investment portfolio v3
Building business in Oregon
Impacting lives around the world

Oregon has long been known as a place of discovery, and now it's home to the world's leading semiconductor facility and other high-tech leaders. At ONAMI, the trailblazing continues.

ONAMI (Oregon Nanoscience and Microtechnologies Institute) is where academia, business and local government come together to accelerate research and bring breakthrough ideas to market. It's where entrepreneurs have access to cutting edge resources and investors have opportunities to fund ground-breaking technology. ONAMI pulls it all together by providing:

» COMMERCIALIZATION FUNDING
$7M in gap funding provided since 2006, resulting in Oregon startup companies raising over $160M in leveraged capital and grant funding (SBIR, etc.)

» STARTUP MENTORING
Entrepreneurs-in-residence provide counsel and expertise

» TECHNOLOGY LABS
Shared user facilities at Portland State University, Oregon State University and University of Oregon offer resources in electron microscopy, materials characterization and nanofabrication

» COLLABORATION PARTNERS
State and federal agencies (e.g., Business Oregon, National Science Foundation), Pacific Northwest National Laboratory, industry and universities

ONAMI makes no warranty concerning the accuracy of the information in this document, which is for informational purposes only and subject to change without notice. Interested parties seeking additional information are encouraged to contact participating companies directly.

Hello,
I'm pleased to introduce you to ONAMI's portfolio of companies. This collection represents the best and brightest in chemistry, materials and device research in Oregon—partnered with entrepreneurs selected because of their companies' high-growth potential.

Each of these companies has participated in our commercialization gap grant program via a proof-of-concept project of up to $250,000. Many of the resultant products are on the market now or soon will be, making these companies ripe for investment and partnership opportunities.

I invite you to spend some time reading through each company's profile. Feel free to contact them directly for more information. Or, if you prefer, I am also available and happy to facilitate introductions.

Thank you for your interest in ONAMI and in discovering new opportunities in Oregon.

Sincerely,

Robert D. "Skip" Rung
President and Executive Director

skip@onami.us
DIRECT 541.231.4883
Commercialization Program
Investing in Oregon’s future

ONAMI’s commercialization program provides critical support to early-stage technologies and companies, bridging the crucial gap between research and market-ready products.

This includes business counsel and up to $250K in gap funding to applicants affiliated with ONAMI member researchers at one of our partner organizations, including:

• Oregon State University
• Oregon Health & Science University
• Pacific Northwest National Laboratory
• Portland State University
• University of Oregon

For potential investors, the commercialization program provides opportunities to partner with companies that have been thoroughly vetted and show significant growth potential in four key areas:

• Advanced materials, semiconductors, sensors, optics
• Energy generation and storage
• Life sciences, healthcare, pharmaceuticals
• Water

Since 2006, ONAMI has awarded $7M in gap funding to Oregon startups, small businesses and academic researchers. The result? Over $160M in leveraged and grant funding (SBIR, etc.) in Oregon’s future innovation leaders.

Looking for more information about ONAMI’s commercialization program? Have questions about what’s happening in a particular industry? Or want more details about one of the companies in this book? Contact our director, Jay Lindquist, or a member of entrepreneur-in-residence team. They’re business executives who work closely with our new ventures, offering practical experience and resources.

COMMERCIALIZATION DIRECTOR
Jay Lindquist
DIRECT 503.522.7031
EMAIL jlindquist@onami.us

ENTREPRENEURS-IN-RESIDENCE
John Brewer, Jr.
SPECIALTIES advanced materials, engineering, energy
DIRECT 503.453.2765
EMAIL jbrewer@onami.us

Augie Sick
SPECIALTIES biotechnology, life sciences
DIRECT 541.521.8834
EMAIL asick@onami.us

Michael Tippie
SPECIALTIES life sciences, water
DIRECT 425.830.5805
EMAIL jmtippie@onami.us
Advanced materials, semiconductors, sensors, optics

Amorphyx
Inpria
Shoei Electronic Materials, Inc.
SupraSensor Technologies
Vadient (potential gap project)

Energy generation and storage

Applied Exergy
CSD Nano
Element 1
Energy Storage Systems
OnTo Technology
Perpetua Power Source Technologies
Polaris Battery Laboratories

Life sciences, healthcare, pharmaceuticals

Cascade Prodrug
DesignMedix
Floragenex
NemaMetrix
Northwest Medical Isotopes
PacNano (very early stage, potential gap project)
Sonivate (completed first product, potential extension gap project)
Valliscor (pending gap project)

Water

Crystal Clear Technologies
Mtek Energy Solutions (desalination concept, very early)
Puralytics
advanced materials »
semiconductors »
sensors »
optics »
Amorphyx is an innovator at the intersection of materials science and electronics for the display market. We leverage our expertise in amorphous metals and the creation of high-quality thin films in developing the Amorphous Metal Nonlinear Resistor (AMNR) device, subpixel circuit, and PECVD-based manufacturing process. The AMNR simplifies backplane processing and reverses the trend of increasing display complexity and cost.
Amorphyx manages two Member-funded Consortia for commercializing its AMNR backplane technology in partnership with display manufacturers, backplane equipment vendors, flexible substrate suppliers, and subpixel and interconnect materials developers. The company licenses its technologies to Consortia Members and enables them to innovate the technologies for their specific applications. Revenues are generated through Membership fees and production royalties. The company has raised $1M from grants and private investors, including an NSF SBIR Phase 1 award in January 2014.

### NEEDS
- The $115B display industry loses more than US$5B annually as price decreases across applications outstrip cost savings
- Current semiconductor-based backplane technologies are not viable on flexible substrates

### MARKET OPPORTUNITY
- 2014: US$7.5B licensing revenue TAM from current LCD segment

### MARKET IMPACT
- Convert average $50 loss per 48” LCD TV display module to $50 profit on existing production lines
- Enable, accelerate flexible displays – currently estimated at $45B TAM in 2020

### ADVANTAGES OF THE AMNR
- Three lithography masks vs. 5-9 for TFT
- No sensitivity to light, minimal sensitivity to temperature
- Differential AMNR subpixel circuit eliminates display-scale uniformity issues
- Simple AMNR structure supports fast switching speeds, reduced power consumption, improved touch performance resulting from lower control voltages

### IP POSITION
- Foundational patent granted by USPTO in May 2013; exclusive license from Oregon State University
- Additional patents filings in process on device, materials and process levels for electronic devices

### CEO
**John Brewer** 25 years in semiconductor industry; startup, university spinout veteran

### CTO
**Dr. Bill Cowell** 17 years in Intel “silicon mines”; doctoral thesis is foundation of company’s technologies

### BoD
**Dr. Doug Keszler** Distinguished Professor at Oregon State; co-developer of metal-oxide TFT backplane technology

**Rick Warren** 25 years with IBM; exec in technology management, international business development

**Mike Phillips** Senior Counsel, Morrison Foerster; 30 years in semiconductor international business development

### Revenue Table

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue</th>
<th>Net Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>$3,750</td>
<td>$(93)</td>
</tr>
<tr>
<td>2014</td>
<td>$5,750</td>
<td>$200</td>
</tr>
<tr>
<td>2015</td>
<td>$7,800</td>
<td>$(600)</td>
</tr>
<tr>
<td>2016</td>
<td>$20,000</td>
<td>$1,100</td>
</tr>
<tr>
<td>2017</td>
<td>$7,600</td>
<td></td>
</tr>
</tbody>
</table>
Our Company

Founded in 2007, Inpria is headquartered in Corvallis, OR. Our team comes from

Our Board of Directors includes Andrew Grenville (CEO, Inpria and formerly Lithography Co-Director, SEMATECH), Dong-Su Kim (Vice President, Samsung Ventures), Jim LaCasse (CEO, NexPlanar), and Chris Progler (CTO, Photronics).

