

Insight Capricorn

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INSIDE NEWS ABOUT CAPRICORN CLEANTECH FUND



Biobutanol facility of GBL partner in China

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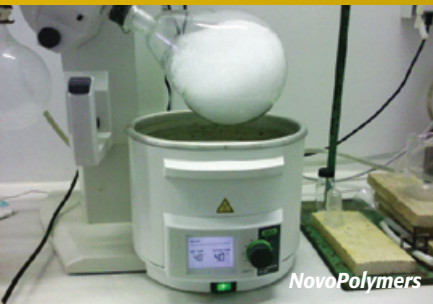
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Chinese Tiger turns into Cleantech Giant

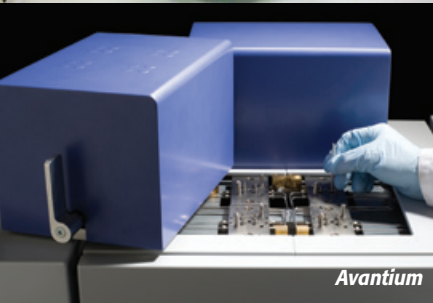
In 2009 China's investments in clean energy outstripped those of the US, this year China is set to overtake Europe. According to Bloomberg New Energy Finance China's clean energy attracted over the past four quarters € 32 billion in asset financing compared to € 23 billion in Europe and € 10.6 billion in the US. Last year China accounted for three quarters of all cleantech IPO proceeds worldwide.

Driven by giant stimulus packages, relative cheap and readily available credit financing, a buoyant IPO market, lack of cumbersome democratic consultation procedures and fast growing numbers of spending consumers the Chinese cleantech market is leading the global recovery and pulling ahead in the quest for market share, new economic development and future oriented job creation. With this metric in mind we have increasingly been focusing on European companies able to ride the Asian cleantech wave. Clearly the challenges in these markets are significant. Dealing with cultural differences, linguistic communication problems, unfamiliar business practices and IP concerns in a very different legal and political framework are not for the faint hearted. But the rewards for those who can manage these pitfalls are potentially huge. Hence the new adage is becoming "Young man - or even more - young woman, look East!"

Dr Jos B. Peeters
Managing Partner



NovoPolymers



Avantium



Green Biologics

Prospects are good for the start-up company NovoPolymers NV active in the development and production of environmentally sound sheets and films, primarily for the solar cell industry. CEO Johan Declerck carefully considers the many business opportunities that arise. "It looks as though, by the end of 2011, we will have to double the production capacity we have just launched in order to be able to meet the explosive demand." In May 2009 Capricorn Cleantech Fund invested € 1.5 million in the first round financing of NovoPolymers, established in Flanders (Puurs).

NovoPolymers in the booming global solar energy market

CEO Johan Declerck wary of too rapid growth

NovoPolymers is developing and manufacturing an innovative polymer film or 'encapsulants' that manufacturers of solar panels, known as module builders, use to encapsulate the delicate solar cells and to protect them against shock, moisture and degradation by UV radiation. Module producers are constantly on the lookout for more durable, cheaper and more efficient encapsulation materials to reduce production costs and increase solar panel efficiency and lifetime. "With the classic foils, most encapsulants are heated in a vacuum laminator for 20 minutes at a temperature of 150°C", explains Johan Declerck. "During this heating process, the upper and lower foil layers cross-link with each other and the solar cells become hermetically sealed."

Emerging photovoltaic technology

As an industrial chemical engineer with almost 20 years of experience in R&D and business development, Declerck was convinced that the heating process could take place faster and with greater energy efficiency. In a short time NovoPolymers developed already two marketable films, NovoVellum™ Fast Cure and Ultrafast Cure, with which a module manufacturer can increase his productivity by as much as 25%. Besides a faster and more efficient heating process, light management is also under development to be integrated in these foils to increase efficiency and hence cost-effectiveness of the solar modules. "And there are still a few innovations in the pipeline", Declerck reveals. "Next to our light management technology platform we work on high barrier solutions for flexible applications and on multi-layer technology in which we can assign specific functions to each film layer and so are able to achieve films customised to the application."

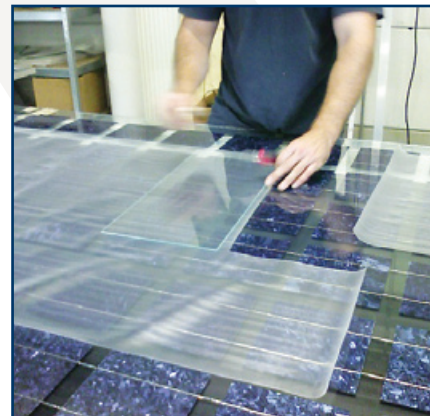
But Declerck aims even higher. By 2012 he wants to put Novellum SW1 onto the

market, a Non Cure Thermoplastic Elastomers Encapsulant. "This film is believed to offer the same features but above all is recyclable and thus contributes to the cradle-to-cradle evolution. Further, due to the nature of the polymer, and the absence of cure additives and plasticising agents, we also believe this solution is less contaminating for the more sensitive thin film solar cell technology. We are also currently testing a prototype of an alternative Unconventional Cure Encapsulant which reduces the heating time to 5 to 6 minutes. Finally, we have developed an extremely high back-reflective encapsulant especially suitable for the thin film solar cell technology with which we can increase the yield of the solar cells by as much as 15% and substantially simplify the module production process. The latter is expected to reach the market by 2011."



