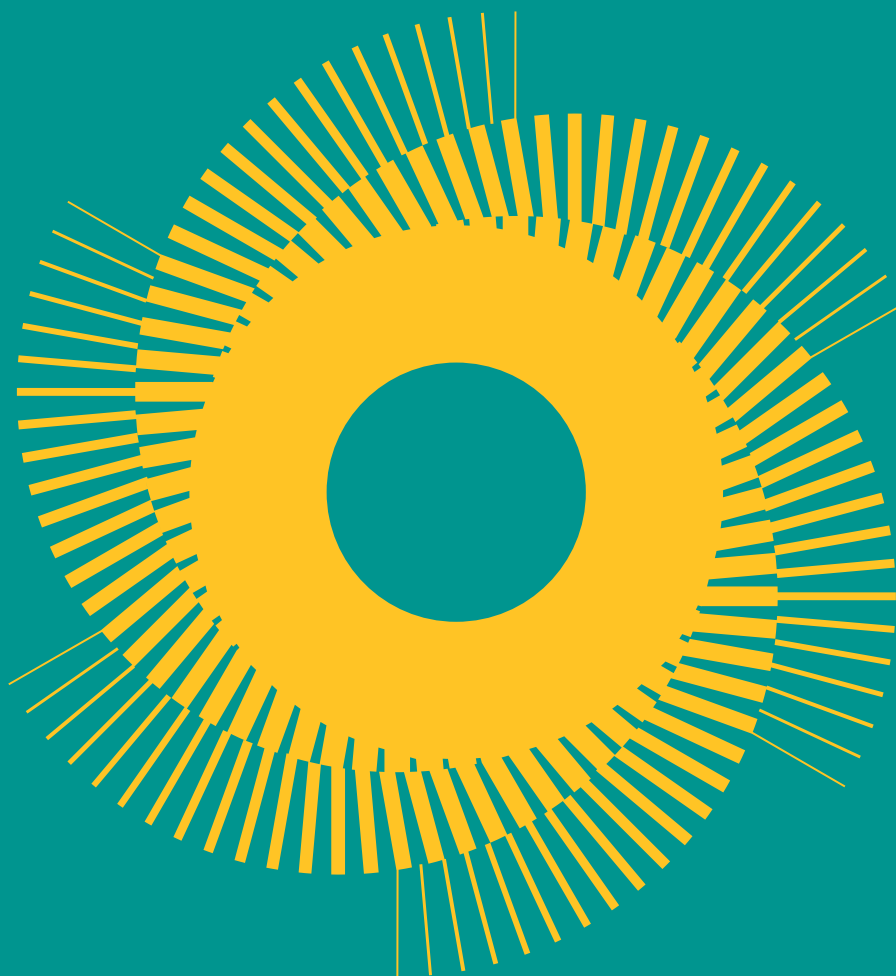




Department for
Communities and
Local Government



EUROPEAN UNION
Investing in Your Future
European Regional
Development Fund 2007-13



European Regional Development Fund
for the East of England

Top 10 Low Carbon Products

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Background

This is a list of Top 10 products made by small companies based in the East of England who have benefited from the European Regional Development Fund Competitiveness Programme. European Regional Development Fund brings £95 million of investment into the six counties of the East of England: Bedfordshire, Cambridgeshire, Essex, Hertfordshire, Norfolk and Suffolk. Over a period of seven years, between 2007–2013, it provides vital support for the transition to a low carbon economy and an important boost to growth and jobs. The fund aims to support economic growth, business start ups and job creation to help small businesses respond to the huge, commercial potential behind a low carbon economy.

For more information visit: www.gov.uk/erdf-regional-guidance-east-of-england

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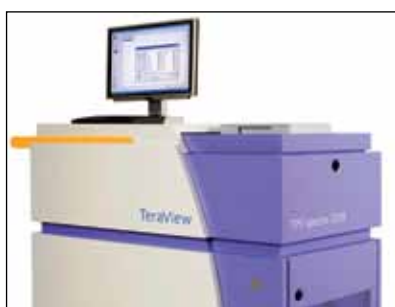
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Weedingtech

Water-to-Go

Water, water everywhere – and it's all available to drink!

Introduction

Green lifestyle company Water-to-Go Ltd is based at Cotswold Business Park in Caddington, Bedfordshire. It benefited from the Sustainable Design-led Innovation (SDI) business support programme hosted at Cranfield University, which provides strategic input to stimulate and support low-carbon innovation. The support value was £1,750, £700 of which was funded by the European Regional Development Fund.



Summary

Bedfordshire company Water-to-Go Ltd (www.watertogo.eu) has been part of a team that has developed a reusable water bottle which filters all water, apart from sea or salt water, rendering it safe and drinkable – anywhere, at any time.