Funding

$3.5M total from NSF grants and corporate JDAs
$6.5M in equity funding from institutional and angel investors

Key investors include
Semiconductor Industry

Moore’s Law:
Semiconductor cost and performance improvements driven by reductions in feature sizes

Smaller feature sizes: semiconductor patterning improvements driven by advances in materials & equipment

Photoresists:
Photoimaging materials that record and transfer semiconductor patterns

Problem: Emerging industry requirements push conventional organic photoresists beyond their structural limits

Our Products
Advanced photoresists based on breakthrough inorganic metal oxide architecture

Product advantages
• Smoother line edges for smaller devices: critical for high device yield
• High resolution: enables the small patterns demanded by future industry requirements
• High etch resistance: results in high fidelity pattern transfer
• Compatible with existing equipment for ease of integration
Shoei Electronic Materials, Inc. is a provider of tailored nanocrystalline quantum dots (NQDs) and nanoparticles (NPs). We provide high quality, mono-disperse NQDs and NPs that are tailored to meet our customers’ specifications. Using our proprietary processing capability, we produce these custom materials at low cost with high batch-to-batch reproducibility.

Areas of Expertise:
- **Photophysics**: active/passive materials
- **Surface Modification**: ligand chemistry
- **Materials Development**: novel materials and optical properties
- **Matrix Incorporation**: films, solvents and polymers
Shoei Electronic Materials, Inc. tailors nanoparticles, through manipulation of the core material, shell configuration, and surface modification to meet our customers’ requirements and to enable use in a specific applications with improved performance:

- **Displays**: enhanced color, reduced cost of fabrication, increased lifetime.
- **Photovoltaics**: flexible form factor, enhanced absorption, reduced energy losses.
- **Security**: increased complexity of information input, increased security and product protection.
- **Thermoelectrics**: ease of production/manufacture.
Field Embedded Nutrient Sensors

Reducing over-application of nitrogen fertilizer would save US growers more than $4B annually.

SupraSensor Technologies exploits Nature’s own self-assembly processes to yield more sensitive, reliable and inexpensive in-situ environmental and industrial sensors by monitoring molecule-molecule interactions directly. SupraSensor Technologies’ in-soil sensors offer precision agriculture a completely wireless and autonomous tool for monitoring nutrients via real-time information about fertilizer levels at any depth in a growing field. With such minute-to-minute detail, growers can resist over-fertilization and save input dollars, while reducing both the environmental footprint and overhead costs of their operations.

331 Jackson St. Eugene, OR 97402
Ph: (541) 346-9334 Fax: (541) 255-4989
info@suprasensor.com
**Need, Market, Opportunity and Impact**

**Need:** Today’s precision agriculture toolbox leaves a large gap between testing and actionable data in monitoring the 12.29M tons of nitrate fertilizer applied annually in the US. Growers need precise reports of nitrate levels in order to optimize farm efficiency (input, labor and regulatory costs per harvest) in order to operate within both economically and ecologically responsible boundaries.

**Value Proposition:** Wireless, in-situ monitoring of nitrate in soil with accuracy equaling standard laboratory testing, and requiring near zero sampling/testing labor expenses. Reduced time-to-data on soil conditions reduces waste, optimizes growing conditions for increased yields and mitigates the environmental impact on a rural community’s potable water sources.

**Market Opportunity:** Decreasing the 30% of wasted fertilizer input on our 382M acres of farmland would save growers an average of $8/acre. Avoiding labor and laboratory costs associated with current testing practice would create an as-yet untapped target market of $275M/yr (derived solely from current testing costs).

**Impact:** Mitigation of water quality degradation in water tables, lakes, streams and oceans. Avoidance of the increased cost of living due to rural well-water fouling by nitrate non-source point pollution, which costs >$375M/yr in CA alone.

**Technology Description:** The core technology is a chemically-modified field-effect transistor (CHEMFET) sensor incorporating a novel, patent-protected nitrate-selective receptor and bundled with amplifier circuitry, on-board power and data storage. The sensor is enclosed in a wirelessly reporting 30x20x20mm module that can be housed in existing soil moisture monitoring probes. Each sensor module has sufficient on-board battery and data storage for >9 months operation in soil, and reports calibrated nitrate concentration in ppm as a function of soil moisture.

**IP Position:** There is an issued patent that covers the core receptor in this technology. SupraSensor has an exclusive license to this and future related University of Oregon patents. The sensor itself is the subject of a SupraSensor held provisional patent covering the underlying electronics and production process that results in the required robustness for in-field deployment.

**Company and Business Model**

**Company:** SupraSensor Technologies is an Oregon company formed in 2012 with a core competency in molecular sensor technology. Our vision is to develop a scalable, high growth business by applying our technology to solve unmet needs for detecting and directly monitoring critical molecular components in agriculture and industrial processes. The company was started through the NSF Innovation Corps program at Stanford University, where they won “Best Team” 2012.

**Business Model:** SupraSensor Technologies will develop, manufacture and sell in-situ sensor components and systems business-to-business, with an eye on future direct-to-user home and garden, drinking and wastewater markets.

**Objective:** The company’s initial market focus is precision agriculture, or more specifically the introduction of science and technology to farm management. SupraSensor Technologies’ in-situ nitrate monitoring devices drive optimization of critical resources to deliver the highest crop yield at the lowest cost to both the growers and our watersheds. SupraSensor is seeking additional partners for integration and manufacturing scale-up of this Oregon-based technology venture.

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**Current Product Development Milestones**

Previously funded by NSF SBIR Phase I/ib ($179K); currently funded by ONAMI Gap (2nd Tranche) grants, Oregon BEST and founder capital.

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Period</th>
<th>Funding</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration of sensor module components with wireless connectivity package</td>
<td>Jan ‘14</td>
<td>$206K</td>
<td>ONAMI Gap</td>
</tr>
<tr>
<td>Production scale-up and field testing of alpha prototype</td>
<td>Jan-Oct ‘14</td>
<td>$88K</td>
<td>OR BEST</td>
</tr>
<tr>
<td>Large-scale sourcing and manufacturing for collaborative beta tests</td>
<td>Jan ‘15-’16</td>
<td>$750K</td>
<td>NSF SBIR II/b (proposed)</td>
</tr>
<tr>
<td>Product launch</td>
<td>Jan ‘16</td>
<td>$750K</td>
<td>Series A*</td>
</tr>
</tbody>
</table>

* Timing and size of round TBD
Vadient is pioneering a new class of 3D freeform optics capable of efficient transfer of light information and capture of light energy.

Using “on demand” inkjet fabrication of volumetrically gradient refractive index nanocomposite films, we implement complex optical functions in smaller, lighter, and lower cost optics used in commercial and consumer products.

We succeed by being first to market, strategically engaging with our channel partners, and delivering robust product solutions, while maximizing shareholder returns.

George Williams
Vadient Optics
15985 NW Schendel Ave
Beaverton, OR 97006
503-703-3260
**Market Opportunity**

**NEED:** There is a $25B optics market for wearable displays, camera lenses and micro-instruments that is ill-served by today’s optics. Conventional optics have a limited degree of design flexibility, bending light only at interfaces, resulting in high-quality systems that are large, heavy, and expensive.

**VALUE TO CUSTOMER:** An inkjet printing fabrication process capable of implementing 3D gradient optical index films realizes complex and freeform optical functions in planar optical grade films.

**IMPACT:** By reducing the required number of optical elements, high-performance optics, implementing complex functions, are made possible in small, lightweight assemblies at a fraction of today’s cost.

**CUSTOMER APPLICATIONS ADDRESSED:** Laser diode fast/slow combiners, Smart glasses, Photovoltaic concentrators, 3D and immersive displays, LED and SSL optics, Fiber-to-photonic coupling, Endoscopes, Cell phone cameras, Military imaging

**Business**

**CORPORATE STRUCTURE:** Privately-held Limited Liability Corp (DE); affiliate of Voxel Inc (DE). and NanoVox LLC.(OR)

**MISSION:** To supply high performance GRIN lenses for commercial and consumer systems, and to supply optical inks and printing equipment to those manufacturers licensing our technology.

**FUNDING:** Owner investment and non-diluting government S&T / strategic partners; seeking strategic investment.

**IP/TECHNICAL POSITION:** Seven (7) provisional patents for ink formulations, deposition methods, and applications; Seven (7) provisional patents licensed for nanoparticle synthesis; exclusive license for a U Oregon patent (R. Chartoff). Landscape is clear as earliest patents for inkjet printing optics (1993) are expired.