On target

NovoPolymers sold its first films in early 2010 and has a production capacity of 400 megawatt peak (MWp) per year - as many as there are now solar panels on the rooftops in Belgium. Half a year later the production facilities are already running at more than 50% capacity. "In 2009 alone, worldwide, no fewer than 9 gigawatts of solar panels have been installed", illustrates Declerck. "Demand is growing exponentially and many module producers are looking for at least a second



The growth of NovoPolymers is being propelled by the worldwide demand for solar panels.

film supplier or large volume preferred supplier. At this rate, we need to double our capacity by mid 2011. First we are focussing on Europe, where one-third of all modules is made, and secondly on Asia, representing almost two-thirds. Our ambition is to open a second production plant, possibly in Asia by 2012. Close to our customers so as to be able to quickly respond to or even anticipate the demand."

From its inception in 2008 Capricorn already believed in the potential and growth strategy of NovoPolymers. "Like other strategic partners such as Proviron, a fine chemical manufacturer offering R&D facilities, and EN-LOG, a well established sales company in the photovoltaic industry with a large worldwide customer base. Indeed, the threshold of our complex product is enormously high. But that has not scared Capricorn. The commercial and technical understanding of Capricorn's

"Capricorn understood better than anyone the business and growth opportunities of our still very complex technology."

Johan Declerck comments on his partnership with Capricorn Venture Partners and its Head of Cleantech Investment Practice, Paul Decraemer.

cleantech specialist Paul Decraemer, amongst others, led to a fully-fledged deal that will enable us to realise our ambition. And that goes a long way, because eventually we also want to market our expertise even in areas outside solar energy, such as fuel cells, algae cultivation, water treatment,..."

FOR MORE INFORMATION

see www.novopolymers.com
Or contact CEO Johan Declerck

PMV "The clean technology turnaround is complete"

When, five years ago, along with three other investors, the ParticipatieMaatschappij Vlaanderen (PMV) supported the launch of the Capricorn Cleantech Fund, many investors kept their doors and wallets closed. Today, clean technology can no longer be ignored as a business driver, and cornerstone investors have propelled the fund to the top three in Europe.

"PMV chose clean technology as one of the four spearhead sectors (alongside life sciences and health-tech, renewable energy, and the care sector) in its investment policy to support the expansion of a new economy in Flanders", says Chairman Clair Ysebaert. The translation of the social objective into actual investment is taking place as a two-track process. On the one hand, PMV supports companies that introduce clean technology into their own business environment. On the other hand, PMV supports innovative technologies and helps start-ups at a very early stage to bring their solutions to the market. "As a matter of fact, the Capricorn Cleantech Fund is one of the exceptions in the venture capital world that dares to provide seed and early

stage capital, as well", reports Ysebaert incidentally. "For several years now, PMV has also been participating in PPP projects where the government benefits from the participation of the private sector. Last year all our activities together accounted for total assets of € 412.2 million."

Cleantech believer

Motivated by the introduction of clean technologies into the Flemish economy and the creation of a window on the cleantech world, PMV sought partners to get exposure to this area. "Capricorn Venture Partners was best placed because of its international experience and know-how. As an independent pan-European manager of venture capital funds, it also had a proven

"Capricorn Venture Partners was the partner of choice for the establishment of a Cleantech Fund in Flanders because of its international track record and charisma."



ability to cope with difficult times. Now, it is evident they have made the right choice. Besides their efforts to maximise added value, they are also true believers in cleantech. And that is the real key to success."

FOR MORE INFORMATION
see www.pmv.eu

Biobutanol competitive biofuel

After a commercial breakthrough in China, the British industrial biotech company Green Biologics Ltd (2005) reinforced its leading position in the commercialisation of biobutanol for the fast growing renewable chemicals and biofuels markets. "Backed by the experience of the Capricorn team particularly in booming China and their technology development expertise, we can work faster towards our goal", says CEO Sean Sutcliffe.

Green Biologics Ltd (GBL) has a library of microbes which accelerate the fermentation of various cellulosic raw materials and convert the raw materials into renewable biobutanol for the next generation market for biofuels and other chemicals. "That process was initially developed at the beginning of the 20th century to become the second largest industrial fermentation process until the mid-50s, at which time it was abandoned. But now its value is being appreciated once again, firstly because of rising oil prices and secondly due to advances in life sciences technologies. This means that we can nowadays also use a wider range of sustainable and widely present biomass materials such as sugar cane waste and even in the future household green waste more cost-effectively."