Tap water as well as toilet water, river water and puddles can all be safely consumed – if required. The product retails at £22.95 and Water-to-Go estimates that using the bottles will save the average, daily bottle-of-water drinker about £200 per year.

The bottle's water filter lasts for about 200 litres of water or three months, reducing the volume of contaminants in water by more than 99.9%.

The technology was originally developed by NASA for its space programme, and was then adapted for use as a filter for water bottles. The filters are constructed with nanofiltration technology to make the water safe, which means the filters' pores are a fraction of the size of those in a carbon block filter and able to block many more contaminants. They are also positively charged so they trap contaminants such as bacteria and viruses, which, by nature, are negatively charged.

Product story

New small business Water-to-Go Ltd is set to change the bottled water drinking habits in two continents by introducing a reusable plastic filtered water bottle to Europe and India.

Managing director Dave Shanks, who runs his own textiles and clothes company designing and developing clothing ranges for the high street, bought the sales and distribution rights for the bottles for Europe and India two years ago, after hearing about the patented product through a business contact.

He says:

I was working in my office in China, which I share with an American company. A friend from that company introduced me to the idea. He was a surfer – fed up with plastic water bottle pollution in the water. Another of his contacts had patented the filter and suggested they put the two ideas together. Following this, Water-to-Go Ltd was born in 2010.

During the past 18 months, we have invested £100,000 to develop the machinery needed to make the filters – previously there had only been one prototype made to establish the worldwide patent.

Apparently there are 70 billion bottles consumed each year in Europe and the US. Only 12% of these are recycled. This water bottle has the potential to have a huge impact on the recycling of waste.

Dave says that the water has a clean, natural taste, as it is completely clean once it has passed through the filter – which takes out bacteria, viruses, as well as lead, chlorine and heavy metals.

The Sustainable Design-led Innovation (SDI) programme support focused on market research, branding activity for the product range, identification of skills needs for potential new job creation, and knowledge transfer.

At the initial stages of the marketing campaign, the bottles are being targeted at tourists, business travellers and gap-year students, through outdoor clothing retailers. Consumers will have the option to link with the Water-to-Go website so that they can be reminded by text or email when it's time to recycle their water filter bottles and buy new ones.

Dave is now also looking at setting up children's charity partnerships with water projects in Africa. He explains, 'My entire psyche has changed since beginning this project. I realise how wasteful we are and how much we are polluting the planet.'

At the moment his business plan is simple. One water bottle, one size – but Water-to-Go is planning to introduce different sized bottles for different markets, such as a mini bottle for children and commuters and a larger bottle for military applications, for use in the field when water sources have been poisoned.

'Apparently there are 70 billion bottles consumed each year in Europe and the US. Only 12% of these are recycled. This water bottle has the potential to have a huge impact on the recycling of waste.'

Dave Shanks, managing director, Water-to-Go Ltd

Algenuity

Algae, genes and ingenuity

Introduction

Biotechnology specialist Algenuity is based at Eden Laboratory in Stewartby, Bedfordshire. It used a £3,000 award from the European Regional Development Fund to pay for two days of research by biochemists from Cranfield University into the possible range of biomolecules that algae make.



Summary

Algenuity (www.algenuity.com) operates as a biotechnology research division of Spicer Consulting, a UK-based manufacturer of specialised electronics equipment, which was founded in 1988.

Algenuity has set out to create a position for itself within the rapidly emerging and evolving algal biotechnology business sector, by creating algal strains for the biopharmaceutical industry.

Algae is, by nature, very versatile and a sustainable crop. It takes in carbon dioxide, sunlight and water, and can use waste water containing nitrates and phosphates. It does not require as much land as other crops, with some strains able to grow in salt water and brackish water.

Dr Andrew Spicer, Algenuity chief research scientist and director, says:

At this stage in its development, Algenuity is competing for outside funding in order to expand its business activities into pilot scale development as well as exploring partnering opportunities. Ninety-nine per cent of our research and development funds to date have come through Spicer Consulting, our parent company. This has allowed us to develop an outstanding foundation from which we expect to launch our first products and services. We are excited about moving into a new season as we anticipate future scale-up.

Product story

Algenuity engineers and improves select microalgae strains that can produce high-value chemicals in a sustainable way for the biopharmaceutical industry.

It operates at the start of the algae industry value chain, preparing and cultivating strains for other companies to harvest and process for industries in the cosmetic, nutraceutical, bioenergy, chemical, pharmaceutical and animal feed sectors.

