Initiation
**Overweight**

**XON, XON US**
Price: $21.73

**Price Target: $30.00**

# Intrexon

## Synthesizing the Next Big Opportunity in Biology; Initiating with Overweight, PT $30

We are initiating coverage on Intrexon (XON) with an Overweight rating and December 2014 PT of $30. XON is a first-mover and leader in synthetic biology, leveraging its expertise to target high-potential verticals within healthcare, food, energy and environmental science. In addition to a unique and highly-scalable business model which should generate significant operating leverage, XON is led by a best-in-class management team with a proven track record.

- **Using synthetic biology expertise to target significant and rapidly-growing end markets across multiple verticals.** Together with extensive knowledge and experience in the design, modification and regulation of gene programs in cellular systems, XON's proprietary suite of technologies provides it with a first-mover advantage in applying synthetic biology at an industrial scale to high-potential verticals within healthcare (oncology, infectious diseases, animal health), food (aquaculture, GM crops), energy (isobutanol) and environmental science. Backed by a multi-pronged revenue model based on collaborations (ECCs), we expect XON to grow revenues at 32% CAGR over the next 5 years.

- **Scalable and sustainable model with significant operating leverage.** XON is run by a proven management team, including CEO Randal Kirk and COO Krish Krishnan, with a track record of building and commercializing R&D-driven companies, including New River Pharmaceuticals (sold to Shire for $2.6B) and Clinical Data (sold to Forest Laboratories for $1.2B). The company has a highly-scalable model based on ECCs with a diverse set of industry partners, reducing dependence on commercialization of any single product, and providing optionality in the event that products are eventually commercialized. ECC agreements bring mandatory cost recovery and lucrative back-end economics via royalties. By restricting involvement to early development, and relying on partners for regulatory approval and commercialization, XON's business model should generate substantial operating leverage. We expect operating margins to expand from ~34% in 2013 to ~55-60% by 2016.

- **Attractive valuation, given superior revenue growth and margin profile.** Driven by high-potential end markets and the operating leverage inherent to the business model, we forecast XON to grow revenues and EPS at a five-year CAGR of 32% and 69% respectively. Our December 2014 DCF-derived price target is $30 and assumes a CAPM-derived WACC discount rate of 13.5% and 1.5% terminal growth, implying a 2014 EV/Sales discount of ~23% vs. peers.

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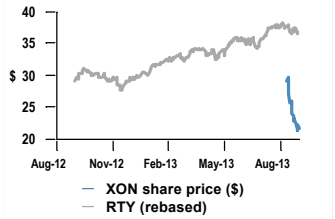
**Price Performance**




| | YTD | 1m | 3m | 12m |
|---|---|---|---|---|
| Abs | -25.3% | -25.3% | -25.3% | -25.3% |
| Rel | -42.9% | -24.0% | -29.4% | -52.3% |

**Intrexon Corporation (XON;XON US)**

| FYE Dec | 2011A | 2012A | 2013E | 2014E | 2015E |
|---|---|---|---|---|---|
| Revenue ($ mn) | | | | | |
| Q1 (Mar) | 2 | 2 | 4A | 38 | 40 |
| Q2 (Jun) | 2 | 3 | 22 | 46 | 46 |
| Q3 (Sep) | 4 | 3 | 31 | 50 | 51 |
| Q4 (Dec) | 1 | 7 | 54 | 76 | 70 |
| FY | 8 | 14 | 111 | 210 | 207 |

Source: Company data, Bloomberg, J.P. Morgan estimates.

| Company Data | |
|---|---|
| Price ($) | 21.73 |
| Date Of Price | 30 Aug 13 |
| 52-week Range ($) | 31.44-16.00 |
| Market Cap ($ mn) | 1,955.70 |
| Fiscal Year End | Dec |
| Shares O/S (mn) | 90 |
| Price Target ($) | 30.00 |
| Price Target End Date | 31-Dec-14 |

**See page 29 for analyst certification and important disclosures.**

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J.P.Morgan

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# Investment Thesis

## Intrexon

**Overweight**

**First mover advantage in rapidly emerging field of synthetic biology**

Synthetic biology is an emerging, and rapidly-evolving, discipline that applies engineering principles to biology for the purpose of designing and constructing new biological systems, or redesigning and modifying existing ones. More specifically, genetically modified cell systems can be used to produce proteins and small molecules or serve as cell-based factories, enabling the development of new and improved products and manufacturing processes across a variety of end markets. Within this field, XON has over 15 years of experience in the design, modification and regulation of gene programs (DNA sequences that control cellular processes), providing it with a first-mover advantage in applying synthetic biology at an industrial scale to multiple high-potential verticals within healthcare (oncology, rare and infectious diseases, animal health), food (aquaculture, GM crops), energy (isobutanol) and environmental science (biological versions of chemical pesticides). Driven by the size of this opportunity set and Intrexon's differentiated and value-added technology, we expect XON to grow revenues at a 32% CAGR through 2018.

**Business model is scalable, sustainable, and offers significant operating leverage**

In addition to first mover advantage, XON has a unique, and scalable, business model based on partnerships, or exclusive channel collaborations (ECCs), which reduces the dependence on any single product. The company currently has 9 ECCs and 1 exclusive research collaboration, which we project to grow to 16 by year-end, and 60 by 2015. Importantly, ECCs bring both mandatory cost recovery, and potentially lucrative back-end economics, via royalties on commercialized products. Under the ECC agreements, XON provides expertise in engineering, fabrication and modification of gene programs and cellular systems, while partners provide market and product development abilities, in additional to regulatory, sales and marketing capabilities. Furthermore, by restricting involvement to early development and relying on partners for late-stage development, regulatory approval and commercialization (while holding royalty rights), XON's business model should generate substantial operating leverage over time. To that end, we model R&D expenses to grow in line with cost recovery revenues, whose contribution to overall revenues will decline substantially once royalty payments ramp. SG&A margins are likely to remain in the mid-teens, as XON depends on partners for product commercialization. Consequently, we expect operating margins to expand from ~34% in 2013 to ~55-60% by 2016.

**Management has proven track record of commercializing R&D technologies**

Intrexon is led by best-in-class management and a strong scientific team, comprised of experts in the synthetic biology space. The company was originally founded in 1998 by Chief Science Officer and inventor of the UltraVector platform Dr. Thomas Reed, but since 2005, has been controlled, managed and primarily funded by Chairman and CEO Randal J. (RJ) Kirk, who, along with COO Krish Krishnan, has an enviable track record of building and commercializing R&D-driven companies, including New River Pharmaceuticals (sold to Shire plc for $2.6B in 2007) and Clinical Data (sold to Forest Laboratories for $1.2B in 2011). XON has ~148 R&D employees, 77 with advanced degrees in engineering, biology and other sciences.

**Valuation remains attractive in light of revenue and margin profile**

Driven by high-potential end markets and operating leverage inherent to the business model, we forecast XON to grow revenues and EPS at a 5-year CAGR of 32% and 69%, respectively. Our December 2014 DCF-derived price target is $30 and assumes a CAPM-derived WACC discount rate of 13.5% and 1.5% terminal growth. On a relative basis, Intrexon is currently trading at a 2014 EV/Sales multiple of 9.5x versus a peer average of 17.7x. Our price target of $30 implies a 2014 EV/Sales multiple of 13.6x, representing a 23% discount relative to peers.

# Risks to Rating and Price Target

**Limited near-term revenue visibility due to partnership driven business model**

Intrexon's business model depends on signing new exclusive channel collaborations (and repeat engagements with existing ones), and the company has limited visibility into the number and timing of ECC wins, as well as partnership terms including payment form (cash vs. equity) and timelines, generating lumpiness and uncertainty in the business model, particularly in the early years. We note that management does not plan to issue quarterly or annual guidance at this time.

**Equity stakes in lieu of cash payments add additional uncertainty**

As several existing ECC customers are early-stage or single product companies, XON often accepts equity in lieu of cash payments, which brings optionality, but also the risk of impairment if ECCs encounter an event that negatively impacts the stock price. Of course, as the number of ECCs grows and royalty payments come to dominate the revenue stream, this risk will diminish over time (although the generation of milestone and royalty payments is beyond Intrexon's control, and we note that to date, no commercial products have been enabled by XON technologies).

**There is regulatory risk for current and future collaborations**

For all ECCs within the healthcare vertical, product commercialization (and hence, milestone and royalty payments) is subject to FDA approval. The FDA has not yet approved any gene therapies for use in humans or animals, making the timing and likelihood of approval uncertain. Beyond healthcare, AquaBounty's genetically modified salmon is yet to receive final FDA approval, and remains the first meat product to ever seek such approval, while environmental regulations and impact assessments imposed by the federal government may also present regulatory hurdles.

## Company Description

Intrexon is a leader in the emerging field of synthetic biology. The company was founded by Chief Science Officer Dr. Thomas Reed in 1998, and since 2005, has been controlled, managed and primarily funded by Chairman and CEO Randal J. (RJ) Kirk. Intrexon's proprietary and complementary suite of gene programming technology and extensive experience provides it with a first-mover advantage in applying synthetic biology expertise at an industrial scale to enable development of new or improved products across verticals within healthcare, food, energy and environmental science. XON is headquartered in Germantown, MD and has 204 employees of whom 148 are exclusively focused on R&D activities. The company is listed on the NYSE under the ticker XON.

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# Corporate Overview

Intrexon was founded by Chief Science Officer Thomas D. Reed, Ph.D. in 1998. Since 2005, the company has been controlled, managed and primarily funded by Randal J. Kirk, the current Chairman and CEO. The company is a leader in the emerging and rapidly evolving discipline of synthetic biology, using its suite of technologies to design, build and regulate gene programs and thereby control cellular processes to produce a desired outcome. The company is headquartered in Germantown, MD and has 204 employees of whom 148 are focused on R&D activities. The company listed on the NYSE under the ticker XON in an IPO for which J.P. Morgan was lead book-runner.

## What is synthetic biology?

Synthetic biology entails the application of engineering principles to biological systems for the purpose of designing and constructing new biological systems or redesigning/modifying existing ones. Biological systems are governed by DNA, the building blocks of gene programs, which control cellular processes by coding for the production of proteins and other molecules that have a functional purpose and by regulating the activities of these molecules. This regulation occurs via complex biochemical and cellular reactions working through intricate cell signaling pathways, and control over these molecules modifies the output of biological systems.

In the early 1970s, scientists utilized basic tools and procedures for transferring DNA from one organism to another. Foundational tools included gene programs contained in vectors, enzymes that could cut DNA at specific sites, and enzymes that could "glue" two complementary segments of DNA together. Developments between 1980 and the end of the 20th century advanced the field of genetic engineering, including automated DNA sequencing, DNA amplification via PCR and the creation of genetically modified organisms. However, the simplistic "cut-and-paste" nature of the available tools, and the absence of genomic sequence information, significantly restricted the scope of early synthetic biology efforts.

More recently, synthetic biology has been enabled by the application of information technology and advanced statistical analysis, also known as bioinformatics, to genetic engineering, as well as by improvements in DNA synthesis. Synthetic biology aims to engineer gene-based programs or codes to modify cellular function to achieve a desired biological outcome.