After China there are India and Brazil

The Capricorn Cleantech Fund acquired an interest of over 20% (good for € 3.6 million) in GBL and led the overall financing negotiations of €4.9 million, an amount which included subscriptions made by all GBL's existing institutional investors as well as by management and founder investors. "The funds allow us to accelerate the next two years of our commercialisation strategy, not only in China, but also in the sugar cane countries of India and Brazil – and in the future the US – providing customers with retrofit packages to convert bioethanol plants to biobutanol and with fermentation and process technology solutions and plant designs for advanced and newly built biobutanol plants. At the same time, we can invest more in our technology development



"Besides the money, Capricorn gives us experience in China and an extensive network in the chemical sector."

Sean Sutcliffe

programme to reduce the production cost of biobutanol from cellulose waste raw materials for the biofuel market. By 2012 this technology could be ready for commercialisation in the biofuel area, taking into consideration that the technology is already commercial in the biochemical market segment."

FOR MORE INFORMATION

see www.greenbiologics.com
Or contact CEO Sean Sutcliffe

Capricorn in the News

On 19 May 2010 **Avantium** launched YXY, the new cost effective green building block for materials and fuels. Earlier in the year Avantium received the first place award of the Clean Technology Business Forum & Competition at the Global Plastics Environmental Conference (GPEC) 2010 in Orlando, USA, for their pioneering contribution in unlocking the enormous potential of these Furanics green plastics.

On 14 April 2010 **FRX Polymers** announced the opening of its new applications lab in Chelmsford, MA, to assist the market development of its entirely new family of inherently flame retardant polymers and oligomers. The pilot plant which started up beginning 2010 currently runs 24 hours a day, 6 days a week and is one of the only plants in the world producing DPP (DiPhenyl methyl phosphonate), a key raw material used in the polymerisation process of FRX.

On 9 April 2010 **Metallkraft's** Singapore factory announced the completion of the first phase of its new processing facility and the launch of commercial operations in Singapore with first deliveries of SIC and PEG to REC.

On 31 March 2010 **Capricorn Cleantech Fund** invested € 6 million alongside investments from Gimv and LRM in **Punch Powertrain**. Belgian based Punch Powertrain is an independent manufacturer of Continuously Variable Transmission systems (CVTs) for cars and has operations and customers in China. Punch Powertrain contributes to the reduction of CO₂ emissions from vehicles and has innovative solutions in the field of hybrid and electric cars.

On 30 March 2010 **SBAE Industries** received the award in the Green Shoots competition during the past World Biofuels Conference in Amsterdam. The Green Shoots award is given to the most exciting innovation in next generation development providing the greatest sustainability benefits as measured by GHG savings, environmental impact and further societal benefits.

On 25 February 2010 **Xylophane** inaugurated a new pilot production plant in Bohus close to Gothenburg, Sweden, for the production of xylan. Xylophane develops a renewable barrier material for packaging that can prolong shelf life and presents a sustainable alternative to non-renewable plastics and aluminum foil.

FOR MORE INFORMATION

please visit www.capricorn.be/news



UPCOMING CLEANTECH
RELATED EVENTS
SUPPORTED BY CAPRICORN

PHOTOVOLTAIC POWER PLANTS
"Optical Design and Grid
Connection" is being organised
by Concentrator Optics
on 20 – 22 October
in Bremerhaven, Germany
Please visit
www.concentrating-pv.org

On 8 and 9 September 2010 the
EUROPEAN ENERGY VENTURE FAIR
will take place in Zurich
Please watch info on
www.europeanenergyventurefair.com

On 9 December 2010 NewNet's
**ENVIROTECH & CLEAN ENERGY
INVESTOR SUMMIT**
will take place in London
Please visit
www.envirotechinvestorsummit.com

Capricorn Venture Partners nv is a pan-European manager of venture capital funds seeking to invest in technology based growth companies. The Capricorn Cleantech Fund is Capricorn's third consecutive venture capital fund. The fund invests in European growth companies developing innovative breakthrough technologies in the fields of renewable energy and energy efficiency, water purification and re-use, bio based material conversion and biorefinery platforms, clean air, climate change, green chemistry and advanced materials, materials recovery and recycling.



Capricorn Cleantech CEO Day Thursday 21 October 2010

After last year's success, Capricorn Venture Partners will be organising the Capricorn Cleantech CEO Day for the second time. A perfect time for Cleantech entrepreneurs to present their companies to a select audience of individual and corporate investors, academics, policy makers and friends of the firm. The second Cleantech CEO Day will be held at the Faculty Club in Leuven, Belgium

FOR MORE INFORMATION
or to receive your personal
invitation, please contact
Marina Ruiters
at Capricorn Venture Partners

+32 (0)16 28 41 00

De Jonge St Jacob
Lei 19/1
B-3000 Leuven
Belgium
Tel +32(0)16 28 41 00
Fax +32(0)16 28 41 08

website www.capricorn.be



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