**Past and Future Accomplishments**

- (2007) Functionalized nanoparticles developed for optical inks
- (2012) Developed scalable nanoparticle reactor resulting in 7 patents
- (2012) Demonstrated 3D gradient index optic films
- (2013) Seven provisional patents filed for ink chemistry and inkjet deposition
- (2014) Receive “production” multi-head large format inkjet printer
- (2014) Characterize first optical-grade Wood lens
- (Q1 2015) First product to strategic partner
energy generation & storage »
Stores electricity at low cost and >80% round trip efficiency

Uses tested electricity generators and patented supercoolers

Turns wasted heat into valuable energy

Applied Exergy, Inc. helps utilities and industrial companies reduce costs and prevent blackouts by storing electricity during high production and delivering it back to the electric grid during high demand. Its patented thermal energy storage system fits next to any power plant or industrial facility, costs less than batteries, and uses process heat at no cost.

Bonnie Bailey, President
Applied Exergy, Inc.
bbailey@appliedexergy.com
+1.541.760.2666
**Customer Needs:**
- Utilities need flexible generators to fill gaps left by unpredictable wind and solar (CAISO).
- Load growth will drop by 5% by 2020, but become less predictable (Clareo Partners).
- Demand charges have increased 20% in three years on CA industrial customers (Stem).

**Market Opportunity:**
- Grid-tied energy storage is growing from $0.2B in 2012 to $19B by 2017 (IHS-CERA).

**Market Impact:**
- AE will reduce the cost of MWh-scale energy storage by 40% over incumbent battery technologies.
- AE will provide rate-based investments to utilities in need of growth.

**Value of AE’s Technology:**
- Uses waste heat at no cost for RTE above batteries - above 80%.
- Thermal storage achieves economies of scale by using same generator for increasing volumes of stored energy.
- Patented supercooler allows more ice to be stored in less space.
- TAGES uses no toxic or harmful chemicals while batteries have repeatedly caught fire in grid storage applications.
- Unlike pumped hydro and compressed air technologies, TAGES can be sited anywhere a power plant or industrial facility exists.
- By siting at power plants, TAGES can improve their output by cooling the air entering the generator.

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**2011-2013**
- Designed and built bench model
- Complete testing at pilot site

**2014**
- Engineer pilot at OR coal plant

**2015**
- Install production projects
- Install pilot project

**2016**
- Complete testing at pilot site

AE and Portland General Electric are planning to install the first pilot project of AE’s Thermal Approach to Grid Energy Storage (TAGES) at PGE’s Boardman coal plant. Pending final testing and legal approval, the pilot should be installed in spring of 2015. AE is seeking $250k to design and engineer the pilot project, with a follow-on investment of $2.5MM to construct the pilot. PGE has expressed interest in purchasing an AE project if the pilot is successful.

<table>
<thead>
<tr>
<th>($000s)</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>$0</td>
<td>$5,000</td>
<td>$20,000</td>
<td>$40,000</td>
</tr>
<tr>
<td>Net Income</td>
<td>-$250</td>
<td>$500</td>
<td>$3,000</td>
<td>$8,000</td>
</tr>
</tbody>
</table>

**CEO Bailey McCallum** – 10 years in utility scale energy development and financing; most recently CFO of Element Power Solar

**President Dr. Bonnie Bailey** – 15 years experience in environmental science and risk assessment; has served AE since it was founded

**Advisor Rob Elam** – Founder and CEO of Propel Fuels, the nation’s largest alternative fuel retailer

**Advisor Koichi Kurisu** – Entrepreneur and investor; previously managed $150MM portfolio of cleantech investments for Essex
CSD Nano develops thin film coatings which allow more light to pass through glass.

- *More light in means more electricity out* of a solar module.
- *More light through a window means less electricity for lighting.*

80GW of installed PV solar arrays has no anti-reflective coating (ARC). **MORESUN** increases output by 4+% yielding 3GW of new solar power.

CSD Nano, Inc.
720 NE Granger Ave, Bldg B
Corvallis, OR 97330

paul@csdnano.com
541-913-9693 (cell)

24 April 2014
MARKET
● First Mover, no other players (yet)
● Total WW Market Opportunity - $1.9B
● Target Market - Solar arrays in Europe and U.S. >100kW (Utility/Commercial) - $0.7B

VALUE PROPOSITION
Array Owner gets solar power for $0.60/watt with an LCOE of <$0.02/kwh
OR
Array Owner gets electricity at $0.03/kwh under a PPA

CUSTOMERS (beta sites)
● Alectris (O&M: Greece, Italy, Germany) - (July 2014)
● juwi (EPC/O&M: US, Germany) – (July 2014)
● edf-re (Owner/IPP: US, France) – (July 2014)

FINANCING
$868,000 Fed & State grants
$120,000 founders investment
“Angel” round I - $500K – 1H 2014 + 50% NSF Match
“Angel” round II – $500K - 1H 2015

Key business milestones: product sales – 2H 2014

TEAM
CEO: Paul Ahrens – Synthetech/CTO->CEO->Chair, BS/MS MIT
Director of Research: Dr. Seung-Yeol Han – PhD OSU optical thin films
Advisors / Founders / BoD
Dr. Chih-hung Chang – Prof. CBEE, OSU
Dr. Brian Paul – Prof. MIME, OSU
Dr. Jimmy Yang – Prof. Finance, OSU
John De Vos – HP/18yrs/Materials Development, Mech Eng

TECHNOLOGY
Optical Performance
4+% power increase
Robust
<10% performance loss – 20 year simulation
Reapplication restores performance
Low Cost
Solution deposition - squeegee
Sun-cured

IP
Patent #8,553,333 - exclusive from OSU
Four patent applications (two first mover)
Trade secret – secret sauce formulation

24 April 2014
Mission Statement/Value Proposition

There is a large and rapidly growing need for pure hydrogen gas in a wide variety of commercial and industrial uses.

Element 1’s strategy is to utilize its world-class engineering expertise and extensive portfolio of IP and trade secrets to design, manufacture and sell, on a global basis, appliances that produce pure hydrogen on-site and on demand.

Our products can eliminate the need for delivery of compressed hydrogen in bulky cylinders, which often presents significant barriers in terms of transportation logistics and expense.

Our value proposition is to be the lowest cost producer in the market by employing outsourced manufacturing and the capital assets required to support manufacturing.

Robert Schluter
President
Robert@e1na.com
+1.541.678.5943
Product Offering
The Company currently offers a family of hydrogen generators (reformers) that operate on a methanol/water blend—the H-Series—which is developed, in lab trials, and ready for market adoption. Product certification is underway with CE certification and CSA certification expected to be completed in 4Q13.

Development has begun on two additional product families—the S-Series, and the NG-Series. The S-Series is a small scale reformer that also operates on a methanol/water blend, but with a reduced form factor that can economically meet the needs of the less-than 1 kW and 2.5 kW market segments. The NG-Series is a reformer that operates on natural gas and water. The design of the NG-Series is a direct derivative of the H-Series design, although materials of construction and operating parameters will differ.

Compared with competing reformer technology available commercially or under development, e1’s reformer design is inherently simple with a low part count. Management believes this will allow e1’s manufacturing costs to trend significantly below competitive products. The finished product can be broken down into manageable sub-assemblies, further simplifying manufacturing in multiple factories worldwide. We have filed patent applications covering 13 different inventions related to the key aspects of our unique design and technology.

Worldwide Telecom Market Opportunity
Our product line primarily targets backup power applications for telecom base stations in which fuel cells are part of the uninterruptible power supply (UPS) solution. These UPS systems provide continuous power to a device despite interruption in electrical grid (AC) power.

e1’s telecom sales will be primarily to customers who intend to package and sell e1’s hydrogen generators in combination with their own fuel cell products, providing backup power for telecom wireless networks. Historically telecom base station backup power has been provided by a combination of lead acid batteries and diesel generators. Our customers’ fuel cells combined with our hydrogen generators can offer a highly attractive alternative to diesel generators due to lower operating expenses, smaller siting requirements (critical for rooftop base-stations) and substantially reduced toxic emissions.

