanders will no doubt continue to attract and generate entrepreneurship to the region. As resource constraint becomes an ever important driver for innovation in Flanders, the region's industries will (out of necessity) focus more than ever on resource efficiency, recycling, transport, and remediation, if they are to grow and remain a globally competitive society. The region is already leveraging its longstanding Materials and Chemicals industries, and will no doubt lead the way in Advanced Materials (as a number of the Flanders Cleantech 10 demonstrate) among other core sectors that are key to the next decade of advancement.

We hope this report has piqued your interest on some interesting start-ups in Flanders that merit further exploration and will act as a stimulant for you to get in touch with one or more of the companies mentioned in this report.

Appendix: The Advisory Panel

SOFIE BAETEN

MANAGING PARTNER, CAPITAL-E

Sofie Baeten is managing partner at Capital-E. Her investment focus is on innovative applications and technology in Green (investment area focusing a.o. on energy efficiency, energy storage, advanced materials and smart grid). She joined Gimv in 2008. Before, she gained two years of venture capital experience as investment manager at Baekeland Fonds II, a venture capital fund of the University of Ghent and as CEO of Viacatt, a small start–up specialized in Ru-catalyst development. Prior to that, she worked for 7 years at Bekaert NV, where she held several positions in R&D project management, business development, and innovation management.

Sofie holds a MSc degree in Materials science engineering from the University of Ghent (Belgium), a PhD from the Katholieke Universiteit Leuven (Belgium), and a Master in Entrepreneurship from the Vlerick Management School (Belgium).

NUNO CARVALHO

HEAD, BEKAERT VENTURING

Nuno Carvalho is head of Bekaert Venturing, the corporate venture capital arm of Bekaert. Bekaert is a world market and technology leader in steel wire transformation and coatings. Nuno is responsible for investments in entrepreneurial companies having innovative technologies, able to create strategic growth options to the business platforms of Bekaert. His previous assignments in businesses across Bekaert, help connect external start-up companies with Bekaert business and innovation interests. Nuno actively represents Bekaert at the boards of portfolio companies and Venture Capital funds.

Before joining Bekaert he held postdoctoral positions in Portugal and The Netherlands. Nuno holds an Executive MBA from the Vlerick Business School, obtained his Ph.D. degree in Materials Sciences from the University of Groningen, and his M.S. degree in Applied Physics from the University of Lisbon

RONNIE BELMANS

CEO, ENERGYVILLE

IEEE Fellow, Dr. Ronnie Belmans is deeply ingrained in the Smart Grid arena. He is a full professor at the Katholieke Universiteit (KU) Leuven where he teaches electric power and energy systems, his research interests include techno-economic aspects of power systems, power quality and distributed generation. He is also guest professor at Imperial College of Science, Medicine and Technology, London-UK. Ronnie Belmans is the co-founder of the KU Leuven Energy Institute of the European Energy Institute, and chairman of the European Smart Grid Technology Platform and Honorary Chairman of ELIA (the transmission system operator in Belgium). Since 2012 Ronnie Belmans became CEO of Energyville, the joint venture research centre for sustainable energy supply of cities in Genk, Belgium as joint venture of VITO, IMEC and KULeuven and since September 2012 he is Executive Director of GSGF (Global Smart Grid Federation). Ronnie Belmans holds a Master Ph.D. degree in electrical engineering from the K.U.Leuven, the Special Doctorate and the Habilitierung from the RWTH, Aachen, Germany.

PAUL DECRAEMER

HEAD OF CLEANTECH INVESTMENT, CAPRICORN VENTURE PARTNERS

Paul Decraemer holds a position as Head of Cleantech Investment at Capricorn Venture Partners, an independent European manager of venture capital and equity funds, investing in innovative European companies with technology as competitive advantage. Prior to Capricorn, Paul acquired most of his investment experience during his stay as Managing Director at Sustainable Energy Ventures and as Senior Investment Manager of Flemish Environmental Holding Company (VMH). Paul Decraemer obtained a Master degree in Bioscience Engineering from the UGent and a Master in Financial Management at the Vlerick School of Business.

MATTHIAS VAN DE PITTE

PRINCIPAL, GIMV

Matthias Van De Pitte is a principal at Gimv, the private equity and venture capital company listed on NYSE Euronext Brussels. Matthias joined the company in 2011. Previously he worked for ExxonMobil's petroleum refining business in Belgium and in Italy, where he held several technical and managerial positions in the fields of process optimization, planning, maintenance, energy efficiency and CO_2 management. During his MBA studies he interned at Bain & Company in Brussels, and he gained private equity and venture capital experience at Climate Change Capital Private Equity in London. Matthias is a board observer at GreenPeak and GreenWatt. He is actively involved in the portfolio management of OTN Systems. Matthias holds an MSc in Electrotechnical Engineering from the Katholieke Universiteit Leuven (Belgium) and Ensimag (France), and an MBA from London Business School.