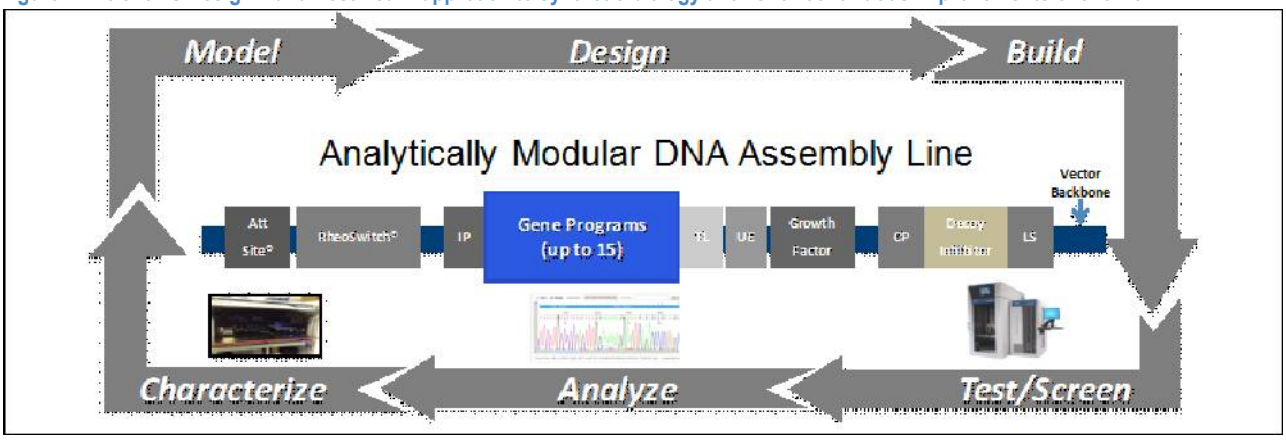
## Intrexon's technology platform

Intrexon's approach is to apply synthetic biology to enable the development of new and/or improved products and processes across a diverse array of verticals (such as healthcare, food, energy and environmental science) using a four-step iterative process:

- *Design* genes of interest and gene programs utilizing knowledge of cellular pathways and protein function
- *Build* biological molecules, gene programs and their variants to optimize performance of biological systems

- *Test* gene programs by inserting them into cellular systems and compare the result to the intended effects
- *Learn* by utilizing information gained in the iterative process to enhance their DNA component inventory and create better DNA vectors and gene programs using a more informed and efficient process

**Figure 1: Intrexon's Design-Build-Test-Learn approach to synthetic biology allows for continuous improvements over time**




Source: Company reports.

Intrexon's fundamental competitive advantage lies in its approach to synthetic biology as an engineering discipline by using process optimization and data analysis techniques. To that extent, the company is rather similar in its offering to big-data players like Splunk and Tableau Software (which we include among our valuation comps), rather than a pure-play early stage biotechnology company.

By leveraging its proprietary database collected from prior projects, Intrexon is able to continuously and iteratively improve experimental design via "smart sampling" techniques. This is not only a more efficient approach as compared to random sampling, but also greatly reduces the number of samples needed to reach the desired biological improvement. The company's business moat lies not in the statistical software that is used in this process, but rather in the data bank they have built up over the last decade which allows them to identify key parameters of interest and reduce the sample size of the biological space under consideration to more manageable levels without compromising on accuracy.

To implement the Design-Build-Test-Learn approach, Intrexon has developed a proprietary and complementary suite of technologies that is capable of working across different cell types and handling the design and control of complex biological molecules and multigenic gene programs. This suite of technologies includes the following four components:

- **UltraVector:** UltraVector is a gene design and fabrication platform and its associated library of modular DNA components that allows for the translation of complex gene programs into standard components that can be designed, manufactured and tested in a robust, automated format. The computer-automated system utilizes construction rules to rapidly assemble and store DNA vectors in their component library, while the underlying algorithm is designed to determine the most efficient approach to assemble DNA regardless of complexity and scale.

In addition to the gene component library, Intrexon continually designs and creates enzymatic and regulatory components such as RheoSwitch and AttSite that provide more precise control over genome integration and gene expression and regulation.

- **Cell Systems Informatics:** Cell systems informatics permits faster design and efficient testing and learning of new gene targets or pathways. The platform enables the development of predictive computer models of biological systems providing a mechanism for high-throughput testing, rapid learning and examination of a large experimental space *in silico.*
- **Laser-Enabled Analysis and Processing (LEAP):** LEAP is an instrument that merges semiconductor manufacturing technologies for cell processing applications to provide high levels of control and scale to cell purification and stem cell culture management. Capable of operating at the single cell level, LEAP can identify and purify cells of interest from large libraries created by the UltraVector platform. Applied to cell line generation, a core step in the production of therapeutic proteins such as antibodies, LEAP generates more highly purified cell lines of higher expressing cells, with greater productivity and in less time than conventional approaches, reducing R&D costs as well as cost of goods for manufactured products. A unique feature of the LEAP platform is its ability to purify cells while they remain attached to the plate surface where they are grown, allowing for better cell health and viability versus conventional flow-based purification methods. This is particularly important for stem cells, and enables the scale up and automation of stem cell processing that has historically been a manual process.
- **mAbLogix:** mAbLogix enables production of large B-cell libraries for discovery of antibodies, which have become increasingly important due to their use in anti-infectives and oncology. The process entails building human B-cell libraries expressing a large number of unique antibodies and the testing of these libraries based on analysis of B-cells that positively express antibodies in response to a specifically chosen antigen. The mAbLogix platform complements UltraVector with a library of human antibodies that exceeds 500M. By immortalizing human tonsils which are comprised of lymphatic tissue containing B-cells, the mAbLogix platform creates a B-cell library that can generate antibodies against an almost infinite number of new antigens. These antibodies can then be isolated via LEAP, and sequenced, manipulated, regulated and reconstructed using the UltraVector system.

## Unique business model and commercialization strategy

Since synthetic biology has applicability across a set of extremely diverse end markets, each with their own opportunities and challenges, Intrexon has chosen to implement a partnership model to product commercialization rather than a go-it-alone approach. This model allows the company to focus on its core expertise in synthetic biology, while bringing commercial products to market via collaborations in a broad range of industries, thus minimizing the use of their own capital and driving significant operating leverage.

**What is an ECC?**

In line with the above rationale, Intrexon's business model is built around the formation of ECCs, or exclusive channel collaborations, which are agreements with collaborators to develop products based on XON's technologies in a specifically-defined field.

Collaborators are typically firms with deep expertise within a specific industry segment and the commitment to provide resources for the development and commercialization of products. While Intrexon provides expertise in the engineering of gene programs and cellular systems, collaborators are responsible for providing market and product development expertise, along with regulatory, sales and marketing capabilities.

In terms of the scope and duration of ECCs, the area covered under a collaboration may be narrowly defined (e.g. a specific therapeutic approach for a single indication) or broad (e.g. an entire class of related products), with collaborator granted exclusive rights to XON's services and suite of technologies to develop and commercialize products in that field. Each ECC is designed to continue into perpetuity unless terminated, with collaborators having the right to do so upon 90 days notice, while either party may do so upon a breach of the agreement (including insufficient efforts on part of the collaborator to develop/commercialize the product). Upon termination, early stage products and IP revert to Intrexon, while late stage and commercialized products revert to the collaborator (though XON would continue to be entitled to royalty payments). Finally, each ECC requires the collaborator to indemnify XON for all liability related to jointly developed products.

**How does Intrexon generate revenues from an ECC?**

In exchange for XON's services and technology, ECC partners fully reimburse all research and development costs incurred by Intrexon, in addition to upfront and milestone payments and product royalties. The three categories of ECC revenue derived by Intrexon are as follows:

- *Cash recovery:* Through the duration of the ECC, XON receives reimbursements from the collaborator to cover all time and material costs. Intrexon has no net investment or ongoing expenditure required as part of an ECC.
- *Upfront and milestone payments:* Technology access fees are paid upfront or upon achievement of developmental milestones (or in some cases, both). Of note, these fees may be in the form of equity or cash payments.
- *Royalties:* A share of potential future revenues through royalties or other similar arrangements derived from the commercialization of products.

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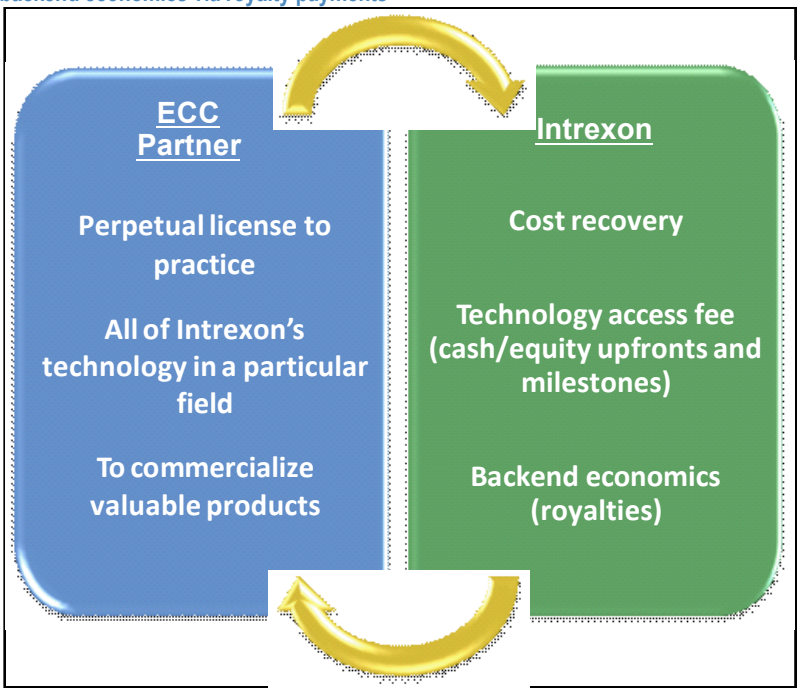
Figure 2: Intrexon's unique ECC business model includes mandatory cost recovery and lucrative backend economics via royalty payments




Source: Company reports.

## Target markets for synthetic biology

By way of background, synthetic biology has applicability across many diverse end markets. Below we list some of the key markets Intrexon is currently focused on.

**Healthcare**

Human and animal therapeutics, bioproduction and diagnostics

According to industry estimates, the global human pharmaceuticals market is ~$900B, of which biological therapeutics represent ~$150B. Additionally, the market for animal health therapeutics is currently estimated to be valued at more than $20B. Within these markets, Intrexon is focused on:

- *Human and Animal Therapeutics:* Synthetic biology can enable the development and regulation of complex biological molecules and processes, with advantages as compared to traditional therapeutics, both *in vivo* and *ex vivo*.
- *Bioproduction:* New biologically-based manufacturing techniques have the potential to significantly lower the cost of goods for highly-complex biological molecules.
- *Diagnostics:* The sensing and reporting capabilities of cells and specific cellular mechanisms can be utilized to create highly sensitive diagnostics.