With an installed world-wide infrastructure of more than 5 million base stations in place (virtually all of which require backup power), the global telecom backup power market is massive in size and is growing at a 5% average annual rate. We expect to realize significant sales from both the displacement of diesel generators used in existing base stations and the sale of our products into newly constructed sites. Market research indicates total fuel cell UPS systems sales that will reach to 110,000 by 2017. Our product line for this market has been developed and is undergoing customer field trial testing. Based upon customer inputs, we expect to begin receiving volume orders in 4Q13.

Financing
The Company is targeting annual gross revenues approaching the $100 million range within a five-year time horizon or sales of approximately 11,100 units in year five. e1 requires additional capital to support this rapid growth plan. The Company is seeking up to $5.5 million of equity financing in exchange for a common stock ownership position in the Company. Primary uses of these funds are expected to be for:

- Recruitment of technical, sales, and administrative talent
- Material and equipment to support new product development
- Support for increasing working capital requirements
- Strengthening of the balance sheet

Management anticipates the existing and growing trend of industry consolidation to continue and that within the next 3 to 5 years a strategic acquisition of e1 will occur providing an investment monetization opportunity for e1 investors.

Management Team

Dr. Dave Edlund, Founder & CEO  
27 years experience developing hydrogen reformers and purifiers. Co-founder of IdaTech, LLC

Robert Schluter, Founder & COO  
20 years business operations, sales and marketing experience

Greg Haugen, CFO  
25 years of business experience, including IPO. Passed C.P.A. exam

Peter Hall, VP Sales  
25 years of business development, sales & marketing, and product development experience

Advisory Board
- Jon Tompkins, Chairman of Electro Scientific
- Rod Ray, CEO of Bend Research
- Jay Henry, CFO of St. Charles Health Systems
ENERGY STORAGE SYSTEMS
ALL-IRON ENERGY STORAGE TECHNOLOGY, IMPROVED CUSTOMER POWER RELIABILITY, AND OVER 33% SAVINGS IN ELECTRICITY EXPENDITURES.

OUR MISSION:
Energy Storage Systems Inc. (ESS) is an innovator in the energy storage market, developing a cost-effective, reliable and environmentally friendly flow battery technology that will significantly reduce user’s electricity bills while also minimizing the impacts of power outages.
A flow battery is an easily rechargeable system that stores its electrolyte—the material that provides energy—as a liquid in external tanks. Unlike typical batteries that are packaged as fixed cells or modules, a flow battery allows the battery’s power (the rate of electricity flow) to be decoupled from the battery’s capacity (the total amount of energy held). As a result, users are free to tune the battery’s specifications to their specific needs.

ESS has developed an advanced flow battery technology that utilizes earth-abundant iron as its energy storage medium. Our patented battery design reduces system costs by combining an extremely cost effective electrolyte with an innovative cell design that dramatically increases power density and enables a smaller, less costly power stack.

Not only is the IFB extremely cost-effective, it is environmentally friendly as well. With a non-toxic, non-hazardous, and completely recyclable iron-based electrolyte, the IFB sets a high bar for safe, reliable and environmentally conscious energy storage.

No other technology can match the advantages of the All-Iron Hybrid Flow Battery (IFB), especially in regards to retail grid electricity consumption shifting.

What distinguishes our technology is its extremely cost-effective electrolyte and highly efficient battery hardware design. This combination allows ESS to demonstrate IFB performance exceeding that of commercially available Vanadium Redox Flow Batteries (VRBs), but at a cost of only <$200/kWh in comparison to >$400/kWh for VRBs—finally giving small and mid-sized businesses a way to harness their local TOU tariffs to their economic advantage.
Electricity pricing is moving from the standard flat rate tariff to a Time of Use (TOU) pricing structure, where rates are dependent on when electricity is consumed. With TOU pricing, the cost of electricity during the peak daytime hours when most small and mid-sized businesses operate is often 400% higher than it would be for the same amount of electricity at night.

Despite the strong financial incentive, most consumers have had no feasible means of shifting their electricity usage profiles to take advantage of TOU pricing—until now. Our flow battery solution automatically charges electricity when prices are low, then discharges this energy on demand when prices are high (Figure 1). Having an ESS battery on-site also protects businesses during intermittent power outages.

ESS performed an analysis for a typical stand-alone fast food restaurant in Southern California that pays approximately $43,500 in annual electricity costs under the PG&E TOU tariff structure. With an ESS battery system, this customer would expect a payback of fewer than three years without the inclusion of any federal or state incentives.

**WHY IT MATTERS**

**A POWERFUL EXAMPLE**

ESS performed an analysis for a typical stand-alone fast food restaurant in Southern California that pays approximately $43,500 in annual electricity costs under the PG&E TOU tariff structure. With an ESS battery system, this customer would expect a payback of fewer than three years without the inclusion of any federal or state incentives.

**HERE ARE THE ANALYSIS HIGHLIGHTS:**

**Battery System Size:**

- **50 kW, 400 kW**
  - **Payback<1yr**
  - **Payback<3yr**
  - Designed to run all electrical operations during peak tariff periods

1 Financed with a 60 month term, 10% down payment and 6% interest rate.
Lithium-ion Battery Recycling Technologies.

Efficient, safe, environmentally friendly recycling technologies for lithium-ion and other batteries.

Objective:
Partnership with battery manufacturing to commercialize advanced battery recycling.

US Patented

OnTo recovers high purity electrode materials to make new batteries.

Advanced Battery Recycling

Patented Processes developed in the US by OnTo Technology

OnTo recovers high purity electrode materials to make new batteries.
World’s first OEM manufactured lithium-ion battery from recycled material.

**Objective:** Partnership with battery manufacturing to commercialize advanced battery recycling.

Contact:
Steve Sloop ssloop@onto-technology.com

**OnTo Tech Federal and State Awards:**
DOE SBIR Award DE-SC0006336
NSF SBIR Award 0750552
ONAMI Gap Award J1652A-A
Power Puck® Energy Harvesters

Deliver break-through energy harvesting power for wireless sensors that lead the market in output power by a wide margin—allowing for capturing more data with maintenance-free operation to overcome the limitations of traditional batteries.

Power Pucks deliver long-life, sustainable power that eliminates the need to trade battery life for increased data.

- Installs in < 1 minute on any warm surface
- Intrinsically Safe certified (Classes I, II, III) for hazardous area operation
- Ingress Protection rating of IP67 for protection from dust & water immersion
- Operates without limitations where extreme temperatures, dust, and moisture are found
- Lower TCO than batteries
- Environmentally friendly option

Major oil companies using steam injection in the Middle East require power that operates in harsh conditions. Power Pucks are unaffected by the conditions that cause solar and other options to fail.

Perpetua solutions are compatible with the sensors that the world’s largest companies rely on. Power Pucks are off-the-shelf solutions and ready for use—wherever real-time data is used for critical decision making.
**Polaris Labs is a processing center that accelerates new battery developments and expedites sampling.**

We provide processing services to accelerate the optimization of new recipes for lithium ion battery developers & OEM's. Customers include material companies, battery startups, Universities, National Labs, and OEM's.

**Product/Services:** Polaris is the catalyst for advancing new rechargeable battery technologies by providing critical processing services:

- Anode and Cathode Electrode Mix and Coat
- Pouch Stack Cell Assemblies
- Analytical Testing Services
- Business Advisory Services
- Links to High Volume Production Manufacturers
- Material Purchasing
- Process and Equipment Development

Polaris can effectively shorten the time to market by expediting sampling and linking companies to established production partners.

**Polaris Battery Labs, LLC**
Beaverton, OR 97008
Office: 971 246-5066
dmorris@polarisbatterylabs.com
www.polarisbatterylabs.com
Need, Market Opportunity, & Impact

Many important trends are apparent in lithium ion batteries; 1) they dominate the
technology over NiCd and Nickel Metal Hydride solutions; 2) demand is steadily
increasing as the technology proliferates into all consumer and industrial products; and
3) automotive uses will essentially double the demand in the next 8-10 years.

Electric Vehicle (EV) Market

In the case of electric vehicles, batteries remain the biggest obstacle to advancing the
industry with cost being the number one driver. Estimates of market size globally range
from 3 million vehicles by 2020, to as many as 50 million by 2050.