DIRK FRANSAER

BOARDMEMBER, VITO

Dirk Fransaer is a Belgian engineer and since 2001 managing director of the Flemish institute for technological research (VITO) in Mol (Belgium). VITO is the premier research institute in Belgium in the field of cleantech and sustainable development with more than 750 collaborators. The research topics of VITO include sustainable energy, sustainable chemistry, and sustainable materials management.

He graduated as a civil engineer at the University of Ghent (Ghent) in 1980 and as biomedical engineer at the Catholic University of Leuven in 1985. He is also chairman of the auditcomité of the University of Antwerp (Belgium).

ROELAND ENGELEN

HEAD OF SUSTAINABLE SOCIETIES, LRM

Roeland Engelen joined LRM in 2007 as Investment Manager. LRM is a Flemish (regional) investment company with an equity of € 350 mio. Since 2009 Roeland Engelen is member of the Management Comité of LRM as Head of Sustainable Societies. Sustainable Societies is one of the focus areas within LRM with an actual portfolio of over 15 companies implying an invested amount of over € 75 Mio. With his team of Investment Managers, Roeland considers investments in a wide range of sustainability e.g. green energy (energy storage, smart grids, energy efficiency, ...) and materials (recycling & re-use, advanced materials, ...), coaching, advising and leading his investment team on a daily basis to excel in their mission.

Roeland holds a degree in Civil Engineer Construction at the KU Leuven. In 2011 he also graduated as Master in Real Estate from the Antwerp Management School.

JOHAN KEPPENS

INVESTMENT MANAGER, PMV

Johan Keppens is a Senior Investment Manager of PMV (Participatie Maatschappij Vlaanderen). He focuses on seed and early stage investments in the cleantech and industrial space. Mr. Keppens serves on the board of several technology companies in those industries. In a previous career Johan Keppens served as a Manager in the strategy division of Accenture. Mr. Keppens graduated as a Commercial Engineer at the Catholic University of Leuven, with specialisation in Business Economics and Strategy.

HANS MAENHOUT

INVESTMENT DIRECTOR, FININDUS

Hans Maenhout is Investment Director at Finindus, a joint investment company of ArcelorMittal and the Flemish Region. Finindus provides early stage financing and growth capital to innovative companies active in the area of materials, material processing and sustainable manufacturing. Hans holds a Master degree in Chemical Engineering from the UGhent, complemented with an executive education in International Management from Vlerick Management School (Ghent), Corporate Finance from EHSAL (Brussels) and M&A and Corporate Development from INSEAD (Fontainbleau). He started his career with Texaco in R&D. Following a number of different assignments at Texaco, including 3.5 years in the USA, and a transition management assignment in one of the portfolio investment companies of the KBC group, he joined a JV of the ArcelorMittal group and the Flemish Region in 2007 to head up a greenfield start-up company active in structural lightweight sandwich panels. After the sale of the company, he was mainly involved as a consultant in M&A projects within the petroleum and energy industry.

Hans joined Finindus in October 2013 as Investment Director.

THIERRY PIRET

HEAD, SOLVAY VENTURES

After 30 year of experience within research, innovation, and new business development (including activities in biotechnology, industrial enzymes and animal health) for Solvay, Thierry Piret is the Head of Solvay Ventures, the corporate venturing branch of the Solvay Group based in Brussels, Belgium. The firm owns a portfolio of direct investments in the chemicals and advanced materials area. Thierry is also part of the management team at Conduit Ventures, an independent power and energy fund manager majorly investing in demand driven technologies with rapid and scalable market deployment across different markets and applications e.g. transportation, energy storage, and “smart” urban infrastructure development.

Thierry Piret holds a Master in Chemical and Agricultural Science from the University of Gembloux.

THOMAS VANHOUTTE

INVESTMENT DIRECTOR, KORYS

Thomas joined Korys in 2011 as an Investment Director in the Direct Investments team. At Korys, Thomas focuses primarily on cleantech and renewable energy, and sits on the boards of D3O, Planet-Eco and Agendia. Prior to Korys, Thomas worked for Total as Logistics manager, and for McKinsey & Company in the Brussels, New Jersey, and London offices. While at McKinsey, he served a diverse set of energy and pharma companies on strategic and operational issues, and advised governmental and non-governmental organizations on climate change and energy strategy. Thomas holds a Masters in Bio-Engineering from KULEUVEN (Belgium), an MSc in Environmental Management from Imperial College (UK) and an MBA from Columbia Business School.

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