**Food**

Food animals and agriculture

The Food and Agriculture Organization (FAO) of the United Nations predicts that by 2050 the world's population will reach 9.1 billion. To feed a larger, more urban and wealthier population, annual cereal production will need to rise to about 3B tons from 2.1B today and annual meat production will need to rise to 470M tons from 270M tons today. In this market, Intrexon is focused on:

- *Food animals:* Meat and dairy constitute $150B in annual U.S. sales alone, with global consumption ~6x this amount. Intrexon's suite of technologies can be used to rapidly develop livestock with commercially valuable attributes such as enhanced nutritional content, resistance to disease and increased growth efficiency.
- *Agriculture:* The FAO estimates that 90% of the production increases necessary to feed the future human population will come from increases in crop yield and cropping intensity through enhanced traits. Synthetic biology can create improved crops by incorporating multigenic traits into plants that are designed to enhance the efficiency of water, carbon and nitrogen utilization, as well as better nutritional content, product quality and disease resistance.

alternatives to carbon feed stocks

**Energy and Chemicals**

Drop-in fuels and chemicals

Synthetic biology offers promising alternatives to conventional energy production as well as resource-intensive synthetic chemistry. While there have been many attempts at generating fuel from biological sources, none have been commercially viable. Intrexon's UltraVector platform enables high throughput gene program design and construction, allowing them to quickly evaluate vast solution sets to identify the most promising candidates. Within this vertical, the company is focused on:

- *Drop-in fuels:* The development of engineered microbes for biological conversion of natural gas to alcohols as drop-in fuels can be accomplished with synthetic biology. Intrexon has already achieved as proof of concept the conversion by engineered bacteria of methane to isobutanol, which is an alternative alcohol-based fuel.
- *Chemicals:* XON's technology can be used to develop economically viable alternatives to scarce and increasingly expensive carbon feed stocks thereby reducing manufacturing costs in the chemical industry.

**Environmental Sciences**

Biosensors, bioremediation and specialty processes

Biosensors, bioremediation and specialty processes

- *Biosensors:* A biosensor is an analytical detection and measurement device that combines a biological element with a physicochemical detector. The biosensor global market is forecasted to exceed $12B by 2016 and opportunities exist to use XON's technologies to design and construct unique biosensors.
- *Bioremediation:* Industrial sources of soil and groundwater contamination present major environmental, policy and health issues with the global market for microbial and associated bioremediation products forecasted to reach over $1B by 2016.
- *Specialty Processes:* Applications include activated microbial filtration, waterborne pathogen elimination, and de-nitrification of waste and surface water.

## Current ECC collaborations

Intrexon is currently party to 9 ECC agreements. In the table below, we outline the list of current collaborations along with a brief description of each ECC and the terms of compensation.

**Figure 3: Intrexon's current ECC collaborations**

| Partner | Effective Date | Target | Compensation |
|---|---|---|---|
| Fibrocell Science | Oct-12 | Autologous fibroblasts for aesthetic and therapeutic indications | Technology access fee of Fibrocell's common stock valued at $7.6 mm. Quarterly royalty equal to 33% of COGS improvement associated with Intrexon's technology. On a quarterly basis, Fibrocell will pay royalties of 7% of net sales up to $25mm and 14% of net sales above $25mm on products developed under ECC |
| Elanco | Nov-11 | Chronic diseases associated with aging in companion animals | Technology access fee in cash and entitled to additional amount up to an aggregate of $2.25mm per product candidate. Royalties in mid- to upper-single digits and lower-double digits based on net sales of products developed under partnership |
| Ziopharm Oncology | Jan-11 | Products for the purpose of in vivo treatment of cancer | Technology access fee of ZIOPHARM's common stock valued at $17.5mm. Received ZIOPHARM stock valued at $18.3mm as milestone consideration. ZIOPHARM to pay 50% of the quarterly net profits derived from the sale of products developed under the ECC |
| Synthetic Biologics | Aug-12 | Monoclonal antibody therapies for infectious diseases | Received $7.8mm in stock as upfront technology fee. Entitled to additional consideration payable in cash or stock at the option of Synthetic Biologics valued at $2.0mm. Tiered royalties as a percentage in the upper-single to lower-double digits on net sales of products developed under the ECC |
| Soligenix | Apr-13 | Human monoclonal antibody for biodefense and infectious diseases | Received ~1mm shares of common stock as an upfront technology access fee. May receive up to $7.0mm in aggregate milestone payments. Entitled to royalty payments as a percentage in the upper-single to lower-double digits on net sales |
| Oragenics | Jun-12 | Lantibiotics as API for the treatment of infectious diseases | Technology access fee of Oragenics' common stock valued at $6.6mm. Upon achievement of certain milestones, entitled to receive additional compensation equal to 10% of Oragenics outstanding shares. Oragenics will pay 25% of quarterly profits derived from the sale of products developed from the ECC on a product-by-product basis |
| AmpliPhi Biosciences | Mar-13 | Bacteriophage-based therapeutics for antibiotic resistant infections | Received technology fee of 24mm shares of common stock of AmpliPhi. May receive up to $7.5mm in aggregate milestone payments for each product. Entitled to tiered royalties as a percentage in the upper-single digits on net product sales of a product developed under ECC |
| Genopaver | Mar-13 | Genetically modified alkaloid production for use as API | Technology access fee of $3.0mm cash payment. Entitled to royalties as a percentage of lower-double digits on the gross profits of product sales from a product developed under ECC |
| AquaBounty Technologies | Feb-13 | Efficient and environmentally-friendly stable production of high-quality finfish | Receives 16.7% of quarterly gross profits for each product. Majority holder of equity in AquaBounty |

Source: Company reports.

In addition to the summary above, we thought it would be useful for investors to gain a deeper understanding of the business opportunities surrounding some of Intrexon's more advanced or high-potential ECCs in healthcare, food and energy. To that end, we are providing a more detailed description for select ECCs below. While the focus on individual ECCs is understandable at this early stage of the company's development, we would caution investors against placing undue emphasis on the success or failure or any single product or collaboration, as Intrexon's business model is specifically designed to diversify away ECC-specific risk.

## Healthcare collaborations

Within the healthcare vertical, Intrexon's most mature ECC's include Fibrocell, Ziopharm and Elanco.

### Fibrocell Science

The ECC with Fibrocell is primarily focused on research around treatment of recessive dystrophic epidermolysis bullosa, or RDEB, a rare, genetically based blistering disorder. RDEB is an autosomal recessive disorder characterized by the loss of collagen type VII, an important protein component of the anchoring fibers that connect the dermis to the epidermis. The proposed treatment for this disease will provide collagen VII produced by autologous, gene-modified fibroblasts. According to the Stanford School of Medicine and the Dystrophic EpidermolysisBullosa Research Association of America (DEBRA), the U.S. incidence of this disease is

1-2/1,000,000 with prevalence ranging from 2,800–5,600 cases. Based on pricing for currently marketed rare disease therapies, the market opportunity is estimated to be $560-2,200M.

Along with treatment of RDEB, the ECC also includes potential treatments for Morphea (U.S. prevalence of ~10,000 with a $300-350M market opportunity), Cutaneous Eosinophilias (U.S. prevalence of ~4,000 with a $120-140M market opportunity) and Psoriasis (U.S. prevalence of 4.5M with a $1.7-3.4B market).

Intrexon is also working with Fibrocell to improve the process efficiency and COGS for LAVIV, Fibrocell's autologous cellular product for treatment of moderate to severe nasolabial fold wrinkles in adults.

**Ziopharm Oncology**

The ECC with Ziopharm (a publicly traded small molecule late-stage oncology company) focuses on in vitro treatment of cancer. The lead drug candidates include DC-IL-12 (which has completed a Phase I human clinical trial to establish the drug's safety) and Ad-IL-12 (which is in multiple Phase II clinical trials with initial results expected by year-end, after encouraging Phase I data presented at ASCO) for the treatment of melanoma and breast cancer.

Both these programs are focused on the regulatable expression of Interleukin-12 (IL-12), a naturally occurring anti-cancer cytokine that has so far been found to be toxic at therapeutic doses. Also, both programs deliver a genetic vector coding for the IL-12 gene directly to tumors and once the vector is delivered, it is controlled by Intrexon's proprietary RheoSwitch Therapeutic System (RTS), an on/off biologic switch. RTS regulates IL-12 expression to reach a targeted clinically active level of IL-12 at the tumor, while limiting broader systemic exposure and toxicities from the cytokine.

The ECC is also investigating the use of IL-12 in combination therapy with selected immunomodulators for solid tumors based on Intrexon's multigenic expression platform, where two or more therapeutic proteins are expressed from a single DNA vector.

**Elanco**

The ECC with Elanco (animal health division of Eli Lilly) is targeting certain chronic diseases associated with aging in companion animals as well as the prevention of certain infectious diseases in pigs. The most significant programs in the Elanco ECC are currently in the research phase.

**Other healthcare ECCs and collaborations**

Along with these key ECCs, Intrexon also has ongoing collaborations with:

- *Synthetic Biologics* for monoclonal antibody therapies for infectious diseases (Acinetobacter and pertussis). The program is currently in the preclinical phase.
- *Soligenix* for human monoclonal antibody therapies used as biodefense countermeasures in the treatment of Melioidosis, identified by the U.S. government as a high-priority threat. The program is currently in the research phase.

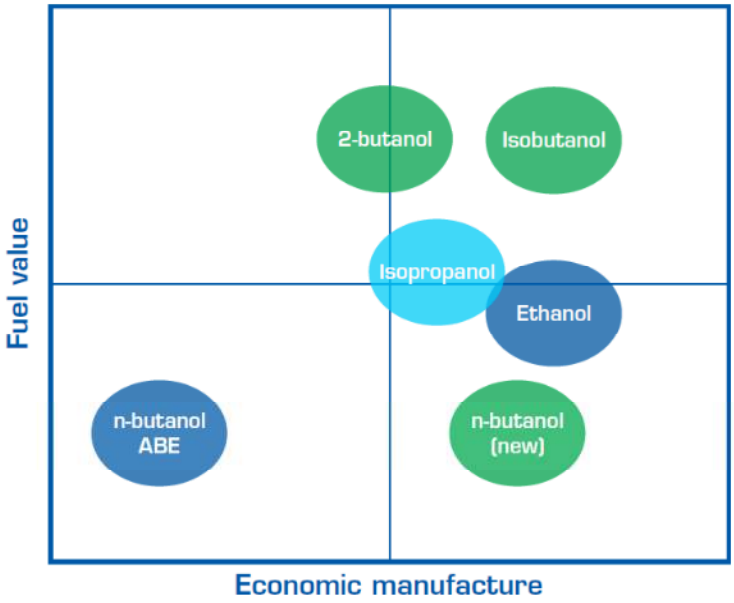
- *Oragenics* for lantibiotics, a novel class of broad-spectrum antibiotics for the treatment of infectious diseases including methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Enterococcus faecalis*, *Clostridium difficile*, Mycobacterium tuberculosis and anthrax, in humans and companion animals. The program is currently in the research phase.
- *AmpliPhi* for bacteriophage-based therapeutics for antibiotic resistant infections including acute and chronic wound and lung infections, and *C. difficile* infections. The program is currently in the research phase.
- *Genopaver* for the commercially viable microbial production of an API used in the manufacture of several commonly used painkillers. The program is currently in the research phase.
- *BioLife Cell Bank:* Rather than an ECC, this is an exclusive research collaboration which gives BioLife the option to form an ECC to produce new treatments for spinal muscular atrophy, a condition responsible for more infant mortality than any other genetic disease.
- *Internal projects:* Finally, Intrexon also has several ongoing internal research projects including (1) the development of in vivo expression (via ocular injection) for therapeutic protein production to treat ocular disorders (wet AMD, autoimmune uveitis, retinal neuropathy); and (2) the generation of recombinant alpha-1 protease inhibitors which compare favorably to those derived from plasma.

