investeco
NEWSLETTER

Canada's First Environmental Investment Company

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Contents

Sector News

1. The Bioeconomy: New opportunities for innovation and sustainability in the agricultural sector

The agricultural sector is going through a time of unprecedented innovation and change, brought about by a growing awareness of issues relating to the environment, health and resource efficiency. In addition, a range of sectors across the broader economy — including energy, chemicals, textiles and pharmaceuticals, to name a few — are being dramatically reinvented on the premise of using agricultural outputs to replace products traditionally made with petrochemicals. These two trends together are creating exciting new investment opportunities.

The following segments (listed alphabetically) represent some of the most fertile areas of innovation at the cross–section of agriculture and the bioeconomy, and together comprise a dynamic global market opportunity well in excess of $500 billion. These are segments of particular interest to Investeco and our Sustainable Food Fund.

ANIMAL HEALTH AND WELFARE

Exciting new opportunities are arising in the $20 billion animal feed additives market as a result of a trend towards healthier, more humane and more sustainable models of animal production. This trend is being driven in large part by consumers who are demanding more natural feed additives as a result of concerns for both animal and human health. For example, the significant use of subtherapeutic antibiotics in animal feed has led to a call for tighter regulation and a drive towards options like vaccines derived from biological sources as alternatives to antibiotics for treating disease and sickness in animals.

In addition, there is a growing demand for additives that can naturally boost the immune system of animals. Feed ingredients such as some kinds of seaweed and algae have the potential to provide immune system strength to animals, and thus reduce the need for the ongoing use of antibiotics in animal feed programs. And the use of probiotics in animal feed is increasing so as to use positive bacteria as a protective agent.

A company to keep your eye on in this segment is: www.algalscientific.com — A Michigan–based company that is able to extract beta glucan from algae to be included in animal feed for health and nutritional properties.

Woodland Biofuel's pilot plant in Sarnia, Ontario.

BIOCHEMICALS/BIOMATERIALS

The global renewable chemicals market is expected to reach US$56.9 billion by the year 2015[1], evidence of the growing trend globally to replace petroleum–based chemicals (resins, acids) and materials (fibreglass, plastics) with renewable alternatives derived from agricultural and forest biomass. These new bio–based chemicals and materials generally have lower carbon footprints, reduce dependency on oil, are less toxic than petrochemical–based materials and chemicals, and create products that are easier to dispose of (can be engineered to biodegrade quickly and completely). They are also generally less vulnerable to the cost increases of fossil fuels.

The primary feedstocks for the new biochemical industry are sugars, starches, lignocelluloses and plant oils, all of which are derived from crops, plants and waste. There are three principle processes for the conversion of biomass into biochemicals and biomaterials: synthetic (using catalysts similar to oil refineries, Fischer–Tropsch, transesterification); biotechnological (fermentation of sugars using enzymes); and thermochemical (mostly gasification and pyrolysis). In addition, new, groundbreaking processes such nanocrystalline cellulose technology offer the promise of providing potential breakthroughs in developing products with unique characteristics in this segment.

A company to keep your eye on in this segment is: www.celluforce.com — This Quebec–based company is a world leader in nanocrystalline cellulose (NCC is the primary building block of plants and trees). NCC, which improves strength and toughness and reduces damage caused by wear, has many applications in cosmetics, biocomposites, iridescent pigments, packaging and coatings.

BIOFERTILIZERS

Biofertilizers are biologically based alternatives to conventional fertilizers, and are particularly important in the value chain for organic agriculture in which it is not permissible to use conventional synthetic fertilizers made from ammonia. Biofertilizers are substances that contain microorganisms and — like synthetic fertilizers — promote plant growth through fixing nitrogen or solubilizing phosphorous. Biofertilizers can be distinguished from soil supplements such as compost or manure in that the benefits of biofertilizers are driven by beneficial micro–organisms (bacteria, fungi and cyanobacteria), whereas compost and manure simply provide nutrients. The chief environmental benefit of biofertilizers is that they do not deplete soil to the same extent as conventional fertilizers.

It is estimated that the global market for biofertilizers was worth approximately $5 billion in 2012 and is expected to grow to more than $10 billion by 2018[2].