Large Scale Storage, Grid, Solar, Wind and Backup Market

In the case of large scale storage applications, there are many pilot studies and
collaborative projects underway with utility companies to understand and characterize
the capabilities of lithium ion batteries. Battery storage can be an excellent solution to
resolve many utility concerns with integrating renewables on the grid, as the technology
is proved, this can open up a significant market.

Consumer Product Market

Consumer products continue to drive current lithium ion battery demand. These markets
are well established and growing with a total available market of $3-4 Billion annually in
2013.

Product Development Milestones

1) **Expanded Lab Processing Capabilities**
   
   **Goal:** Expand processing knowledge and capabilities to include new anode and cathode materials, half cells and single layer cells.

2) **One New Material Introduced to Production Partner**
   
   **Goal:** At least one new material provided to Polaris partner for sampling and consideration for commercial use.

3) **Relationships and Collaboration**
   
   **Goal:** Develop business relationships that are beneficial to a partner company, Polaris and a customer

Technology and IP Position

**Licensing:** There are three licensing models for Polaris:

a. Polaris licenses technology from Universities and National Labs, develops the technology for commercialization in our labs, then licenses to manufacturers.

b. Polaris licensing our process IP to customers. Technology that is developed outside of the field of use for our clients will be available to Polaris for license to others.

c. Polaris intends to facilitate the license of technology from Universities and National Labs to customers and manufacturers. Polaris would obtain a royalty.

Business Model-Business Segments

![Diagram of Business Model-Business Segments]
life sciences »
healthcare »
pharmaceuticals »
Cancer is a group of diseases characterized by uncontrolled growth and spread of abnormal cells. If the spread is not controlled, it can result in death.

Cascade Prodrug is a pharmaceutical R&D company developing novel prodrugs for the treatment of cancer. The company’s lead compound, CPD 100, is a novel treatment for certain forms of cancer. The company’s prodrug technology enables the therapy to be delivered site specific in an inactive form and converts to an active form in the presence of low oxygen or “hypoxia” which is a prevalent condition of fast growing tumors. The value proposition is centered on delivering a higher “therapeutic index” for cancer treatment by increasing both the safety and efficacy of the drug.

P.O. Box 13020
Eugene, OR 97440
Ph: 541-343-6065
Fx: 541-343-6025

www.cascadeprodrug.com
**Need, Market, Opportunity and Impact**

**Need:** Tumor targeted drugs having a higher Therapeutic Index improving patient safety and efficacy in improving patient outcomes

**Value Proposition:** Cascade modifies FDA approved chemotherapy drugs to produce prodrugs that improve safety and efficacy in treating cancer

**Market Opportunity:** The oncology therapeutics market was $48 billion in 2008 and expected to grow at an 11% CAGR over the next 5-years, reaching $81 billion by 2013. With over 24 million cancer patients worldwide, 12 million new cases added per year and a demographic expected to grow by 50% by 2020, cancer poses an enormous medical challenge for society

**Impact:** The average age of the world’s population is increasing. As people live longer the probability of contracting cancer grows. Cascade Prodrug therapeutics are being engineered to meet this challenge

**Technology and IP Position**

**Technology Description:** Anti-cancer compounds are designed to kill tumor cells, but most chemotherapy agents prescribed today show little selectivity between cancer cells and rapidly dividing normal cells. The harsh side effects associated with anticancer therapy are primarily caused by this random attack on healthy cells. Our proprietary platform technology provides a straightforward means for chemically modifying existing anti-cancer compounds that change the drug from an always-active state to a prodrug of much lower toxicity that can be selectively activated. For treating tumors, the prodrug is relatively inactive in the blood stream until it reaches the tumor and diffuses inside the tumor. The physical environment inside the tumor activates the drug where it can kill the cancer cells.

**IP Position:** Two issued US patents with corresponding foreign filings. Additional IP being held as trade secrets until time and money is available to file applications.

**Current Product Development Milestones**

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Period</th>
<th>Funding</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete IND Enabling Studies</td>
<td>June '14</td>
<td>$1.4M</td>
<td>Series A</td>
</tr>
<tr>
<td>Compile and File IND</td>
<td>Sept '14</td>
<td>$0.5M</td>
<td>Series B*</td>
</tr>
<tr>
<td>First Commercial License</td>
<td>June '15</td>
<td>$.250M</td>
<td>Series B*</td>
</tr>
</tbody>
</table>

* Series B Round Anticipated June ’14 – size of round TBD

**Company and Business Model**

**Company:** Preclinical stage drug development company focused in the area of oncology

**Business Model:** Develop IND Package for Phase I Clinical Trials – license rights for clinical/commercial development. Reinvest proceeds to develop IND pipeline and repeat licensing

**Objective:** Develop commercially valuable therapeutics to treat cancer that pharmaceutical partners will successfully bring to the market yielding better patient outcomes and solid financial returns for investors
DesignMedix develops drugs to overcome drug resistance in multiple diseases that kill millions of people each year. All anti-infective and most cancer drugs develop resistance over time, causing the drugs to become ineffective. With an initial focus on malaria, the Company has demonstrated the validity its technology approach and has a drug almost ready for clinical trials in humans. DesignMedix’s technology approach also has been extended to other diseases, including tuberculosis and bacterial infection and cancer.

www.designmedix.com

Drug resistance is one of the top three threats to human health.
**Need, Market, Opportunity and Impact**

**Need:** Drugs that work again, and are not crippled by drug resistance.

**Value Proposition:** DesignMedix develops drugs to overcome drug resistance. The lead proof of concept drug for malaria is proven effective in animal modals, and is within a year of human testing.

**Market Opportunity:** The total market need for antimalarial drugs is approximately $500 million. In emerging markets such as India, China, Southeast Asia and Brazil, pharmaceutical markets are growing at rates of 17-20% per year, rapidly increasing the number of patients who can afford medical treatment. The markets for antibiotics and cancer drugs are multi-billion markets.

**Impact:** Diseases resistant to drugs claim millions of lives each year. DesignMedix drugs are being engineered to meet this challenge.

---

**Technology and IP Position**

**Technology Description:** DesignMedix has a novel technology approach to drug-resistance, modifying a drug that has lost effectiveness by combining it with a molecule that overcomes the resistance by inhibiting efflux of the drug. This results in new patentable therapies that are potent, safe, stable and cost effective.

Leveraged 5:1 by grants, DesignMedix has efficiently used $1.2 million equity to move a novel drug candidate through preclinical studies approaching readiness for human trials. A second preventive and antimalarial drug candidate is being developed in collaboration with the Walter Reed Army Institute for Research. In addition, applications in the antibacterial market are in development.

**IP Position:** Three issued US patents with corresponding foreign filings. Additional patent application filings are planned.

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**Current Product Development Milestones**

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Period</th>
<th>Funding</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete IND Enabling Studies</td>
<td>June ’15</td>
<td>$0.8M</td>
<td>Grants</td>
</tr>
<tr>
<td>Compile and File IND</td>
<td>Dec ’15</td>
<td>$0.2M</td>
<td>Grants</td>
</tr>
<tr>
<td>Phase Ia proof-of-concept drug trials in humans</td>
<td>June ’16</td>
<td>$0.5M</td>
<td>Series B*</td>
</tr>
</tbody>
</table>

*$1.2M of $1.5 M raised

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**Company and Business Model**

**Company:** Preclinical stage drug development company focused on the major health problem of drug resistance.

**Business Model:** Conduct first-in-human Phase I Clinical Trials, leading to strategic partnering and/or acquisition.

**Objective:** Develop drugs to overcome drug resistance in multiple disease areas, working with partners/acquirer to bring products to the market, yielding better patient outcomes and solid financial returns for investors.
Powerful, newly developed genomics technologies offer great promise to solve major problems in agriculture, ecology, basic and applied scientific research.

Floragenex is a biotechnology company that provides outsourced service solutions to academic and commercial research and development teams. Our firm specializes in the application of innovative genomics technologies to help scientists better understand the genes and genetics of important plant and animal systems.