## Energy opportunities

The development of engineered microbes for biological conversion of natural gas to alcohols as drop-in fuels can be accomplished with synthetic biology. Intrexon has already achieved as proof of concept the conversion of methane to isobutanol (an alternative alcohol-based fuel) using engineered bacteria.

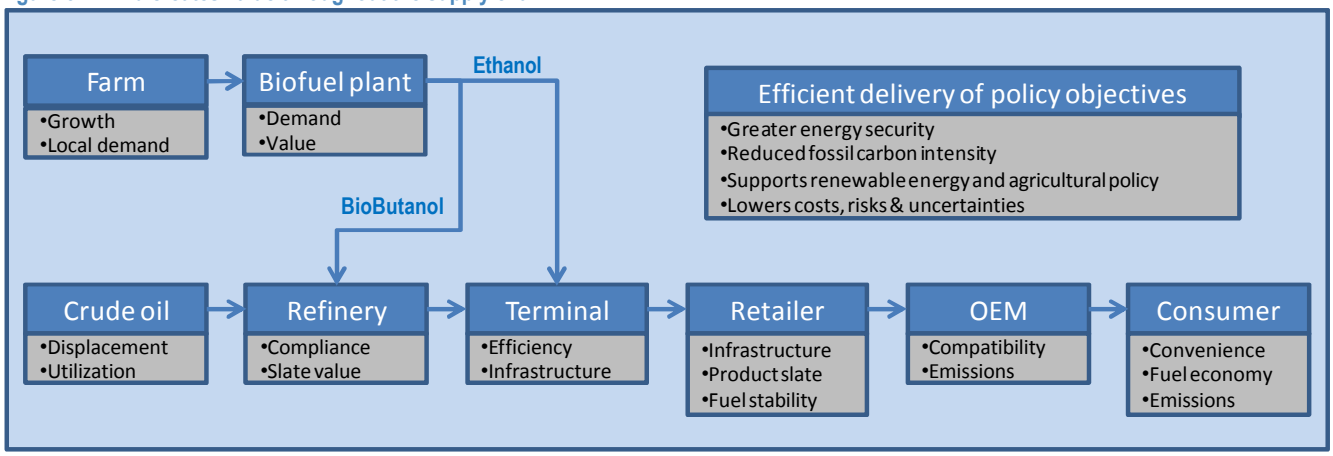
Isobutanol has fuel properties that are much closer to gasoline than other alternative fuel compounds such as methanol, ethanol and propanol. As a result, it can be added to the fungible fuel pool using existing supply infrastructure and is fully compatible with the existing vehicle park. We note that this has already been demonstrated by Butamax (biobutanol developed and commercialized as a JV between BP and DuPont). In their market demonstration study, biobutanol was blended at a conventional gasoline terminal and successfully supplied to 10 retail sites (10M liters sold with ~250K vehicle fills and ~80M miles driven). No special preparation such as drying of retail tanks was required and there were no quality or operational issues discovered. Moreover, isobutanol can be used at greater blend concentrations than ethanol and requires no compromise in fuel specifications. Finally, it meets the needs of the customer without a compromise in performance.

Figure 4: Isobutanol combines economic manufacture with high fuel value




Source: Company reports.

Figure 5: …And creates value throughout the supply chain




Source: Company reports.

Crude petroleum is an ~$2.8T annual market (at a conservative price of ~$90 per barrel) with ~90% of petroleum used for production of liquid transportation fuels. Intrexon expects isobutanol produced from natural gas feedstock to sell at the same price as gasoline (no extra costs to consumers). Using an assumption of 10% blend, the potential market size for isobutanol as an alternative liquid fuel is ~$250B per year.

In order to capitalize on the isobutanol opportunity and their own internal development efforts, Intrexon is creating an International Research Association (IRA) for natural gas and oil companies. Members are expected to pay a $25M membership fee to Intrexon, in return for which they obtain the rights to sell the product in their geographies. The company hopes to sign their first IRA member this year, with an incremental member per year thereafter. We note the Robert Walsh,

former senior executive and General Manager for Supply (Europe) for Royal Dutch Shell, recently joined Intrexon as Senior Vice President in the Energy vertical.

Finally, one of the bi-products of Intrexon's carbon upgrading platform is fish meal (which has become a strategic nutritional ingredient used increasingly in aquaculture (fish farming) as compared to its historical commoditized usage as a farm animal feed), which the company views as a potentially large and lucrative future opportunity given tight global supply.

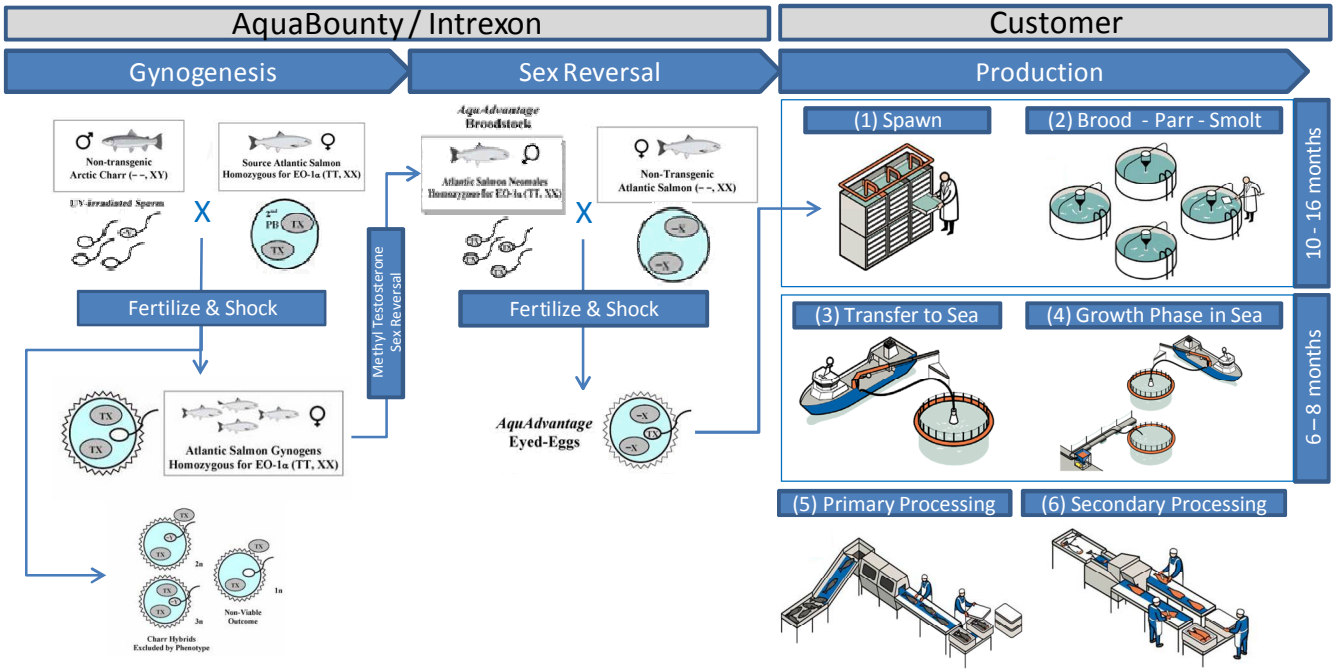
**Food/AquaBounty**

Over 80% of the world's fish stocks are overexploited, depleted or endangered, while population growth, increased health awareness, and increased purchasing power in developing economies are creating greater demand for seafood globally. Aquaculture is an alternative to conventional fishing for meeting this increasing demand.

Intrexon is applying its proprietary suite technologies and techniques to develop livestock with commercially valuable attributes, including enhancing aquaculture productivity through genetic engineering. The aquaculture collaboration with AquaBounty Technologies (a publicly-traded biotechnology company traded on the London Stock Exchange focused on aquaculture) is likely to be the company's first source of revenue from a commercialized product, although we note that it was not developed using Intrexon technology (as we expect to be the case for follow-on products).. By way of background,

AquaBounty's lead product, AquAdvantage Salmon (AAS), is a strain of salmon capable of reaching marketable size in half the time of conventional salmon. AAS is developed by inserting the coding sequence from a chinook salmon growth hormone gene under the control of regulatory sequences from an ocean pout antifreeze protein gene into wild Atlantic salmon. Although this process does not cause the fish to reach a larger final size than conventional salmon, it does accelerate growth in the early stages, enabling AAS to reach marketable size in 18 months rather than 28 - 36 months. This enables shorter production cycles and increased production efficiency. The production process for AAS is shown below.

Figure 6: AquaAdvantage salmon production cycle




Source: Company data, Marine Harvest.

The marketed product will be a population of fish that are triploid (sterilized) females, which serves to prevent spread of the genetic modification in the environment and mitigate impact, in the event of escape.

**Structure of collaboration with AquaBounty**

In November 2012, Intrexon acquired a 47.6% stake in AquaBounty. In March 2013, Intrexon acquired additional shares of AquaBounty stock, increasing its ownership to 53.8% and gaining control over the company. Although AAS was developed by AquaBounty without using any of Intrexon's technologies, as noted, Intrexon's majority ownership entitles the company to a share of profits generated from all future AAS sales. They has also signed an ECC agreement with AquaBounty that covers the development and commercialization of GM finfish (including trout and tilapia) for human consumption that are more nutritious, have increased muscle mass, and grow quickly to maturity.

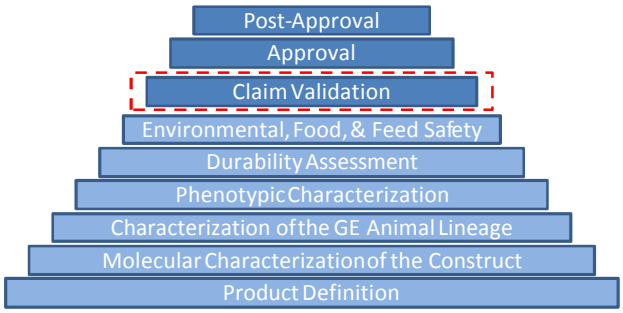
**Dimensioning the market opportunity for GM salmon**

In an attempt to model the AAS opportunity, we used the market penetration rates, and pricing of GM crops (first commercialized in the early 1990's) as the best available proxy, in conjunction with our views regarding FDA approval and cultural adoption.

We note that the most critical factor driving AAS adoption is FDA assessments of safety and environmental impact. The FDA considers the growth hormone used in AAS as a "new animal drug". In December 2012, the FDA published its environmental assessment, or EA, for AAS, along with its Finding of No Significant Impact, or FONSI, in the Federal Register, confirming that an approval of the

pending New Animal Drug Application would not have an adverse effect on the environment followed by a period of public comment that expired in April 2013. We note that prior to the publication of the EA and FONSI, in September 2010, the FDA's Veterinary Medicine Advisory Committee concluded that AAS is indistinguishable from other farmed Atlantic salmon, is safe to eat and does not pose a threat to the environment under its conditions of use. We believe that FDA approval for AAS should be forthcoming shortly.