A company to keep your eye on in this segment is: www.ostara.com — This Vancouver–based company has successfully deployed their nutrient recovery technology in wastewater–treatment plants. Ostara's "crystal green" commercial fertilizer is produced by removing up to 90% of the phosphorous and 40% of the ammonia from sludge water.

BIOFUELS/BIOENERGY

The global biofuels/bioenergy segment is approximately $140 billion and grew at more than 10% in 2011[3]. This segment is in a stage of transition towards second–generation technologies, which will use as a feedstock either agricultural wastes — and in particular woody biomass from the forest products industry — or fast–growing perennials such as miscanthus grass that can be grown on lower quality soils and thus do not compete with food crops. In some cases, next generation bioenergy technology may even use municipal wastes as a feedstock. As a result, second–generation biofuels will likely be both much more efficient in terms of greenhouse gas emissions than first–generation biofuels, and also much more politically palatable as they will not lead to food price increases that became the bane of the first–generation biofuels industry.

1. Global Business Analysts Inc., www.strategy.com/Renewable_Chemichals_Market_Resport.asp

2. Frost and Sullivan

3. Bioenergy Today, worldofbioenergy.com

A wide array of technical platforms are being utilized in an effort to achieve commercial–scale second–generation biofuels, including various thermochemical approaches (such as pyrolysis or gasification) and biological conversions of waste biomass through processes such as anaerobic digestion.

A company to keep your eye on in this segment is: www.ensyn.com — This Ottawa–based company uses a patented process called Rapid Thermal Processing to create a wide array of products, including renewable transportation fuel and fuel for power generation. Investeco is an investor in Ensyn. Investeco is also an investor in Woodland Biofuels (www.woodlandbiofuels.com), which is profiled in the Investeco News section of this newsletter.

Inside Ensyn's Renfrew Rapid Thermal Processing plant.

BIOCIDES

This segment refers to biologically derived agents that control harmful substances and organisms in agriculture. The largest subsection of this segment is biopesticides (a category that also includes bioherbicides and biofungicides), which are naturally occurring microbes or biochemicals used as alternatives to conventional pesticides and are an important part of the value chain for organic and sustainable agriculture. Biopesticides generally have narrower effects than conventional pesticides and are therefore considered less harmful to humans, wildlife and beneficial insects. Another possible benefit of biopesticides results from the possibility that targeted pests may be less likely to develop genetic resistance, which has reduced the effectiveness of conventional pesticides over time.

Biopesticides may be derived from animals, plants, or microorganisms (e.g., phytochemicals, microbial products). A promising source of biopesticides is mustard, which contains glucosinolates that are effective against many soil–borne pathogens, worms and weeds.

The market for these pesticides was valued at $2.1 billion in 2012 and is expected to increase at a CAGR of 12% to surpass $3.7 billion in 2017[4]. This growth is chiefly supported by increasing demand for organic food and demand for food without chemical residues. However, biopesticide use in the US is also supported by simpler EPA requirements for biopesticide development and testing, which make biopesticides relatively cheaper and easier to bring to market.

A company to keep your eye on in this segment is: www.vivecrop.com — This Toronto–based company has significant IP around their ultra small, water dispersible, polymer particles, which contain active ingredients for crop protection. The company is working with very large strategic companies through testing and trials.

FUNCTIONAL FOODS/ NEUTRACEUTICALS

Growing consumer attention to the health properties of the food we consume, along with rising rates of chronic diseases such as diabetes, has increased the focus on food as a component of the broader health picture and created a huge market opportunity for foods, or medicines derived from foods, that have positive physiological benefits and/or reduce the risks of chronic diseases. In addition, the cost of healthcare is forcing healthcare providers and governments to think more broadly about new ways to improve health outcomes. All of these trends are leading to a new focus on neutraceuticals and functional foods, a segment that is estimated to be more than $150 billion today and is expected to grow to more than $200 billion by 2016[5].

A number of Canadian crops lend themselves to the development of functional foods and neutraceuticals, including pulse crops, flax, mustards, quinoa, cranberry, mushrooms, blueberries and yew, to name a few. Extensive efforts are ongoing to derive new products from these crops that can produce health benefits for consumers.

4. bccresearch.blogspot.ca/2013/03/global–market–for–biopesticides–to.html

5. www.bccresearch.com/report/nutraceuticals–markets–processing–technologies–fod013d.html

A related field to nutraceuticals is biopharmaceuticals, where new pharmaceutical proteins or vaccines are manufactured from mammalian cell cultures, fungi or bacteria derived from living organisms.