Rick Nipper, Ph.D.
President, Floragenex

44 West Broadway
Eugene, OR 97402
ph: (541) 343-0747

www.floragenex.com
**Key Events and Milestones**

2012  
Floragenex reaches $1M+ in annual revenues

2013  
Inked co-marketing deal with genomics division of Eurofins Scientific (Ticker: ERF)

2014  
Genomics analysis software development and commercialization  
Seeking $200K+ in financing, loan or investment

**IP and Technology**

IP: Floragenex has licensed intellectual property (two issued patents and four patent applications) around innovative genomic technologies developed from university and industry sources. These technologies provide a unique selling and differentiating point in Floragenex sales efforts.

**Business Model, Team and Objective**

Business Model: Floragenex has an existing seven figure revenue stream from laboratory services. We are now looking to expand sales through marketing agreements with other biotechnology firms and development of DNA sequence analysis tools.

Team: Dr. Rick Nipper and Dr. Jason Boone joined Floragenex in 2008 and 2009, respectively, and have deep expertise in sales, business development, project management. The management team is supported through a consulting relationship with the Alta Biomedical Group of Lynnor Stevenson, Ph.D. and Sandra Shotwell, Ph.D.

Objective: Grow annual revenues to $5M+ through sales agreements focused on lab services and development of novel genomics analysis software.
We are implementing an innovative neurophysiology-based technology to accelerate drug discovery for parasitic worms infections impacting human and animal health world-wide.

NemaMetrix is a designer and developer of an innovative microfluidic neurophysiology platform for the screening and optimization of anthelmintic (anti-parasitic worm) drugs. Such drugs are needed by humans in developing countries, as well as livestock and domestic pets worldwide. NemaMetrix technology provides direct pharmacokinetic and mode-of-action insights into drug activity in real time. Allowing sufficient selectivity to distinguish between true anthelmintics and non-specific biocides (generic poisons), thereby rapidly eliminating false positives. The technology is compatible with a variety of species of parasitic worms allowing precise tests on potential drugs for specific diseases. Testing target parasites early in the drug discovery dramatically lowers the time and cost to develop new anthelmintic drugs.

Matt.Beaudet@NemaMetrix.com
Ph: 541-510-5216

NemaMetrix.com
**Need, Market, Opportunity and Impact**

**Need:** An adequate pipeline for new anthelmintic (anti-parasitic worm) drugs to meet the urgent need for new drug treatments that are safe, effective, and affordable.

**Value Proposition:** Our new approach surmounts current barriers to anthelmintic (anti-worm) screening and development, representing a breakthrough or ‘disruptive’ technology for anthelmintic drug discovery.

**Market Opportunity:** A staggering 2 billion people harbor parasitic worm infections. Parasitic worms also infect livestock and crops, affecting food production with a resultant economic impact. NemaMetrix targets the secondary screening and lead optimization segments of the parasiticides discovery process. In 2008 the estimated size of these two segments was about $30M (6% CAGR).

**Impact:** Anthelmintic resistance has been widely reported in livestock and it may also only be a matter of time before this phenomenon occurs in parasites of humans. NemaMetrix is building a drug screening and optimization pipeline to meet this challenge.

---

**Technology and IP Position**

**Technology Description:** The core technology is a patent protected microfluidic chip that interfaces with proprietary software to deliver high-resolution, non-invasive readouts of neuromuscular function in the parasitic worms. The technology is ideal for direct, pharmokinetic, real-time assessment of the physiological effects of test compounds in fields from world health to veterinary medicine.

**IP Position:** NemaMetrix has an exclusive license from the University of Oregon for the patent-pending technology. Additional IP is being held as trade secrets until time and money is available to file for patent protection.

---

**Current Product Development Milestones**

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Period</th>
<th>Funding</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPG chip for BSL-1 parasitic nematodes</td>
<td>Q3 2013 - Q1 2014</td>
<td>$103K</td>
<td>ONAMI Gap Fund</td>
</tr>
<tr>
<td>EPG chip for BSL-2 parasitic nematodes</td>
<td>Q4 2013 - Q2 2014</td>
<td>$100K</td>
<td>Bill &amp; Melinda Gates Foundation</td>
</tr>
<tr>
<td>Combined 1° and 2° anthelmintic screening from compound libraries</td>
<td>Q1 2014</td>
<td>$35K</td>
<td>OTRADI Innovation &amp; Comm Fund</td>
</tr>
</tbody>
</table>

---

**Company and Business Model**

**Company:** Contract Research Organization (CRO) company focused in the area of anthelmintic drug development.

**Business Model:** NemaMetrix will be a CRO offering compound screening services to companies involved in: (1) anthelmintic discovery and development and (2) drug safety and toxicity screening. We will charge our customers on a “per compound” basis and provide them with a compound bioactivity profile. We will go to market as a service company and as the technology matures we will diversify with a product offering to additional segments of the market.

**Objective:** Facilitate the development of commercially valuable anthelmintics to treat STH infections that pharmaceutical partners will successfully bring to the market yielding better human and livestock outcomes and solid financial returns for investors.
Mission Statement: Assuring a Domestic, Secure, and Reliable Supply of $^{99}$Mo for Medical Diagnostics

Opportunity/Need

- $^{99m}$Tc (Derived from $^{99}$Mo) Most Commonly Used Cardiac Diagnostic Imaging Agent – 50,000 per day (US)
- Demand Growing Owing to Aging Demographics of US
- No Domestic Supply
- Greater than 90% Imported from Two Nuclear Reactors to be Decommissioned 2016 and 2017
- Global Supply Produced from Highly Enriched Uranium – Must Convert to Low Enriched Uranium

$70-$100 Million/Year Revenue Opportunity
Solution and Advantages

- Replace Foreign Reactors with Network of University Research Reactors – Domestic, Reliable, and Obviates $100MM Investment

- Novel Extraction, Purification, and Recycling Chemistries Based on Low Enriched Uranium – Secure and Least Cost Production

- Integrate into Existing FDA Approved Supply Chain – Same Product Fills Supply Chain Void

Traction

- Network of US University Research Reactors Identified and In-Place

- Extraction and Purification Chemistries Engineered and Demonstrated

- Siting of Radioisotope Production Facility Optioned

- Nuclear Regulatory Commission Licensing Initiated
Heart disease is the worldwide leading cause of death. You have to survive your first cardiovascular event to benefit from treatment.

Pacific Nanoscience is a medical diagnostic device company that has invented the Nanomonitor, which will identify patients before they have their first cardiovascular event by detecting biomarkers in blood faster, less expensive, and at least 10,000 times more sensitive than the current standard. This improved sensitivity will save lives, decrease cost, and change the practice of medicine.

Jim Fixx died age 52 of heart attack
20% of first heart attacks present with death
5% of surgical patients have heart attack, and 65% have no symptoms
### Need, Market, Opportunity, and Impact

**Need:** Prediction of first heart attack, prediction of heat attack after surgery, triaging patients with chest pain, and targeting response to therapy are poor.

**Value Proposition:** PacNano’s increased sensitivity will improve the current diagnosis of heart attack and open new horizons for risk prediction, companion diagnostics with therapy, and response to treatment, using a point of care device.

**Market Opportunity:** 7 million deaths from heart disease in 2008; the cardiac diagnostic testing market will be $10 billion by 2016, and grow by 5% per year. 7 million ER visits for chest pain in US and 90% are non-cardiac; 1% are discharged and have a heart attack at home. 50 million surgeries in US 2010; 230 million worldwide, with an estimated 12 million heart attacks after surgery.

**Impact:** As the population ages, heart disease, surgery, and postoperative complications become more common.

### Current Product Development Milestones

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Period</th>
<th>Funding</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete prototype and open Lab</td>
<td>Nov ‘14</td>
<td>$1 M</td>
<td>Series A</td>
</tr>
<tr>
<td>Complete clinical studies</td>
<td>Nov ‘15</td>
<td>$10 M</td>
<td>Series B*</td>
</tr>
<tr>
<td>Submit FDA 510k</td>
<td>July ‘16</td>
<td>$5 M</td>
<td>Series B*</td>
</tr>
</tbody>
</table>

* Series B Round Anticipated Nov ‘14 – size of round TBD

### Technology and IP Position

**Technology Description:** There are 2 million nanowells on the 2x2 cm sensor. Nanoscale confinement and the change in capacitance that occurs with antigen and antibody binding explain the greatly enhanced sensitivity. The dynamic range of measurement is attogram/ml to microgram/ml, a trillion fold change. 1 attogram/ml = 1 part per Quintillion.