**Figure 7: AquAdvantage salmon is expected to receive FDA approval shortly**

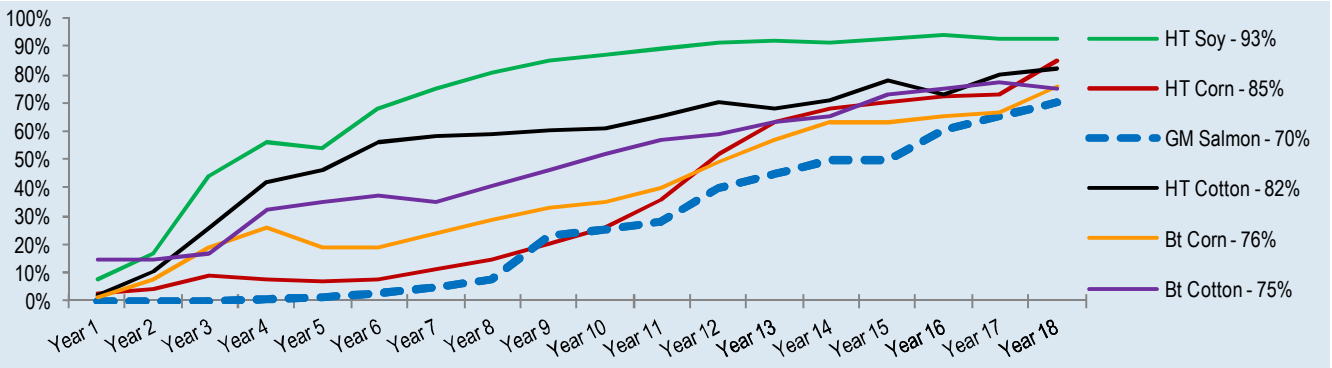



Source: Food and Drug Administration

The second consideration that could impede adoption of AAS post regulatory approval is the cultural perceptions surrounding GM foods from the point of view of personal consumption and environmental impact. We note that Intrexon does not intend to attempt commercialization of AAS in Europe (given anti-GM sentiment among both regulators and consumers), but believes Latin America and Asia present future growth opportunities.

Looking at the adoption rate curve for GM crops, the widest disparity in adoption rates across crops was around 10 years post commercialization, with HT Soy at 87% and HT Corn at 27% . Using these adoption rates as a benchmark as assuming FDA approval in the next 12 months, we extrapolate a GM salmon adoption rate of 52 % after 10 years of initial commercialization.

**Figure 8: Our GM salmon adoption forecast versus historical GM crop adoption**




Source: USDA Economic Research Service, J. P. Morgan estimates

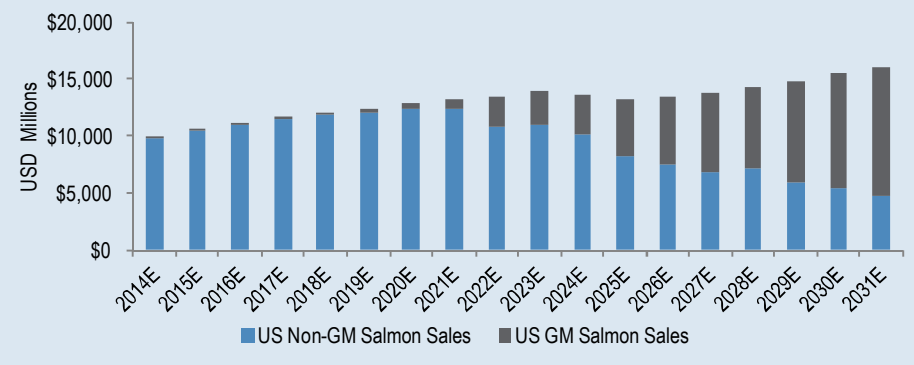
A survey conducted by the Fridtjof Nansen Institute in Norway (world's largest supplier of salmon) indicated that the majority consumers polled would be open to

GM salmon if it came at a discount of 20% or more to the current salmon prices. While we realize that this is only one data point, it does suggest that AAS may have to be priced at a significant discount to conventional salmon to drive adoption in the early stages of its commercialization.

Using historical salmon consumption trends (and growing them in line with GDP) coupled with a GM salmon adoption rate and price discount as discussed above, we estimate the US market opportunity for AAS to be ~$500M by 2020.

Poised to become the first FDA approved GM animal product, we believe the commercialization of AAS could open the door for Intrexon to expand the application of its technologies to other meat products such as pork, chicken and beef.

**Figure 9: We estimate the GM salmon market to be ~$500M by 2020**




Source: National Marine Fisheries Service, J.P. Morgan estimates

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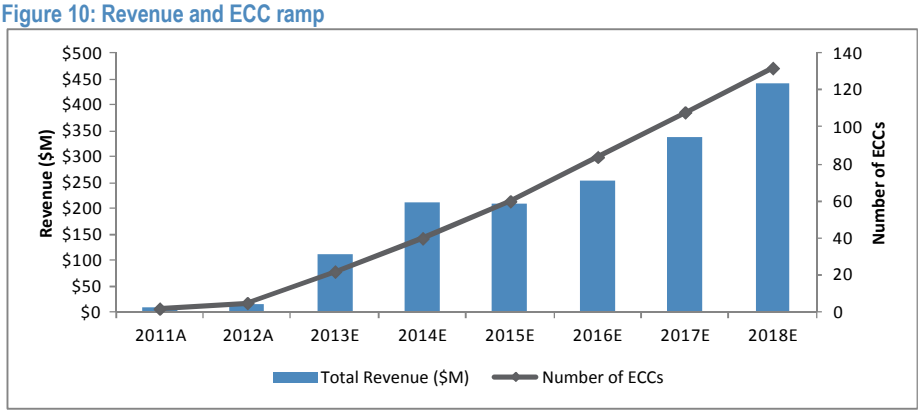
# Financial Outlook

Intrexon grew revenues from $8M in 2011 to $14M in 2012 (a y/y increase of 70%), driven by new ECC signings within the healthcare vertical. The company does not report COGS or gross margins, and all costs including R&D and SG&A are included within operating expenses. Due to the small revenue base over the last two years and the early stage of growth, operating margins are a relatively less appropriate metric for Intrexon at this time.

Intrexon currently has 10 ECCs (including 9 in Healthcare and 1 in Food). As pipeline products hit interim milestones, achieve regulatory approval and approach commercialization, we believe awareness of their complementary suite of proprietary technologies will grow rapidly within each vertical, driving a "virtuous cycle" of new ECC signings and repeat customers. By year end, we model Intrexon will have 22 ECCs, including 16 in Healthcare, 3 in Food, 1 in Energy and 2 in Environmental Science. Over the next 4-5 years, we model ~20 incremental ECCs annually (including repeat engagements with existing clients), with approximately 2/3rd of the signings within the Healthcare vertical.

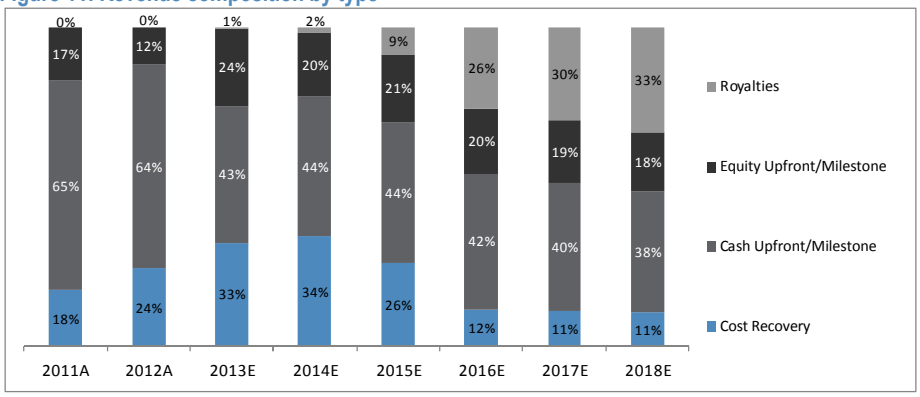
**Figure 10: Revenue and ECC ramp**




Source: J.P. Morgan estimates, Company data.

We expect the majority of the revenues through 2017 will be derived from cost recovery (in cash) and upfront/milestone payments (in cash and/or equity) from ECC partners, with royalties beginning to drive growth in 2018 and beyond once pipeline products are successfully commercialized. For AquaBounty, we conservatively model a meaningful contribution only in 2017 ($31M, representing ~10% of total revenue), as we believe consumer adoption of GM salmon will likely take time even with FDA approval. Overall, we expect Intrexon will generate ~$111M in revenue in 2013, with a five-year CAGR of ~32% through 2018.

Figure 11: Revenue composition by type




Source: J.P. Morgan estimates, Company data.

As mentioned earlier, by restricting the involvement to early development and relying on ECC partners for late-stage development, regulatory approval and commercialization (while holding royalty rights), Intrexon's business model should be able to generate substantial operating leverage over time. We model R&D expense to grow in line with cost recovery revenues, whose contribution to overall revenues will decline substantially once royalty payments begin to ramp in 2017 and beyond. We expect R&D margins to compress from ~37% in 2013 to 20-25% over the next five years, and even lower thereafter. More importantly, we believe that SG&A margin will also remain range bound in the low-to-mid teens through 2017 (and in the mid-to-high single digits thereafter), as XON relies on partners for regulatory approval, marketing, sales and commercialization. Consequently, we expect operating margins to expand from ~34% in 2013 to ~55-60% by 2017 and even higher beyond that timeframe.

Figure 12: XON Margin profile

| | 2011A | 2012A | 2013E | 2014E | 2015E | 2016E | 2017E | 2018E |
|---|---|---|---|---|---|---|---|---|
| R&D | 861% | 461% | 37% | 25% | 25% | 25% | 20% | 10% |
| SG&A | 224% | 179% | 25% | 13% | 12% | 12% | 8% | 6% |
| **Operating margin** | **-1009%** | **-540%** | **34%** | **59%** | **59%** | **57%** | **62%** | **75%** |

Source: J.P. Morgan estimates, Company data.

Driven by strong top-line growth and the operating leverage in the ECC business model, we expect Intrexon will be able to grow earnings at ~69% CAGR through 2018. As such, we forecast Intrexon to turn profitable and free cash flow positive over the course of 2013.

Finally, we note that as of December 2012, Intrexon had net operating loss carry forwards of ~$207M which should limit tax liability over the next two years. We model a tax rate of 38% for 2015 and beyond.

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# Valuation

Our preferred valuation metric is a discounted cash flow analysis using our base-case assumptions, which we then check for reasonableness by using a multiple-based relative value approach versus an appropriate group of peers.

We believe Intrexon is attractively valued at current levels and presents a favorable risk/reward for patient investors given its above average top and bottom-line long-term growth profile. Our December 2014 price target on XON is $30.

**Absolute valuation**

Our December 2014 price target of $30 is derived from a 10-year discounted cash flow analysis, with a CAPM-derived WACC discount rate of 13.5% and terminal growth of 1.5% (see Figure 16). We also include a sensitivity analysis for the value of the company's equity relative to our WACC and the terminal growth rate assumptions, the two most subjective metrics in our analysis.