Using a two-unit lab-scale photobioreactor called Algem, Algenuity can explore and identify the optimum conditions in which to grow desired algae traits. Researchers can use Algem to culture microalgae or cyanobacteria under simulated environments where light intensity, temperature, day length and other features can be closely controlled via touch screen or a USB computer link.

Dr Andrew Spicer says:

Technically, if you can demonstrate a platform where these biomolecules can be produced by microalgae you would drive down the costs of some of these drugs while building your own business and market position.

Engineering consultants Spicer Consulting, a family organisation, was set up by Denis Spicer 24 years ago. Algenuity (formerly Spicer Biotech) was set up in 2010 and is now run by his son Andrew. With this combination of engineering and biotechnical expertise, the company is now going from strength to strength.

Dr Spicer adds:

Unless you have big cash reserves initially it is very difficult as a research-based company to succeed. We are very fortunate to operate as a division of a bigger biotech company: it means we aren't so exposed to cashflow problems as other biotech start-ups tend to be.

Our approach is a broad one initially but we aim to carve out a niche for ourselves in the future. We are in a fortunate position – on the one hand learning from the successes as well as the mistakes made by the larger algal tech companies in America, while on this side of the Atlantic we are seen as pioneers or early movers in improving and creating microalgal strains. So, in this regard, we have the best of both worlds.

Next year, the company is looking to scale up production and is talking to researchers at the John Innes Centre in Norwich about an opportunity to work together on improving algal strains for the sustainable production of high-value chemicals.

Algenuity currently has seven employees, including research scientists and business development specialist Michael Yates, and is expected to grow steadily.

During the next three years, the company aims to continue building relationships with strong research communities including those at University College London,

Cranfield University, the University of East Anglia, the John Innes Centre and the University of Cambridge.

It is also looking to support the industry as it grows, establishing itself in Europe and the USA.

'We are interested in applications of a high value – for example, some of the pharmaceutical chemicals needed cost millions of pounds per kilo because they come from rare and often unsustainable plant sources... If you can demonstrate a platform where these biomolecules can be produced by microalgae, you would drive down the costs of some of these drugs.'

Dr Andrew Spicer, chief research scientist and director, Algenuity

Bactest Limited

Moving microbial monitoring out of the lab

Introduction

Biotechnology specialist Bactest Ltd is based at St John's Innovation Centre in Cambridge. It is using a £900,000 investment, which included £300,000 from the Low Carbon Innovation Fund (LCIF), to transform the way in which water is tested for microbial contamination by bringing affordable, portable testing equipment to market.



Summary

Speedy Breedy (www.speedybreedy.com) was launched in October 2012 at Microcon, the first Swiss international conference on industrial microbiology. It is Bactest Ltd's first product, based on its proprietary technology platform.

Speedy Breedy is a compact, portable, precision respirometer, which was developed to identify the presence of contamination in liquid. It has applications across many sectors including potable water testing, food and drink processing and bottling, and general microbial research.

Speedy Breedy weighs just 2.75 kg, can be used in the field or on the factory floor, and does not require a microbiologist to interpret results. It eliminates the need to send samples to the lab meaning that tests can begin immediately, at the point where the sample has been taken. This reduces the carbon emissions of the testing process, and Speedy Breedy also reduces both the time to detection and the cost of testing.

Bactest's chief executive, Professor Annie Brooking, says: 'Speedy Breedy is the first of a family of products ... that will change the way microbiologists, researchers and product safety teams work, for good.'

Product story

Bactest Ltd was set up to address the gap in the market for a new kind of automated instrument to monitor microbial activity in a wide variety of applications, and to help businesses address concerns over contamination in liquid, product safety and public health, while improving their productivity and reducing costs.

Its solution was the development of a testing technology platform, to incubate bacteria in a test chamber and measure their development by detecting small pressure changes caused by their respiration. Potential applications are diverse, but include potable water testing, bottling, brewing, general laboratory research and – in the future – human healthcare.

In 2010, Bactest began to develop a product-based business to exploit its technology platform, focusing on water testing and microbial research as applications that could be commercialised in the near term.

Chief executive Professor Annie Brooking says:

The availability of clean water and safe waste water management are key environmental and public health issues the world over. In the future, Bactest's technology will help businesses to address these concerns far more efficiently. It can also help water management companies to control the aeration of waste water precisely, and so reduce energy consumption and the carbon footprint of the process.

Bactest approached the LCIF, which is funded by the European Regional Development Fund, as a potential investor via Turquoise International, which manages LCIF finance for the energy and environmental sectors. After completion of due diligence, LCIF invested £300,000 in the business, taking the lead in a syndicate that included existing shareholders London Business Angels and Minerva (Warwick). The funding round had a first close in January 2012 and raised £900,000. Just nine months later, Speedy Breedy was launched, the first in a proposed series of affordable, easy-to-use water-testing products.