**IP Position:** 1 US patent issued, 1 US patent filed. Exclusive option agreements reached. Licenses currently being negotiated. Trade secrets held.

### Company and Business Model

**Company:** Medical diagnostic device company focused at first on the cardiovascular disease biomarker troponin; next diseases include sepsis and cancer. Applications in water and soil quality, food safety, biodefense, and smart sensor for in line manufacturing.

**Business Model:** First sell to research community, then sell a handheld reader with disposable sensor to hospital labs, then a point of care device to be used in the field, and finally will be used by patients at home with a smartphone and a subscription.

**Objective:** Produce a Nanodevice that demonstrates rapid, ultrasensitive detection of key biomarkers that will improve patient’s lives, and create value that will bring financial returns to our investors.
**Executive Summary**

**Overview**

Sonivate Medical, Inc. (SMI) participates in the fastest growing segment in the $7B annual worldwide ultrasound imaging market with simple, breakthrough solutions. The FDA-cleared, IP-protected SonicEye® finger-worn probe resolves the severe limitations created by traditional devices and provides not only an obvious replacement for, but an addition to, existing probes. Sonivate extends the applications for ultrasound so physicians can make better diagnostic decisions at the point of care. Equally important, SonicEye improves the use of ultrasound in needle-guided procedures. Sonivate enables the physician to “see/feel/do” so they can act quicker and with more confidence.

**Opportunity. Product, Market**

The SonicEye, SMI’s core product, is an ultrasound imaging probe that fits onto the user’s finger, leveraging innate human hand/eye coordination in order to provide both fine-motor positional control and exquisite spatial awareness of fingertip location with tactile feedback. Harnessing these innate abilities also shortens the learning curve, thereby removing a huge impediment for new users.

The ultrasound market is sizeable—$7 billion annual worldwide for machines and accessories. There are 430 million scans performed each year on 450,000 systems installed. The market for probes alone is $1.4 billion annually. Traditionally, the ultrasound market has been a mature, hospital-centric market with usage confined to a centralized department. Growth opportunities now exist in the portable segment which is driven by the desire to utilize ultrasound at the point-of-care and for procedural use.

To ensure ease of use and desired functionality, the SoniceEye was developed and funded in close collaboration with customers. The U.S. Army Medical and Material Research Command has provided Sonivate with a series of grants driven by increasing clinical interest among military and civilian users.

Currently the SonicEye supports applications in line placement, peripheral vascular, biopsy, needle aspiration, nerve blocks, and small parts. The technology is being developed to extend applications to trauma assessment, general abdominal imaging, circulatory system assessment, abdominal fetal imaging, general ultrasound, primary care, OB/GYN-transvaginal, Urology-transrectal, and intra-operative.

**Technology and IP Section**

Sonivate has a multi-pronged approach to protecting its technology: patents, trade secrets, and willingness to partner. Sonivate has two issued U.S. patents, US 7297115 B2 and US 8211026 B2 and several international design patents. One of the patents makes it unlikely someone can copy the design without compromising clinical utility.

The company has developed several engineering and manufacturing techniques that are integral to copying the design successfully. Sonivate believes these are best protected by trade secret as they comprise key technology that enables transducer miniaturization.
Executive Summary

Milestones

Financial Projections

<table>
<thead>
<tr>
<th>Key Management</th>
<th>DAVID STARR, CHIEF EXECUTIVE OFFICER AND PRESIDENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Starr has over 30 years in marketing and operations, product definition, market research and analysis, commercialization/adoption path for medical products, market and business development, and fundraising, with medical and consumer devices. Mr. Starr was part of the original DeskJet printer introduction team that presided over rapid growth from $200M to over $3B in five years. At HP Medical he developed the defibrillator strategy that led to tremendous market growth outside the hospital. He has held senior management positions at Inovise Medical, which Mr. Starr co-founded. BA, Cum Laude, Pomona College. MBA, University of Chicago.</td>
<td></td>
</tr>
</tbody>
</table>

| RONALD W. SCHUTZ MD, FACC, FOUNDER/CHAIRMAN |
| Dr. Schutz is a board certified cardiologist and Fellow of the American College of Cardiology with nearly 30 years experience in cardiac ultrasound. In 1982 he founded Heart Sounds, Inc., a leading echocardiography service provider to hospitals and clinics. He has developed other medical devices that resulted in successful start-up ventures. B.S., Phi Beta Kappa, and MD, University of Illinois. Cardiology Fellowship, former Assistant Professor of Medicine and Director of the Adult Echocardiography Laboratory, Oregon Health Sciences University. |

| SCOTT CORBETT, FOUNDER, CHIEF TECHNICAL OFFICER |
| Scott Corbett has over 30 years experience as a biomedical engineer/executive in the medical device industry and co-founded two Seattle-based biomedical companies, MicroConnex and Advanced Cochlear Systems. He has held senior engineering/management positions at Precision Interconnect (now Tyco Healthcare), and GE Medical Ultrasound Division. B.S. Physics, Occidental College, M.S. Acoustics, Pennsylvania State University. |

Strategic Direction going Forward

Although the SonicEye represents a huge opportunity, the second round of products takes SonicEye to a whole other level. This product line will be developed with a partner and is comprised of a miniaturized wearable ultrasound system/finger probe combination that can penetrate vast new markets based upon price, ease of use, and a dramatically reduced footprint.
**Mission Statement:** To be the world’s premier producer of fluorinated intermediates for pharmaceutical and specialty chemical applications.

**Value Proposition:** Valliscor has invented a process for the production of bromofluorohydrocarbons (BFC’s) of significant industrial utility that is cost efficient and minimizes waste and highly reactive impurities. The lead compound in this process for Valliscor is bromofluoromethane (BFM).

<table>
<thead>
<tr>
<th>Metric</th>
<th>Valliscor</th>
<th>Competitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single step</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>No toxic waste</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Avoids problematic methyl bromide impurity</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Low raw materials cost</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Small physical footprint</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Rapid response to market demand</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>High operating margins</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>BFC / Custom synthesis synergy</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Cash flow positive after first BFM sale</td>
<td>Yes</td>
<td>N/A</td>
</tr>
</tbody>
</table>

BFM is used to make fluticasone propionate - with $8B in sales as the active ingredient in Advair® and Flonase®.

Please contact Rich Carter for more info:
4033 NW Princess St
Corvallis, OR 97330
Tel: 541-250-9034
Email: rich.carter@valliscor.com
**Our Site:** We are located in the Microproducts Breakthrough Institute on the Hewlett-Packard Campus in Corvallis, OR.

**Future Directions:** We are actively working towards expanding manufacturing capacity and broadening our product portfolio. We view bromofluoromethane (BFM) as an entry point for the broader bromofluorocarbon (BFC’s) market. BFC’s are widely used in the pharmaceutical, agrochemical & polymer markets. We see significant upside potential for this business model.

**Concept Works:** We are already delivering the highest purity material on the market in kilogram levels to customers.

**The Team:**
- Rich G. Carter, Ph.D. (Co-founder and CEO) Current Professor and Chair, Department of Chemistry, Oregon State University. Expertise in multi step organic synthesis and reaction development.
- Mike Standen, Ph.D. (Co-founder and COO) Currently Chief Technology Officer at Lacamas Labs. Formerly Director of Technology, Synthetech, sold to W.R. Grace.
- Raj Lingampally, Ph.D. (Employee #1, Lead Scientist) Currently Research Associate, Rich G. Carter laboratory, Oregon State University.
Our patented technology revolutionizes water purification.

With our patented technologies we provide filtering solutions for the widest variety of needs.

Heavy Metals: Arsenic, Lead, Mercury, Copper, Zinc.

Suspended Solids, Sediment and Soil, Fats, Oils, and Greases.

Radioactive Isotopes: Uranium, Strontium, Barium.