A company to keep your eye on in this segment is: www.nutracanada.ca — This Quebec–based company has developed IP around the production process and characteristics of their high–value plant extracts for nutraceuticals and functional foods (white blueberry, cranberry, broccoli).

Nutra Canada specializes in the production of high quality extracts from fruits and vegetables.

GREENHOUSE TECHNOLOGY

North American's multi–billion dollar greenhouse vegetable sector production area grew by 70% between 2002 and 2006[6]. The Canadian greenhouse sector now produces more than $1 billion annually[7], much of it in targeted, high–value products such as campari tomatoes, strawberry tomato and yellow cherry tomatoes.

Today's greenhouses are a result of centuries of research and innovation that has targeted greater control over temperature, humidity, lighting and ventilation, as well as improved food safety, higher production, reduced energy and water consumption, and higher yields.

Most of the recent innovation in this segment is a response to resource scarcity and rising energy costs by focusing on the development of technologies that allow greenhouses to operate more efficiently. Water recycling is a standard practice, and many greenhouses are moving towards using little–to–no pesticide use, relying on integrated pest management practices instead. New technology applications using biomass for combined heat and power production can make greenhouses even more efficient and can provide a stream of carbon dioxide that can be used to increase plant growth (and reduce GHG emissions). Other greenhouse technologies include vertical air circulation systems, more efficient energy management systems including thermal/shade screens for heating and cooling, mechanization and automation developments, and new plant science techniques.

A company to keep your eye on in this segment is: www.gc6.ca — This B.C.–based company provides custom engineering, fabrication and installation of CO2 carbon capture systems for specific use in biomass–fueled greenhouse applications. This company is an affiliate of SunSelect Produce, which Investeco has announced an investment in. See Investeco News at the end of this newsletter.

SunSelect Produce is an example of a modern high–tech greenhouse producer.

PRECISION FARMING AND IRRIGATION

As resources such as water become more valuable and costs of inputs rise, farmers will be under pressure to be as efficient as possible. Increasingly, technologies such as GPS, satellite imagery and even unmanned aerial vehicles with infrared cameras can help ensure a greater degree of precision in the application of agricultural inputs, and flexibility so as to adjust such applications based on a survey of the soil and plant health in their fields. This segment, referred to sometimes as "precision farming", is already a $1.3 billion market in the US alone[8].

Other technologies that can help dramatically increase resource efficiency in the agricultural sector include

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6. "The North American Greenhouse Vegetable Industry", Farm Credit Canada

7. "Greenhouse Industry Statistics", Statistics Canada

8. IBIS World's Precision Agriculture Systems & Services report

Investeco News

1. Investeco Sustainable Food Fund, L.P. announces an investment into SunSelect Produce

Investeco is pleased to announce a $2 million investment into leading greenhouse operator SunSelect Produce. In addition to having a long history as a profitable producer of high quality greenhouse vegetables, SunSelect has a history of being on the cutting–edge in terms of the sustainability of its greenhouse operations. Among other leading practices, SunSelect utilizes an integrated pest management system to avoid the use of pesticides, and has also pioneered the development of a carbon capture technology that allows waste CO2 streams from their biomass heat generation system to be delivered to the greenhouse as needed for benefit of plant growth. This is a first globally, and a testament to their ability to innovate for both environmental and financial returns. SunSelect already operates 70 acres under glass in the lower mainland of BC, and plans to use the financing to begin construction on an additional 130 acres in California.

SunSelect's greenhouse in Delta, BC is a leader in sustainability in the sector.

Inside the new Rowe Farms Leslieville store.

2. Rowe opens new store in Leslieville, and tests a new format

Rowe Farms' new store in the Leslieville neighbourhood of Toronto has been a huge success so far, with sales volumes far exceeding expectations. The new store of approximately 3500 square feet takes over from the original 900 square foot store that was opened across the street in 2007. The additional space has allowed for an expanded offering, which includes more prepared foods such as rotisserie chickens and a much broader produce offering.