Bactest Ltd is keen to support businesses in the East of England and works with contractors from the region wherever possible. To date, this has included product design specialists and manufacturing partners, creating new jobs and securing existing ones locally. Bactest itself has recruited finance staff and marketing specialists to develop the market for Speedy Breedy, and anticipates making further appointments in 2013.

'LCIF was the cornerstone investor in the latest funding round, and its involvement undoubtedly made it easier for us to secure the remaining investment.'

Professor Annie Brooking, chief executive, Bactest Ltd

CPT

Cost-effective technologies for greener, more fuel-efficient cars

Introduction

Controlled Power Technologies (CPT) Ltd is developing cost-effective, practical technologies to enable the world's car makers to boost fuel efficiency and reduce CO₂ emissions from their products. It is based in Laindon, Essex.



Summary

Controlled Power Technologies (CPT) Ltd (<http://www.cpowert.com/>) is developing two core products to help car manufacturers to meet tightening regulations on CO₂ emissions without the need to fundamentally redesign the car, the engine or its powertrain, and without compromising vehicle performance. The products are aimed at the high-volume end of the market, and are suitable for petrol, diesel and hybrid drive cars:

- **Speedstart** is a fast, micro-hybrid electric motor that allows the engine to be turned off in stop/start traffic, restarting quickly and responding smoothly to the driver changing their mind. It offers efficient energy generation and recovery during braking. It is application ready, and targeted at car production in 2015/16.
- **TIGERS** is an electric generator that recovers waste energy from exhaust gases. Currently at proof-of-concept stage, it is targeted at production in 2017/18.

Product story

CPT Ltd was spun out of global automotive supplier Visteon Corporation as a management buy-in in 2008 to develop technologies to help car makers to meet upcoming, tougher EU regulations on CO₂ emissions, and to support manufacturers in other countries as they face similar challenges.

Its directors approached the Low Carbon Innovation Fund (LCIF) – a European Regional Development Fund-supported venture capital fund – in 2011 as part of a programme to stimulate around £5 million of investment to help in bringing two innovative products to market.

LCIF invested more than £400,000, and both products are now moving towards commercial adoption. CPT director Nick Pascoe says that Speedstart, as a third-generation, stop/start product, could enable drivers of cars with standard 12-volt electrical systems to make fuel savings in the region of 5% to 15%, while – at the same voltage – TIGERS could improve fuel economy by around 2% to 5% by harvesting energy being expelled in exhaust gases. Yet, because the technology is modular and fits easily into the existing product design, it should not add a hefty price premium for the consumer.

But these are only the start of the energy savings that should be possible using CPT's technology. Nick Pascoe says: 'The industry is moving away from 12-volt to 48-volt systems, and that's really a game-changer in terms of the savings that can be made.'

Since 2008, CPT has grown from a small, four-man team to a 32-man business, and it is actively recruiting. Nick says that it needs well-qualified engineers with experience in electronics and control theory and that they are hard to find. As a result, it is investing in 'growing their own' – CPT took on its first apprentice in 2012, and the business regularly welcomes undergraduates looking for challenging work placements.

'Our technologies are a solution from heaven for car manufacturers – no one makes money from true hybrids because the cost of production puts them out of the price range of the mass market consumer. CPT is working to make cars that offer real savings on fuel costs and fuel emissions more affordable.'

Nick Pascoe, director, CPT

Incinerator Replacement Technology

Life after death

Introduction

Biotechnology specialist Incinerator Replacement Technology Ltd (IRTL) is based at the University of Hertfordshire. Its subsidiary, Biomation Ltd, has developed a way to produce a biodegradable and environmentally friendly fertiliser from animal carcasses.



Summary

Incinerator Replacement Technology Ltd (IRTL) (<http://www.irtl.co.uk/>) develops alternative low-carbon methods to the incineration of animal carcasses and human cadavers. It also transforms the resulting material from the two processes into products that support life.

Its subsidiary, Biomation Ltd, in collaboration with the University of Hertfordshire, has created a fertiliser from animal carcasses, abattoir waste and other protein waste streams – for example, catering and supermarket waste – which can prolong plant life for between 10 and 30 days, prevent sandstorm damage to plants in the desert, reduce the damaging effects of drought on plants, reduce leaching and improve soil quality.

Production of a sterile meat by-product also offers an environmentally sound alternative to the agricultural incineration of animal carcasses, avoiding the production of carbon dioxide.

Product story

The creation of Biomation Ltd was inspired by a lack of cost-effective and carbon-friendly methods for disposing of fallen livestock in the East of England after the BSE crisis.