**Relative valuation**

For relative valuation, our preferred metric is forward EV/EBITDA, although for early-stage companies that are not yet profitable such as Intrexon, we use forward EV/sales as a substitute. Given that Intrexon is a first mover in a relatively nascent market with a unique business model, it is difficult to identify a set of directly comparable publicly traded companies. Our peer group analysis consists of a wide range of early-stage biotech and big-data software companies, which we believe represent the best proxy for Intrexon's sizeable addressable market and potentially game-changing (yet admittedly early stage) technology.

On a relative basis, Intrexon currently trades at a 2014 EV/Sales multiple of 9.5x versus a peer average of 17.7x, representing a 46% discount despite a comparable growth profile over the long term. Our price target of $30 implies a 2014 EV/Sales multiple of 13.6x, representing a 23% discount relative to peers. We believe this narrowing of the multiple discount is justified and will come to fruition once new ECC signings are announced, the company turns profitable, and the first products achieve regulatory approval and commercialization.

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## Figure 13: ICEL - Relative valuation versus peers

| Company | Ticker | Price 8/30/13 | Mkt Cap $M | EV $M | EV/Sales 2012A | EV/Sales 2013E | EV/Sales 2014E | EV/Sales 2015E | Revenue Growth 2012A | Revenue Growth 2013E | Revenue Growth 2014E | Revenue Growth 2015E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Group 1 (Trading comps)** | | | | | | | | | | | | |
| SEATTLE GENETICS INC | SGEN | $42.40 | 5,166 | 4,802 | 22.8x | 19.6x | 17.4x | 13.7x | 122% | 16% | 13% | 27% |
| ISIS PHARMACEUTICALS INC | ISIS | $25.83 | 2,978 | 2,831 | 27.7x | 20.7x | 24.2x | 20.7x | 3% | 34% | -14% | 17% |
| ALNYLAM PHARMACEUTICALS INC | ALNY | $51.80 | 3,261 | 3,035 | 45.5x | 68.0x | 83.9x | 68.4x | -19% | -33% | -19% | 23% |
| OPKO HEALTH INC | OPK | $9.24 | 3,700 | 3,690 | 78.4x | 37.2x | 25.1x | 23.5x | 68% | 111% | 48% | 7% |
| IMMUNOGEN INC | IMGN | $16.00 | 1,362 | 1,173 | 90.9x | 21.3x | 19.6x | 13.9x | -41% | 326% | 9% | 41% |
| ACCELRYS INC | ACCL | $9.04 | 502 | 390 | 2.2x | 2.2x | 2.1x | 2.0x | 21% | 1% | 6% | 9% |
| EXACT SCIENCES CORP | EXAS | $11.57 | 818 | 712 | 171.8x | 173.5x | 17.6x | 6.5x | 0% | -1% | 883% | 173% |
| SOLAZYME INC | SZYM | $11.25 | 701 | 567 | 12.9x | 10.6x | 2.4x | 1.2x | 13% | 21% | 333% | 100% |
| CODEXIS INC | CDXS | $1.72 | 66 | 16 | 0.2x | 0.5x | 0.3x | 0.2x | -29% | -60% | 70% | 31% |
| NOVOZYMES A/S-UNSPONS ADR | NVZMY | $36.33 | 11,613 | 13,113 | 1.2x | 1.1x | 1.0x | 0.9x | 7% | 10% | 6% | 10% |
| **Group 2 (IPO precedent comps)** | | | | | | | | | | | | |
| MERRIMACK PHARMACEUTICALS IN | MACK | $3.38 | 345 | 275 | 5.6x | 4.3x | 3.4x | 1.6x | | 31% | 28% | 106% |
| PROSENSA HOLDING NV | RNA | $22.77 | 797 | 763 | | 47.6x | 17.0x | 8.8x | | | 179% | 94% |
| BLUEBIRD BIO INC | BLUE | $24.90 | 591 | 524 | | 35.5x | 28.8x | 31.0x | | | 23% | -7% |
| EPIZYME INC | EPZM | $27.75 | 789 | 691 | | 15.7x | 10.7x | 22.3x | | | 47% | -52% |
| SPLUNK INC | SPLK | $55.21 | 5,731 | 5,426 | | 19.8x | 14.8x | 11.2x | | | 34% | 31% |
| TABLEAU SOFTWARE INC-CL A | DATA | $72.31 | 4,248 | 4,209 | 32.9x | 20.8x | 15.4x | 11.7x | | 58% | 35% | 32% |
| | | | | **All Peer Average:** | **41.0x** | **31.2x** | **17.7x** | **14.9x** | **14%** | **45%** | **111%** | **41%** |
| | | | | Group 1 (Trading comps) Peers: | 45.4x | 35.5x | 19.4x | 15.1x | 2% | 46% | 147% | 46% |
| | | | | Group 2 (IPO precedent comps) Peers: | 19.3x | 24.0x | 15.0x | 14.4x | | 44% | 58% | 34% |
| **INTREXON CORP** | **XON** | **$21.73** | **2,102** | **2,008** | **144.2x** | **18.0x** | **9.5x** | **9.7x** | **70%** | **699%** | **89%** | **-1%** |
| | | | | **XON Premium (Discount) to Peer Average:** | **252%** | **(42%)** | **(46%)** | **(35%)** | **386%** | **1444%** | **(20%)** | **(103%)** |
| | | | | Premium (Discount) to Group 1 (Trading comps) Peers: | 218% | (49%) | (51%) | (36%) | 2725% | 1437% | (40%) | (103%) |
| | | | | Premium (Discount) to Group 2 (IPO precedent comps) Peers: | 649% | (25%) | (36%) | (33%) | | 1475% | 54% | (104%) |
| | | | | JPMorgan December 2014 PT of $30 | 206.1x | 25.8x | 13.6x | 13.8x | | | | |
| | | | | **Premium (Discount) to Peer Average at $30:** | **403%** | **(17%)** | **(23%)** | **(7%)** | | | | |
| | | | | Premium (Discount) to Group 1 (Trading comps) Peers: | 354% | (27%) | (29%) | (8%) | | | | |
| | | | | Premium (Discount) to Group 2 (IPO precedent comps) Peers: | 970% | 8% | (9%) | (4%) | | | | |

Source: J.P. Morgan estimates, Bloomberg.

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# Appendix I: Financial Model

Figure 14: XON Income Statement

| Income Statement (in millions, except per share amounts) | 2011A | 1QA Mar | 2QA Jun | 3QA Sep | 4QA Dec | 2012A | 1QA Mar | 2QE Jun | 3QE Sep | 4QE Dec | 2013E | 2014E | 2015E | 2016E | 2017E | 2018E | CAGR 13-18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ECC Operating Revenue | 5 | 2 | 3 | 3 | 7 | 14 | 4 | 22 | 31 | 54 | 111 | 209 | 204 | 239 | 306 | 390 | |
| AquaBounty | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 13 | 31 | 50 | |
| Other Revenues | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| **Total Revenues** | **8** | **2** | **3** | **3** | **7** | **14** | **4** | **22** | **31** | **54** | **111** | **210** | **207** | **252** | **336** | **440** | **32%** |
| R&D | 70 | 19 | 18 | 14 | 13 | 64 | 12 | 7 | 9 | 13 | 41 | 53 | 52 | 63 | 68 | 44 | |
| G&A | 18 | 8 | 6 | 5 | 6 | 25 | 6 | 7 | 6 | 8 | 27 | 28 | 25 | 30 | 28 | 26 | |
| Other operating expenses (incl. AquaBounty) | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 5 | 6 | 9 | 16 | 32 | 40 | |
| **Operating Profit (Loss) (EBIT)** | **(82)** | **(25)** | **(21)** | **(16)** | **(12)** | **(75)** | **(14)** | **8** | **14** | **30** | **38** | **124** | **122** | **143** | **208** | **330** | **54%** |
| EBITDA | (79) | (23) | (19) | (14) | (10) | (67) | (12) | 10 | 17 | 33 | 47 | 134 | 132 | 154 | 218 | 340 | |
| **Pretax income (loss)** | **(85)** | **(14)** | **(17)** | **(20)** | **(31)** | **(82)** | **(36)** | **8** | **14** | **31** | **18** | **130** | **130** | **154** | **221** | **346** | **81%** |
| Income tax | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49 | 58 | 84 | 131 | |
| Net Income (loss) | (85) | (14) | (17) | (20) | (31) | (82) | (36) | 8 | 14 | 31 | 18 | 130 | 81 | 95 | 137 | 215 | |
| Net income (loss) attributable to minority interest | 0 | 0 | 0 | 0 | 0 | 0 | (0) | 0 | 0 | 0 | (0) | (1) | (2) | 0 | 1 | 3 | |
| Accr. of dividends on redeemable conv. | (14) | (5) | (6) | (6) | (6) | (22) | (6) | 0 | 0 | 0 | (6) | 0 | 0 | 0 | 0 | 0 | |
| **Net income (loss) attributable to common shareholders** | **(99)** | **(19)** | **(22)** | **(26)** | **(36)** | **(104)** | **(43)** | **8** | **14** | **31** | **11** | **130** | **82** | **95** | **136** | **211** | |
| Diluted Shares Outstanding | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 90 | 98 | 99 | 74 | 99 | 99 | 100 | 100 | 100 | |
| **GAAP Diluted EPS** | **($10.81)** | **($2.03)** | **($2.30)** | **($2.68)** | **($3.72)** | **($10.73)** | **($4.31)** | **$0.09** | **$0.15** | **$0.32** | **$0.15** | **$1.32** | **$0.83** | **$0.96** | **$1.36** | **$2.11** | **69%** |
| R&D Margin (as % of total revenue) | 861% | 1173% | 647% | 491% | 198% | 461% | 289% | 30% | 30% | 25% | 37% | 25% | 25% | 25% | 20% | 10% | |
| SG&A Margin | 224% | 480% | 232% | 173% | 87% | 179% | 163% | 30% | 20% | 15% | 25% | 13% | 12% | 12% | 8% | 6% | |
| Operating (EBIT) Margin | -1009% | -1553% | -779% | -564% | -185% | -540% | -352% | 36% | 45% | 56% | 34% | 59% | 59% | 57% | 62% | 75% | |
| Effective Tax Rate | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 38% | 38% | 38% | 38% | |
| Net Margin | -1213% | -1197% | -809% | -889% | -548% | -746% | -1074% | 37% | 46% | 58% | 10% | 62% | 40% | 38% | 40% | 48% | |
| *Revenue growth y/y* | | *-2%* | *34%* | *-18%* | *611%* | *70%* | *146%* | *722%* | *958%* | *711%* | *699%* | *89%* | *-1%* | *22%* | *33%* | *31%* | |
| *EPS growth y/y* | | *176%* | *-24%* | *-35%* | *27%* | *-1%* | *113%* | *-104%* | *-105%* | *-109%* | *-101%* | *768%* | *-37%* | *16%* | *42%* | *55%* | |

Source: J.P. Morgan estimates, Company data.