3. Miovision launches adaptive signal control technology

Waterloo–based Miovision has announced the launch of Spectrum, their new adaptive traffic signal control product. A leader in technology solutions that address the challenges facing today's global transportation networks, Miovision has developed a product that delivers the best possible driving experience by coordinating all traffic signals in a traffic network based on changing traffic volumes. The system coordinates traffic in a given region to shorten travel times, improving productivity and reducing congestion and pollution from idling. The system uses video monitoring to detect traffic flows, and uses cellular networks and cloud computing to create the adaptive capabilities that drive the system. An initial trial in the city of Kingston has shown promising improvements to city traffic, and Miovision is rolling the product out to a number of similar municipalities in Canada and the United States.

4. Woodland Biofuels successfully produces fuel ethanol

Woodland Biofuels' new pilot plant in Sarnia, Ontario is now operating and has produced fuel ethanol in a continuous process, demonstrating the technical viability of the company's process. Using a thermo–chemical approach to producing fuel ethanol from agricultural and forestry wastes, Woodland believes that it can produce ethanol on a strong commercial basis. The pilot plant was financed by investors such as Investeco and the MaRS Cleantech Fund, along with governmental support from sources such as Ontario's Innovation Development Fund and Sustainable Development Technology Canada. Following on the success of this demonstration of its technology, Woodland is now developing plans for a commercial scale facility.

5. Final Close of the Investeco Sustainable Food Fund

The Investeco Sustainable Food Fund, L.P. will have a final close on January 4, 2014. If you are an accredited investor and would like to see an Offering Memorandum, please email info@investeco.com.

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irrigation technologies. Large, high–value crop farms (almonds, strawberries, citrus) in California are increasingly moving towards web–based irrigation management and soil moisture sensors to increase yields and decrease water use. Without accurate real–time soil tension data, many crops are overwatered, causing lower yields and wasting water as well as valuable fertilizer through leaching. Proper irrigation technologies can dramatically reduce the use and cost of water for farmers while increasing yields and revenues. Together the global drip and sprinkler irrigation market globally is almost $3.5 billion, and growing at more than 15% annually[9].

A company to keep your eye on in this segment is:
www.aquaspy.com — This company is focused on reducing water and fertilizer use in the pivot irrigation agriculture market. The technology is internet connected and tracks the moisture content of soil to produce data for irrigation and fertigation (fertilizer applied through drip irrigation).

SUSTAINABLE AQUACULTURE TECHNOLOGIES

As wild fish–stocks have declined over the last few decades, largely as a result of overfishing combined with a growing demand for high–quality protein, the demand for aquaculture production has grown from 34.6 million tonnes in 2001 to 59.9 million tonnes in 2010. The value of aquaculture production was estimated at US$119.4 billion in 2010. Aquaculture is also currently one of the fastest growing areas of food production in the US[10].

However, the aquaculture industry faces a number of serious concerns and challenges that include waste handling, side effects of antibiotics, competition between farmed and wild animals, and problems arising from using other fish to feed more marketable carnivorous fish (thereby increasing the burden on wild populations). Significant innovation is being directed at addressing these challenges. Modern sustainable aquaculture practices often reduce the risk of biological and chemical pollution through minimizing fish stress, fallowing net pens and applying integrated pest management techniques. Further, onshore recirculating aquaculture systems, polyculture farming techniques, and properly situated facilities (for example, offshore areas with strong currents) are examples of ways to manage negative environmental effects. Recirculating aquaculture systems recycle water by circulating it through filters to remove fish waste and food and then recirculating it back into the tanks. This saves water, and the waste gathered can be used in compost and other applications.

A company to keep your eye on in this segment is:
www.agrimarine.com — This Vancouver–based company has developed IP for solid wall, sustainable aquaculture enclosures that are designed to avoid pollution and invasive species and to control water temperature.

SUMMARY

Growing consumer and governmental interest in more sustainable practices is sure to drive continued growth in these segments and in the bioeconomy in general, as will ongoing research and development that is already providing products with unique features and benefits, as well as attractive economics. The Investeco Sustainable Food Fund is positioned well to work with a number of these companies to achieve global success and scale in a fast–growing global market.

9. Micro Irrigation Systems Market Trends and Global Forecasts (2011–2016), marketsandmarkets.com, 2012

10. Food and Agriculture Organization of the United Nations

investeco

70 The Esplanade,
Suite 400
Toronto, Ontario
M5E 1R2

T: 416.304.1750
E: info@investeco.com
www.investeco.com