IRTL technical director Mike Morris-Watson, a former thermodynamics engineer, has spent the past four and a half years developing an alternative process to animal incineration with Dr Arjomand M Ghareghani of the University of Hertfordshire.

Morris-Watson says:

We could no longer bury horses after the BSE crisis so there has been an issue over how to dispose of fallen stock. In 2002 I broke my leg and spent six months in front of a computer investigating alternative methods to the environmentally unfriendly method of incinerating animals. Two million tonnes of animals are rendered or incinerated in the UK each year, using vast amounts of energy. With our product, we really believe we can turn totally unproductive soil into crop-producing land and that, over time, it will also improve the quality of the soil.

The energy-efficient process involves macerating the animal waste before putting it into a pressurised heating tank. The material is mixed with alkali which turns it to slurry. It is then heated to a very high temperature and mixed with a polymer which turns the product into highly absorbent, yellowy brown crystals. The product is capable of absorbing 20 times its own weight in water, is biodegradable and has a water-saving lifespan of between three and five years, depending on the soil type.

Morris-Watson explains, 'Another benefit is that approximately 50% of standard fertiliser put on the land is washed away by irrigation and rain, and can create the dangerous blue-green algae in our water supplies. Our fertiliser can reduce leaching by up to 60%.'

The product – called Protein Based Super Absorber (PBSA) – is a sterile, organic, slow-release fertiliser containing nitrogen, phosphorus and potassium, and it is pH neutral so it adjusts to the natural balance of the soil in which it is placed.

IRTL received a £170,000 grant from the European Regional Development Fund in July 2011, which it used to prove that it could scale up lab trials into full production, to start greenhouse growing trials to demonstrate the non-toxicity of the product, to quantify its claims of enhanced crop yields and better water absorption, and to prove that nitrate leach rates can be reduced.

Morris-Watson adds:

We have had a lot of interest from the Middle East where they consume 75% of each animal for meat but leave 25% in waste. The Arabs are also looking for processes to 'green up' the deserts, so they are very interested in our work. We have tested the product in sand growing tomatoes and in wind tunnels, and with winds of up to 30 miles per hour it reduces the amount of sand the wind can pick up by 95%, reducing 'sand burn'.

Our next step for Biomation is to prove its efficacy, with field trials in different soil types, including deserts. We are hoping to start trials with the National Institute of Agricultural Botany in Cambridge, which will conduct trials using different crop types.

PBSA will be trialled by a number of other interested organisations in the coming months, in a number of countries, on a variety of crops in the northern and southern hemispheres. The trouble at the moment is that each new trial seems to throw up another benefit we had not predicted. The most recent benefit would appear to indicate that PBSA can mitigate the effects of salinity in soil. We are continuing with further trials at Hertfordshire University to prove this further advantage. More benefits unfortunately mean more trials. It is a very busy, yet very exciting time for us.

***'This kind of work can't be done without the support of grants.
This one was absolutely crucial to the project.'***

Mike Morris-Watson, technical director, Biomation Ltd

Isotera

A revolution in green lighting technology

Introduction

Ultra-efficient lighting company Isotera Ltd is based at Cambridge Science Park in Cambridge. It received an equity investment of £320,000 in March 2012 from the Low Carbon Innovation Fund, which will be used for product development, marketing, sales and building customer relations.



Summary

Isotera Ltd (<http://www.isotera.com/site/home.html>) has created a revolutionary lighting system which is based on a completely new way of processing and distributing power for LED lighting fixtures. This system also enables the use of lower-cost intelligent controls and produces a more reliable and durable, energy-efficient and cost-effective form of lighting.

Inside its system no mains power is used. Its safety is further enhanced by the use of contactless power transfer – no wires are needed to connect the light source with the power source.

The Isotera system provides a low-maintenance lighting infrastructure in buildings and outdoors while reducing capital costs by 30–50% and reducing electronic waste by as much as 60%.

The intelligent control system is fully integrated and requires little human input as it automatically responds to differing light levels and the presence of people. It also offers high-quality dimming without flicker and without compatibility problems.

Chief executive Marc Ottolini says:

Isotera is a revolution in the lighting industry, which has been traditionally very conservative. Through the decades, the industry has seen generations of lamps from incandescent through to fluorescent, halogen and metal halide but, until now, the power infrastructure has never changed. Our innovation is in lighting infrastructure – we are the invisible part of the lighting system that makes it all work.

Product story

Cambridge lighting company Isotera Ltd is set to change the face of the global lighting industry with a new intelligent lighting network system that uses contactless power transfer.