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## Figure 15: XON Balance Sheet and Cash Flow

| Balance Sheet and Cash Flow<br>USD $M | 2011A | 1QA<br>Mar | 2QA<br>Jun | 3QA<br>Sep | 4QA<br>Dec | 2012A | 1QA<br>Mar | 2QE<br>Jun | 3QE<br>Sep | 4QE<br>Dec | 2013E | 2014E | 2015E | 2016E | 2017E | 2018E | CAGR<br>13-18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Balance Sheet | | | | | | | | | | | | | | | | | |
| Cash and equivalents | 20 | 33 | 19 | 4 | 10 | 10 | 60 | 65 | 212 | 238 | 238 | 373 | 471 | 578 | 721 | 940 | |
| Short-term investments | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Receivables | 1 | 1 | 1 | 0 | 1 | 1 | 4 | 10 | 13 | 23 | 23 | 33 | 30 | 35 | 45 | 56 | |
| Total current assets | 23 | 37 | 23 | 7 | 14 | 14 | 66 | 77 | 228 | 264 | 264 | 409 | 504 | 616 | 768 | 998 | |
| Equity securities | 39 | 60 | 72 | 68 | 83 | 83 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | |
| PP&E, net | 18 | 21 | 21 | 20 | 19 | 19 | 19 | 20 | 21 | 22 | 22 | 25 | 27 | 29 | 31 | 32 | |
| Intangible assets, net (incl. goodwill) | 33 | 32 | 31 | 30 | 30 | 30 | 58 | 57 | 55 | 54 | 54 | 49 | 44 | 39 | 36 | 32 | |
| ST Debt | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Accounts payable | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | |
| Total current liabilities | 18 | 30 | 13 | 14 | 17 | 17 | 18 | 19 | 19 | 20 | 20 | 20 | 20 | 21 | 21 | 20 | |
| LT Debt | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | |
| Deferred revenue | 16 | 20 | 24 | 20 | 49 | 49 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | |
| Total liabilities | 34 | 51 | 38 | 36 | 67 | 67 | 72 | 75 | 77 | 81 | 81 | 90 | 99 | 109 | 120 | 132 | |
| Total shareholders equity (deficit) | 80 | 100 | 109 | 90 | 85 | 85 | 128 | 136 | 284 | 316 | 316 | 449 | 534 | 632 | 772 | 987 | |
| **Net Cash (Debt)** | **20** | **33** | **20** | **4** | **11** | **11** | **58** | **63** | **210** | **236** | **236** | **371** | **470** | **576** | **719** | **938** | |
| per share | $2.17 | $3.50 | $2.04 | $0.45 | $1.09 | $1.10 | $5.83 | $0.70 | $2.14 | $2.40 | $3.18 | $3.76 | $4.73 | $5.78 | $7.19 | $9.34 | |
| Cash Flow | | | | | | | | | | | | | | | | | |
| Cash flow from Operations | (82) | (13) | (21) | (15) | (12) | (62) | (14) | 6 | 15 | 26 | 32 | 137 | 100 | 109 | 145 | 221 | |
| Purchases of property & equipment | (13) | (6) | (1) | (0) | (0) | (7) | (0) | (1) | (1) | (1) | (2) | (2) | (2) | (2) | (2) | (2) | |
| Cash flow from Investing | (64) | (16) | (1) | (0) | (7) | (24) | 1 | (1) | (1) | (1) | (1) | (2) | (2) | (2) | (2) | (2) | |
| Cash flow from Financing | 148 | 42 | 8 | 0 | 25 | 76 | 63 | 0 | 133 | 0 | 196 | 0 | 0 | 0 | 0 | 0 | |
| **Free Cash Flow to Equity** | **(95)** | **(19)** | **(22)** | **(15)** | **(13)** | **(69)** | **(14)** | **5** | **14** | **26** | **31** | **135** | **98** | **107** | **143** | **219** | **48%** |
| FCF growth y/y | 0% | -6% | -12% | -29% | -54% | -27% | -23% | -123% | -193% | -302% | -144% | 341% | -27% | 9% | 34% | 53% | |
| FCF per share | $0.00 | ($1.96) | ($2.31) | ($1.59) | ($1.29) | ($7.13) | ($1.46) | $0.06 | $0.15 | $0.26 | $0.41 | $1.37 | $0.99 | $1.07 | $1.43 | $2.18 | |
| Dividend Per Share | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | |

Source: J.P. Morgan estimates, Company data.

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## Figure 16: XON DCF analysis

| *Projected FY Ending Dec* | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Revenue ($M) | 111 | 210 | 207 | 252 | 336 | 440 | 554 | 665 | 748 | 869 | 957 | 1,043 |
| growth y/y | | 89% | -1% | 22% | 33% | 31% | 26% | 20% | 12% | 16% | 10% | 9% |
| EBIT ($M) | 38 | 124 | 122 | 143 | 208 | 330 | 424 | 512 | 593 | 694 | 768 | 840 |
| EBIT margin | 34% | 59% | 59% | 57% | 62% | 75% | 76% | 77% | 79% | 80% | 80% | 81% |
| Tax-affected EBIT ($M) | 38 | 124 | 75 | 89 | 129 | 205 | 263 | 317 | 367 | 430 | 476 | 521 |
| **Free Cash Flow** | **25** | **123** | **86** | **93** | **128** | **201** | **259** | **314** | **366** | **425** | **474** | **519** |
| growth y/y | | 386% | -30% | 8% | 37% | 58% | 29% | 21% | 17% | 16% | 12% | 9% |

| Discount Rate | Discounted Cash Flows ($M) 2015-2024 | | PV of Terminal Value ($M) at a Perpetual Growth Rate of 0.5% | 1.0% | 1.5% | 2.0% | 2.5% | | Enterprise Value ($M) 0.5% | 1.0% | 1.5% | 2.0% | 2.5% | Equivalent Terminal EBITDA Multiple (forward 12 mos) 0.5% | 1.0% | 1.5% | 2.0% | 2.5% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12.5% | 1,148 | | 1,586 | 1,662 | 1,746 | 1,838 | 1,939 | | 2,733 | 2,810 | 2,894 | 2,986 | 3,086 | 34.7x | 35.6x | 36.7x | 37.9x | 39.1x |
| 13.0% | 1,118 | | 1,466 | 1,534 | 1,609 | 1,690 | 1,779 | | 2,584 | 2,653 | 2,727 | 2,808 | 2,897 | 32.8x | 33.6x | 34.6x | 35.6x | 36.7x |
| **13.5%** | 1,090 | + | 1,358 | 1,419 | **1,485** | 1,557 | 1,636 | = | 2,448 | 2,509 | **2,575** | 2,647 | 2,726 | 31.0x | 31.8x | **32.7x** | 33.6x | 34.6x |
| 14.0% | 1,063 | | 1,260 | 1,315 | 1,374 | 1,438 | 1,508 | | 2,323 | 2,377 | 2,437 | 2,501 | 2,570 | 29.4x | 30.1x | 30.9x | 31.7x | 32.6x |
| 14.5% | 1,036 | | 1,171 | 1,220 | 1,273 | 1,330 | 1,392 | | 2,207 | 2,256 | 2,309 | 2,367 | 2,429 | 28.0x | 28.6x | 29.3x | 30.0x | 30.8x |

| | Net Debt (Cash) ($M) | | Equity Value ($M) 0.5% | 1.0% | 1.5% | 2.0% | 2.5% | | Equity Value per Share 0.5% | 1.0% | 1.5% | 2.0% | 2.5% | Terminal Value as a % of Enterprise Value 0.5% | 1.0% | 1.5% | 2.0% | 2.5% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (371) | | 3,104 | 3,181 | 3,265 | 3,357 | 3,458 | | $31.43 | $32.20 | $33.05 | $33.98 | $35.00 | 58% | 59% | 60% | 62% | 63% |
| | (371) | | 2,956 | 3,024 | 3,098 | 3,180 | 3,268 | | $29.92 | $30.61 | $31.37 | $32.19 | $33.08 | 57% | 58% | 59% | 60% | 61% |
| - | (371) | = | 2,819 | 2,880 | **2,947** | 3,019 | 3,097 | = | $28.54 | $29.16 | **$29.83** | $30.56 | $31.35 | 55% | 57% | **58%** | 59% | 60% |
| | (371) | | 2,694 | 2,749 | 2,808 | 2,872 | 2,942 | | $27.27 | $27.82 | $28.42 | $29.07 | $29.78 | 54% | 55% | 56% | 58% | 59% |
| | (371) | | 2,578 | 2,628 | 2,681 | 2,738 | 2,800 | | $26.10 | $26.60 | $27.14 | $27.72 | $28.34 | 53% | 54% | 55% | 56% | 57% |

Source: J.P. Morgan estimates, Company data.

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# Appendix II: Management Team

**Figure 17: XON Management team**

| Name / Title | Age | Compensation ($) | | | Ownership | | Experience |
|---|---|---|---|---|---|---|---|
| | | Salary | Bonus | Equity | Shares (#) | Value (%) | |
| Randal J. Kirk<br>*Chairman and Chief Executive Officer* | 59 | - | - | - | 8,448,730 | 8.74% | - Chairman and CEO since 2009<br>- Served on the Board of Halozyme Therapeutics, ZIOPHARM Oncology, Chairman at Clincal Data Inc.<br>- Founder, SMD and CEO of Thrid Security, LLC, investment management firm<br>- Fmr Chairman and CEO of New Rivier Pharmaceuticals<br>- B.A. in Business from Radford University and J.D. from Univeristy of Virginia |
| Thomas D. Reed, Ph.D.,<br>*Founder & Chief Science Officer* | 47 | $379,167 | $120,000 | $73,556 | 334,145 | 0.35% | - Molecular geneticist with over 20 years of experience in recombinant DNA technology<br>- Developed transgenic model systems for studying the role of gene products in neuronal, cardiovascular, and cancer systems<br>- Co-founded Intrexon in 1998, serves on the Board of Directors, and is inventor on numerous patents<br>- B.S. in Genetics from the University of California-Davis, MS. at Wright State University in Biological Science, Ph.D. from the University of Cincinnati in Molecular and Developmental Biology |
| Krish S. Krishnan<br>*Chief Operating Officer* | 48 | $566,667 | $600,000 | $26,658 | - | - | - Fmr CFO, COO, and Board member of New River Pharmaceuticals, Inc.<br>- Served as a Senior Managing Director of Third Security, LLC<br>- Served as Director at Biotie Therapies Oyj<br>- Fmr Engineer at E.I Dupont de Nemours<br>- B.S. in Mechanical Engineering from the Indian Institute of Technology, MS. in Engineering from UT, Ohio, and M.B.A. in Finance from The Wharton School at the University of Pennsylvania |
| Don Lehr<br>*Chief Legal Officer* | 38 | - | - | - | 13,476 | 0.01% | - Former attorney at Hogan Lovells LLP<br>- Represented private and public corporations in biotechnology, pharmaceuticals, health care, software technology, and manufacturing industries<br>- Served as judicial clerk for the Honorable Irma S. Raker of the Court of Appeals of Maryland<br>- B.A. from Swarthmore College, Post graduate study in Political Science at Johns Hopkins University, J.D. from the University of Maryland School of Law. |
| Rick Sterling<br>*Chief Financial Officer* | 49 | - | - | - | - | - | - CFO since 2007<br>- Audit professional at KPMG over 17 years with clients primarily in the healthcare, technology and manufacturing industries<br>- Experience serving clients private and public sector companies with significant experience in SEC filings and Sarbanes-Oxley compliance<br>- B.S. in Accounting and Finance from Virginia Tech and is a licensed CPA. |

Source: Company reports.