Isotera, headquartered at Milton Road, Cambridge, is currently launching the system, which makes LED lighting and intelligent lighting controls simpler, more robust and less expensive to commercial sectors including offices, retail outlets, hotels, factories and public buildings. It was officially launched at the LuxLive event at Earls Court, London in November 2012.

The benefits include the following:

- Installation costs are reduced by 40–50%.
- The systems are safe to work with.
- They are more reliable and durable than conventional systems.
- Running costs are lower as less maintenance is required.
- Energy efficiency is as good as the best alternative.
- The system is easy to adapt and fixtures can easily be moved around by the people who are using them.

Marc Ottolini says:

Isotera deals with the power processing behind the light source, not the light source itself. Our system works with LED light fixtures from all brands. In our system, light fixtures can be safely moved around by anyone – which offers great flexibility. There is no need to customise the light fittings to make them operate with our system.

He adds:

Many users of LED lighting report problems: premature failures, poor dimming performance, etc. The truth of the matter is that these problems have nothing to do with the LEDs: they are caused by the power systems behind them. This could taint the good name of LEDs, which would be completely unjustified. Incredible carbon reductions can be achieved with LED lighting and intelligent lighting controls. By taking out the weakest link (LED drivers) and taking out a lot of unnecessary costs, we hope to restore the good name of LEDs and stimulate the adoption of ultra-efficient lighting.

The technology originates from Juice Technology Ltd, a UK-based research and development company and, in 2010, Marc, a Dutch electronics engineer, suggested that the lighting system be taken from Juice and that a new management team and new company be built around it to take the product to market.

Marc says the company, which currently employs 10 people, is looking to expand and adds:

We have attracted new investors and the company is now going from strength to strength. We anticipate a big take-up in the commercial sector and it has been very positively received so far. People are very, very impressed. At a later stage, we will look to launch it to the residential sector as well.

'We are very keen that the UK benefits from this homegrown innovation and that it leads the way in adopting this green technology. Too often, great technological innovations stem from the UK but end up being first adopted by other countries long before the UK does.'

Marc Ottolini, chief executive, Isotera Ltd

Syrinx

'Electronic ear' device that can save water companies millions of pounds

Introduction

Water mains technology specialist Syrinix Ltd is based at the Hethel Engineering Centre in Norwich. It has used a £60,000 investment from the Low Carbon Innovation Fund to help the company in its transition from the development stage to product delivery.



Summary

Syrinx Ltd (<http://www.syrinx.com/>) develops and sells sophisticated sensor and signal processing devices for monitoring water trunk mains.

TrunkMinder, launched in 2010, is a smart water pipeline monitoring system which uses sensors placed at 500- to 750-metre intervals along pipeline systems. The sensors detect tiny leaks and then transmit an automatic alert directly to the relevant utility, which is then able to repair the leak before a pipe bursts or any more water is lost.

Chief executive James Dunning says, 'Water is a very precious resource. Syrinix is committed to helping our clients reduce water losses and cut the costs associated with them.'

Product story

Norwich-based company Syrinix Ltd, which has created a new gadget to detect the potential water leaks in mains pipelines, is looking to go global.

The TrunkMinder smart monitoring system is already set to save water utilities across the UK millions of pounds in time, labour and resources.

In the past two years Syrinix, now a leading expert in infrastructure management technology for the water sector, has gone from strength to strength in the UK and is negotiating with utility companies in Australia, the USA, the Middle East and the Far East.

So far, Thames Water is installing 120 units across its systems over the next 12 months, and the London Crossrail tunnelling project is installing 30 units to monitor pipelines that could be affected by the tunnelling.

The intelligent system will allow Crossrail and the water utility to continuously monitor pipelines that cross the construction corridor and will immediately report any changes, triggering a proactive and early response to avoid a catastrophic failure of the main. Such a failure could have a serious impact on the Crossrail construction programme through flooding of the underground works and potentially threatening the safety of the construction workforce.

TrunkMinder allows client utilities to:

- detect emergent leaks in the early stages of their development and to plan accordingly;
- react to immediate burst notifications;
- pinpoint leaks to within 1 metre along the length of a pipeline;
- provide direct alerts through channels including SMS, internet and SCADA (supervisory control and data acquisition); and
- give utilities the ability to react in a planned and proactive manner to avoid catastrophic failures.

Last year, Syrinix was awarded the prestigious Cleantech Investment of the Year Award by the British Business Awards Association, the Government-backed national trade association which promotes and supports early-stage industries and investment in the UK. The award recognises innovative and successful new businesses in the environmental sector.

In 2013, the company is looking to develop and bring to market another water mains device – TransientMinder – which detects damaging pressure waves and eradicates them at an early stage.

'We are proud that TrunkMinder provides an affordable, easy-to-adopt way of reducing water leakage. Prolonging asset life will also help water companies to keep bills down and meet regulatory targets.'

James Dunning, chief executive, Syrinix Ltd

TeraView

Illuminating approach to improving solar cells

Introduction

TeraView Ltd is leading the way in the development of technologies that exploit the unique properties of terahertz light. It is developing analytical solutions for use across a variety of different market sectors, including solar power generation, from its base in Cambridge.



Summary

For the past decade, TeraView Ltd (www.teraview.com) has been developing techniques and instruments that use hard-to-detect terahertz light to provide detailed analysis of a wide range of materials, resolving many of the questions that cannot be answered by more familiar methods such as optical imaging and infrared. Moreover, TeraView's methods achieve their results in a completely non-invasive, non-destructive way.

Following a collaboration with the Renewable Energy Corporation (REC) in Norway, TeraView developed a completely new, tailored solution to help REC to reduce waste in its solar panel manufacturing operations and improve silicon production yields. Armed with that experience, the company is now focusing its effort on commercialising systems for the solar power generation sector. The majority of solar cells use silicon, and TeraView's systems will enable highly detailed examination of the crucibles used to make silicon, and of the silicon wafers themselves, to ensure a quality supply for manufacturers of solar cells.

Product story

The terahertz spectrum falls between light and radio waves and has been notoriously hard to detect. TeraView Ltd, a technology business spun out from Toshiba Research Europe and the University of Cambridge, is the first company to develop technologies to exploit the unique qualities of terahertz light commercially.

After a decade of research and development, TeraView has created a range of terahertz instruments that can generate, detect and manipulate radiation to analyse materials minutely, and its technology has applications in many sectors including security, healthcare and integrated circuits and chips for smartphones and tablet computers. TeraView has sold its systems to customers around the world.

With so many potential applications, TeraView has made a commercial decision to make silicon production for the semiconductor and solar energy markets its priority. The silicon manufacturing process generates a high proportion of waste, with typically up to 30% of the material wasted during cutting and being lost into the environment. Reducing this waste through terahertz analysis of the crucibles used in manufacture, and of the silicon itself, will reduce the amount of silicon going into the soil, reduce energy use and CO₂ emissions, and cut production costs.

TeraView approached the Low Carbon Innovation Fund (LCIF) at the start of 2011 as part of a funding round to support commercialisation of its technology in this area.

As a clean technology application, this proved to be a neat fit for LCIF which contributed £500,000 to the total round of £3.5 million. TeraView chief executive Don Arnone says: 'LCIF's investment undoubtedly gave our funding bid added credibility to attract the remaining investors, especially those from overseas who drew confidence from the fact that government funds were being committed.'

Importantly, the LCIF money was also made available at a critical time for TeraView, when it needed to provide a high level of support to its Norwegian solar panel-producing customer REC, as it took the TeraView technology out of its labs into its production facilities. Arnone explains, 'The money enabled us to play our part and provide a high level of customer support to make sure REC could implement our technology quickly and effectively in the Far East.'

The funding round has also helped the company to market the now well-proven technology to other producers of solar panels, and to manufacturers and users of silicon wafer in other sectors.

At the end of 2012, TeraView was a business with around 20 employees, but it was already on the recruitment trail, looking to take on and retrain skilled, committed customer support staff.

'LCIF's investment undoubtedly gave our funding bid added credibility to attract the remaining investors, especially those from overseas who drew confidence from the fact that government funds were being committed.'

Don Arnone, chief executive, TeraView Ltd

Mike Weaver

Where there's muck, there's magic

Introduction

Mike Weaver, a sole trader, is based in Landbeach near Cambridge. He is working to commercialise Pyreg – a technology that processes biomass waste into a product that improves soil quality and can help to protect the country's peat bogs.



Summary

Agricultural and green waste, and sewage sludge, are the feedstock for Pyreg (<http://www.pyreg.de/home-en.html>), a technology for processing waste into biochar, which can be used to improve soil quality and boost crop yields, making a growing medium similar to peat. During the process, Pyreg captures and fixes the carbon in the waste and, by mixing it into the soil, it efficiently keeps greenhouse gases out of the atmosphere.

Mike Weaver says that, because biochar has an improving effect on composted waste and soil, the Pyreg technology has the potential to reduce reliance on a dwindling natural resource and to help in preserving peat bogs, which are natural carbon dioxide sinks and which support a variety of plant and animal species.

The Pyreg unit is designed for small- and medium-scale operations, processing around 120 kg of green waste, or 150 kg of sewage sludge, per hour.