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# Appendix III: Board of Directors

## Figure 18: XON Board of Directors

| Name / Title | Age | Committee | | | Experience |
|---|---|---|---|---|---|
| | | Audit | Govern. | Comp. | |
| Randal J. Kirk<br>*Chairman and Chief Executive Officer* | 59 | | | | - Chairman and CEO since 2009<br>- Served on the Board of Halozyme Therapeutics, ZIOPHARM Oncology, Chairman at Clincal Data Inc.<br>- Founder, SMD and CEO of Thrid Security, LLC, investment management firm<br>- Fmr Chairman and CEO of New Rivier Pharmaceuticals<br>- B.A. in Business from Radford University and J.D. from Univeristy of Virginia |
| Thomas D. Reed, Ph.D.,<br>*Founder & Chief Science Officer* | 47 | | | | - Molecular geneticist with over 20 years of experience in recombinant DNA technology<br>- Developed transgenic model systems for studying the role of gene products in neuronal, cardiovascular, and cancer systems<br>- Co-founded Intrexon in 1998, serves on the Board of Directors, and is inventor on numerous patents<br>- B.S. in Genetics from the University of California-Davis, MS. at Wright State University in Biological Science, Ph.D. from the University of Cincinnati in Molecular and Developmental Biology |
| Cesar L. Alvarez | 66 | Member | | Chariman | - XON director since 2008<br>- Executive Chairman, Fmr CEO of Greenberg Traurig, LLP<br>- serves as director at Mednax (MD), Watsco (WSO), St. Joe Co. (JOE), Fairholme Funds<br>- BS, M.B.A., and a J.D. from the University of Florida |
| Steven Frank | 53 | | | | - XON director since 2008<br>- Chairman of Global HC Investment Banking at J.P. Morgan since 2008<br>- Head of Worldwide Health Care Investment Banking at Bear Stearns for 16 years<br>- Life Sciences Portfolio Manager at State Farm Insurance Company<br>- BS Illinois State University, M.B.A. University of Chicago |
| Larry Horner | 79 | Chairman | | | - XON director since 2008<br>- Executive Chairman, Fmr CEO of Greenberg Traurig, LLP<br>- Serves as director at Clinical Data, Inc., New River Pharmaceuticals<br>- Fomer Chairman of Asia Pacitic Wire & Cable (AWPC)<br>- MD at Arnhold & S. Bleichrode<br>- Former Chairman and EO of KPGM Peat Markick<br>-BS, University of Kansas, Exec. MB.A, Stanford Univeristy |
| Jeffrey B. Kindler | 58 | Member | | Chairman | - XON director since 2011<br>- Venture partner with Lux Capital and Director of Starboard Capital Partners<br>- Principal at Paragon Pharmaceuticals<br>- Held roles at Pfizer incliding CEO and Chairman of the Board, Vice Chairman, and General Counsel<br>- Held Chair and eqxecutive positions Boston Market Corporation and Partner Brands group of McDonald's Corporation<br>- Serves as Director at Chipotle Mexican Grill and a number of privately-held companies and non-profit organizations<br>- B.A. from Tufts University and a J.D. from Harvard Law School. |
| Dean J. Mtchell | 56 | | Member | Member | - XON director since 2009<br>- Director, President and Chief Executive Officer of Lux Biosciences, Inc.<br>- Director at ISTA Pharmaceuticals, Talecris Biotherapeutics<br>- Former Director, President and CEO of Alpharma Inc. and Guilford Pharmaceuticals Inc.<br>- Several roles at Bristol-Myers Squibb in Strategy and President U.S. Primary Care<br>- 15 years at Glaxo SmithKline and its predecessor companies in Strategy roles<br>- M.B.A. from City University Business School, in London, U.K., and a B.Sc. degree in Biology from Coventry University |
| Robert B. Shapiro | 75 | | Member | Member | - XON director since 2011<br>- Co-Founder and Managing Director of Sandbox Industries<br>- Held several roles at Monsanto including Chairman and CEO, President and COO<br>- Held executive positions at G.D. Searle & Co., General Instrument Corporation, Pharmacia Corporation<br>- Served as Director on several companies including the New York Stock Exchange, Citigroup, and Rockwell International<br>- Served on President's Advisory Comm. on Trade Policy, and White House Domestic Policy Review of Industrial Innovation<br>- B.A. - Harvard College, J.D. - Columbia University, Law professor at Northeastern University and University of Wisconsin |

Source: Company reports.

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# Intrexon: Summary of Financials

| Income Statement - Annual | FY12A | FY13E | FY14E | FY15E |
|---|---|---|---|---|
| Revenues | 14 | 111 | 210 | 207 |
| Cost of products sold | - | - | - | - |
| Gross profit | - | - | - | - |
| SG&A | (25) | (27) | (28) | (25) |
| R&D | (56) | (32) | (42) | (41) |
| Operating income | (75) | 38 | 124 | 122 |
| EBITDA | (67) | 47 | 134 | 132 |
| Net interest (income) / expense | - | - | - | - |
| Other income / (expense) | (6) | (20) | 6 | 8 |
| Income taxes | 0 | 0 | 0 | (49) |
| Net income | (104) | 11 | 130 | 82 |
| Diluted shares outstanding | 10 | 74 | 99 | 99 |
| Diluted EPS | (10.73) | 0.15 | 1.32 | 0.83 |

| Balance Sheet and Cash Flow Data | FY12A | FY13E | FY14E | FY15E |
|---|---|---|---|---|
| Cash and cash equivalents | 10 | 238 | 373 | 471 |
| Accounts receivable | 1 | 23 | 33 | 30 |
| Inventories | - | - | - | - |
| Other current assets | 2 | 2 | 2 | 2 |
| Current assets | 14 | 264 | 409 | 504 |
| PP&E | 19 | 22 | 25 | 27 |
| Total assets | 152 | 397 | 539 | 633 |
| | | | | |
| Total debt | 0 | 2 | 2 | 2 |
| Total liabilities | 67 | 81 | 90 | 99 |
| Shareholders' equity | 85 | 316 | 449 | 534 |
| | | | | |
| Net income (including charges) | (82) | 18 | 130 | 81 |
| D&A | 8 | 9 | 10 | 10 |
| Change in working capital | 6 | (20) | (7) | 5 |
| Other | 6 | 26 | 4 | 4 |
| Cash flow from operations | (62) | 32 | 137 | 100 |
| | | | | |
| Capex | (7) | (2) | (2) | (2) |
| Free cash flow | (69) | 31 | 135 | 98 |
| Cash flow from investing activities | (24) | (1) | (2) | (2) |
| Cash flow from financing activities | 76 | 196 | 0 | 0 |
| Dividends | - | - | - | - |
| Dividend yield | - | - | - | - |

| Income Statement - Quarterly | 1Q13A | 2Q13E | 3Q13E | 4Q13E |
|---|---|---|---|---|
| Revenues | 4A | 22 | 31 | 54 |
| Cost of products sold | - | - | - | - |
| Gross profit | - | - | - | - |
| SG&A | (6)A | (7) | (6) | (8) |
| R&D | (10)A | (5) | (7) | (11) |
| Operating income | (14)A | 8 | 14 | 30 |
| EBITDA | (12)A | 10 | 17 | 33 |
| Net interest (income) / expense | - | - | - | - |
| Other income / (expense) | (22)A | 0 | 0 | 1 |
| Income taxes | 0A | 0 | 0 | 0 |
| Net income | (43)A | 8 | 14 | 31 |
| Diluted shares outstanding | 10A | 90 | 98 | 99 |
| Diluted EPS | (4.31)A | 0.09 | 0.15 | 0.32 |

| Ratio Analysis | FY12A | FY13E | FY14E | FY15E |
|---|---|---|---|---|
| Sales growth | 70.4% | 699.3% | 88.9% | (1.4%) |
| EBIT growth | (8.8%) | (151.0%) | 223.5% | (1.9%) |
| EPS growth | (0.8%) | (101.4%) | 767.8% | (37.3%) |
| | | | | |
| Gross margin | - | - | - | - |
| EBIT margin | (539.7%) | 34.4% | 59.0% | 58.7% |
| EBITDA margin | (482.4%) | 42.3% | 63.8% | 63.6% |
| Tax rate | 0.0% | 0.0% | 0.0% | 38.0% |
| Net margin | (745.9%) | 10.1% | 62.0% | 39.6% |
| | | | | |
| Net Debt / EBITDA | 15.5% | (501.3%) | (276.4%) | (355.7%) |
| Net Debt / Capital (book) | (13.9%) | (293.2%) | (475.6%) | (724.4%) |
| | | | | |
| Return on assets (ROA) | (78.0%) | 4.1% | 27.9% | 14.0% |
| Return on equity (ROE) | (125.5%) | 5.6% | 34.1% | 16.7% |
| | | | | |
| Enterprise value / sales | 0.0 | 0.0 | 0.0 | 0.0 |
| Enterprise value / EBITDA | 0.0 | 0.0 | 0.0 | 0.0 |
| Free cash flow yield | (32.8%) | 1.9% | 6.3% | 4.6% |

Source: Company reports and J.P. Morgan estimates.
Note: $ in millions (except per-share data).Fiscal year ends Dec

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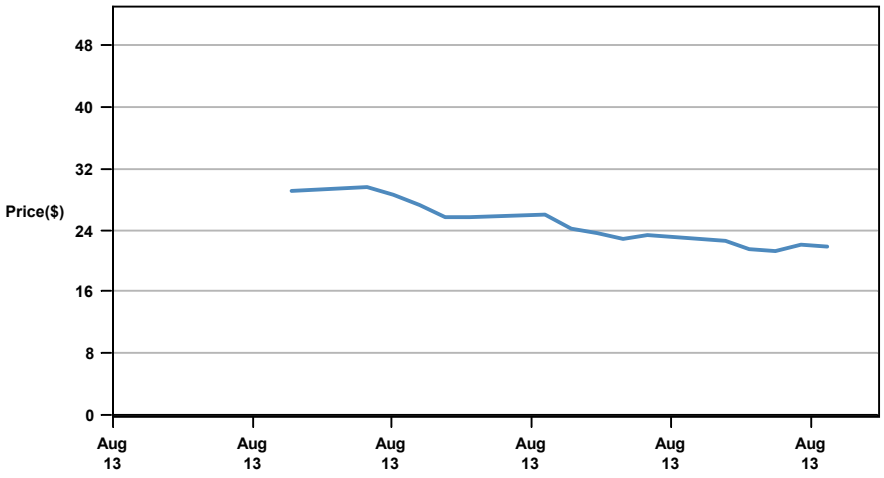
**Intrexon (XON, XON US) Price Chart**




Source: Bloomberg and J.P. Morgan; price data adjusted for stock splits and dividends.

The chart(s) show J.P. Morgan's continuing coverage of the stocks; the current analysts may or may not have covered it over the entire period.
J.P. Morgan ratings or designations: OW = Overweight, N= Neutral, UW = Underweight, NR = Not Rated

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| | Overweight (buy) | Neutral (hold) | Underweight (sell) |
|---|---|---|---|
| J.P. Morgan Global Equity Research Coverage | 44% | 44% | 12% |
| IB clients* | 56% | 50% | 40% |
| JPMS Equity Research Coverage | 42% | 50% | 8% |
| IB clients* | 76% | 66% | 55% |

*Percentage of investment banking clients in each rating category.
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