Product story

Pyreg technology was developed at the University of Bingen am Rhein in Germany as a way for producers of biomass to process their waste products sustainably in the face of tightening EU and national regulations on disposal. It offers an energy-efficient, local, thermal disposal method for small- and medium-scale operations and has won a prestigious innovation award in Germany, where units are now coming into commercial use.

Mike Weaver heard about Pyreg technology and its ability to transform green waste into a soil improver known as 'biochar' in 2009 via a BBC news report, and he set about discovering more straight away. By 2010, he had joined a group of business angels to help in bringing it to the UK, and then turned to InCrops at the University of East Anglia to access funding from the European Regional Development Fund for consultancy and practical assistance.

The funding support has helped Mike to identify barriers to market and market opportunities for the technology and its end product. InCrops has also facilitated a series of introductions to commercial and academic partners, which have led to a potential deal with an end user and new collaborations with the universities of Cambridge and East Anglia to quantify the benefits of biochar as a way to lock carbon back into the soil and improve plant yields.

Mike says:

The consultancy has helped me to a much better understanding of the UK market, and it has also helped me to build a strong network of partners to collaborate with on projects. Now it is easier to find solutions to problems, and I am being invited to get involved in useful initiatives.

The consultancy has helped Mike to get closer to commercialisation of the technology in the UK. Once it gains traction, and Pyreg modules are commissioned, it could become necessary to secure a manufacturing licence for the units and to appoint manufacturing partners to assemble the equipment. When these become operational, skilled technicians will be required to oversee the process.

'At our current level of knowledge, the stable storage of carbon in soil is a very significant way to withdraw greenhouse gases from the atmosphere in meaningful quantities.'

Mike Weaver

Weedingtech

Effective weed control – without the chemicals

Introduction

Weedingtech Ltd has developed a thermal weed control system that eliminates the need to use synthetic chemicals, and is safe for people, animals and the environment. Its manufacturing facility is in St Neots, Cambridgeshire.



Summary

Weedingtech Ltd's (<http://weedingtech.com/>) vegetation control system uses water, heat and the company's own Foamstream product to eliminate weeds in any location – making it suitable for agricultural use and for amenities management applications, even in residential areas or where children play.

Foamstream is a 100% natural product made from plant oils and sugars, and is non-toxic. It is applied using Weedingtech's AW-Series, and requires no specialist safety training or certification. When used on a farm, there is no need to observe an interval between application and harvest and, because it is carbon negative, its use can offset the use of carbon-intensive industrial herbicides.

Weedingtech's system is classified as a thermal weed control product, and these are permitted by the Soil Association, Organic Farmers & Growers, and other organic certification bodies in the UK and overseas.

Product story

Weedingtech Ltd was set up by a group of environmentally aware, experienced agricultural and horticultural specialists who feel passionate about the over-use of chemical herbicides and wanted to create a safer alternative.

The result is Foamstream, a weed control product made from plant oils and sugars that is used in conjunction with water and heat to destroy the plant's waxy exterior cell walls. Foamstream is applied to weeds using Weedingtech's specially developed AW-Series. Natural and safe, it has commercial applications in farming, amenities management and in environmentally sensitive areas such as near water courses and reservoirs, and is also being developed for use by domestic gardeners.

Product development has been carried out in conjunction with a number of organisations and businesses in the East of England, including Cambrand, a Cambridge-based research and development company. In early 2012, and with the initial development work completed, Weedingtech approached the Low Carbon Innovation Fund (LCIF) for an investment of £260,000 to provide capital for further research and development, and for the manufacture of pre-production AW-Series for use in detailed product trials. The investment was made in June 2012, and Weedingtech began working with some of Cambridgeshire's largest farming businesses as test partners, as well as with the universities of Birmingham and Cambridge to put the product and its delivery system through its paces.

In September 2012, Weedingtech won an Expo Demo Green Europe (EDGE) Award at Saltex, the UK's leading amenities management show, and the weed control system was put into use in Gothenburg, Sweden. Closer to home, Countrymans Contractors Ltd, one of the East of England's largest amenities management companies, began working with the system and was contracted by Lincolnshire County Council to use it to prepare the Olympic Torch relay's route through the county.

Weedingtech's operations director Leo de Montaignac comments:

The LCIF investment has enabled us to develop the products into the pre-production/production phase. We believe the product will be available for general roll-out into the market in the summer of 2013. But the support didn't end when the cheque was written. LCIF has introduced us to a number of useful commercial and research contacts to help us take the business forwards.

The development of the product has already resulted in the creation of new technical support jobs in the manufacturing facility in St Neots: the company will be recruiting again in 2013.

'As a result of LCIF's support, we've been able to accelerate the pre-production processes, and to get the product into trials with some of the region's key growers and contractors.'

Leo de Montaignac, operations director, Weedingtech Ltd