“Our not clean water
if it’s not crystal clear”

Lisa Farmen
President and CEO

12423 NE Whitaker Way
Portland, OR 97230
503-544-2330
lisa@crystalcleartechnology.us
www.crystalcleartechnology.us
Mission Statement
Crystal Clear Technologies provides innovative technical solutions to solving complex water treatment issues on a clean green sustainable platform.

Need
Being able to remove contaminants from water and wastewater to low micro- or nanogram levels and terminate the liability is in tremendous demand. Green solutions to water treatment are few and far between, and Corporations with Sustainability policies are looking for technologies to treat a myriad of water pollution issues. Being able to treat larger flow rates. Use of conventional water and waste water treatment processes is increasingly being reduced due to diminishing water resources, rapid industrial development and population growth. The requirement for removal of synthetic organic compounds, nutrients and inorganics from water due to potential effect on health & environment makes conventional process less efficient. Producing high-purity water for drinking and industrial water with improvements on quality and cost makes advanced treatment technologies more demanding and widely accepted.

Value to the Customer
CCT’s Solid Phase Extraction (SPE) materials use clean green sustainable raw materials and can reach low nanogram removal levels, passing the TCLP & CA WET test, terminating RCRA liability. Our layering patent allows an exhausted media be to be recharged in situ and reused up to 8 times, dramatically reducing the operating costs as measured in $/K-gal. Customized formulation of chitosan-based biopolymer coagulate and flocculate materials quickly and economically in process configurations not possible with currently available alternatives. The materials are AAFCO/FDA- & EPA-approved, providing easy of disposal or reclaim of the removed solids.

Market Opportunity
The water treatment market for CCT’s technology includes Storm Water ($5B), Agricultural Processing ($18B), Oil & Gas Fracking ($1B), Electric Power Utilities ($1B), Potable Water ($18B). The market is growing at CAGR of 3.8%. The coal-fired power plants recently became regulated by the EPA for air and water discharge.

Impact
Industrial Storm Water customers have years of accumulated contamination on their sites, and being able to treat storm water runoff and reach ND or removal levels way below the regulations and terminate their liability provides a credible path to meeting and exceeding discharge requirements. The Agricultural market sector can remove their solids, FOG and reclaim their wastes as a resource for animal feed not a waste stream requiring disposal. The Coal-Fired Power Plant market sector will need to implement technology to reach low nanogram mercury removal and terminate their liability. All these market sectors can achieve these results at a low $/K-gal operating cost.

Technology and IP Position
CCT’s IP Portfolio includes the following products and services:

- Customized formulation of chitosan-based biopolymers coagulate and flocculate materials quickly and economically in process configurations not possible with currently available alternatives. The product is FDA- and EPA-approved, providing for animal feed application and ease of disposal.
- Functionalized substrate IP allows for any of the 20 patented nano-coatings to be bonded to high surface area substrates that will transform the substrate to sequester high concentrations of dissolved contaminants from water and wastewater.
- A layering patent allows for an exhausted adsorptive media bed to be recharged in-situ, and the bed is placed back on line. By concentrating the dissolved metals on the same substrate, the metal concentration is increased to the point at which it can be economically reclaimed.

Other products based on CCT IP include:

- Human-powered water purifier patent uses nano-coated materials to sequester arsenic, fluoride and other contaminants in water
- Licensed industrial product designed for a 9-log reduction of bacteria, 4-log reduction of virus and protozoa and can be recharged in the field.
- A licensed Taylor-Couette UV reaction chamber
- Patented forward-osmosis process that reduces the energy required for water purification.

Investor Potential
CCT is seeking a $3M Series A to complete the development phase to fully commercialize our technology. Potential payback is 10x in 5 years.

Lisa Farmen
President and CEO
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503-544-2330
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Oregon State University, working with MTEK Energy Solutions, is developing a microscale-based capacitive deionization system expected to result in significantly lower cost, better energy utilization and higher water recovery relative to conventional desalination technologies.

Jeff Canin, MTEK Energy Solutions
JeffCanin@earthlink.net
Dr. Goran Jovanovic, Oregon State University
goran.jovanovic@oregonstate.edu
Need, Market Opportunity & Impact

**Need:** The desalination market, estimated at $95 billion for the ten years through 2015, is large and rapidly growing, driven by population growth, climate change, improved living standards and industrial development. Energy is the single largest operating cost component in traditional thermal and RO facilities.

**Value to the Customer:** Reduced energy utilization; scalability (portable to large facilities); lower capital and operating cost; designed for retrofit into existing plants; higher water recovery.

**Market Opportunity:** Sales and licensing revenue for:
- Retrofit into existing and deployment in new large-scale desalination plants
- New business opportunities in small-scale and portable systems
- Use in non-potable industrial and agricultural water treatment.

**Impact:** significantly reduce energy and other operating & capital costs for desalination facilities; enable use of distributed renewable energy sources.

Technology & IP Position

Technology Description: Novel, microchannel membrane-less technology for the production of desalinated drinking water. Capacitive deionization technology (CDT) promotes low energy consumption and improved water recovery compared to conventional reverse osmosis and thermal desalination techniques in a reduced footprint.

IP Status: An invention disclosure has been filed with the Oregon State University Office of Commercialization and Corporate Development. The patent application is being finalized for submission. MTEK has been granted an exclusive option to license the technology.

Company/Team & Business Model

**Company:** MTEK Energy Solutions is a C-Corp formed to commercialize Oregon State University innovations in the fields of cleantech and energy efficiency.

**Team:**
- Jeffry Canin, MTEK CEO, co-founder
- Jack Winter, MTEK CFO, co-founder
- Dr. Goran Jovanovic, OSU Professor, co-founder
- Dr. Chris Loeb, OSU, Project Manager

**Business Model:** MTEK, working through partnerships, intends to market key components and license technology for use in new and existing desalination plants worldwide.

**Objective:** MTEK is seeking additional funding and strategic partners to complete the development, manufacture and market its microchannel-based desalination system.
Mission Statement
Puralytics mission is to provide safe, clean water to anyone, anywhere using simply implemented advanced and sustainable technology. The company has products directed at the $20B decentralized drinking water and industrial equipment market where water quality is critical. Puralytics has developed a water purification technology using a light-activated nanotechnology coated mesh which significantly increases contaminant coverage and decreases operational costs and waste associated with competitive systems.

Value Proposition and Products
Puralytics has entered these markets through channel partners and with two product families introduced in the last 2 years, and a 3rd product, the LilyPad in funded prototype testing. Puralytics products have shipped to over 60 countries to-date.

Puralytics patented purification process uses only light energy to activate an advanced nanotechnology photocatalyst. Water is purified by five simultaneous photochemical reactions, breaking down organic compounds, reducing and removing heavy metals, and sterilizing microorganisms. There are no chemical additives and 100% of the water is purified. The back flushing and cleaning operations are eliminated, and there are no contaminated filters or membranes requiring special disposal.

Competition with the SolarBag comes in various technologies, from UV sterilizers, carbon filters and treatment tablets. No other technology covers the entire range of harmful contaminants including pathogens, organic chemicals and heavy metals as the SolarBag.

Intellectual Property
Puralytics has one granted US patent and four patent applications filed and four positive international search reports by the PCT.

The Puralytics Solution
Water and electricity reduced, contaminants destroyed and more contaminants removed than competitive solutions. Eliminates “emerging” contaminants. Low water treatment costs, operating expenses reduced by 80%, less than a 10 month payback. $20B Market in decentralized drinking and industrial process water.

Sales Traction
Puralytics has shipped products into sixty different countries, and has a current sales opportunity pipeline >$40 Million. In addition to numerous other awards, The International Water Association (IWA) has awarded Puralytics its 2013 Global Honor Award for its Drinking Water Hardware Category. Series A investment has allowed the company to hire two sales managers and recruit 4 dozen distributors.
Financial Projections

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<td>Sales</td>
<td>204,020</td>
<td>2,985,640</td>
<td>7,139,000</td>
<td>17,881,500</td>
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<td>Grants &amp; NRE</td>
<td>20,901</td>
<td>30,462</td>
<td>200,000</td>
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<tr>
<td>Total Revenue</td>
<td>224,921</td>
<td>3,016,122</td>
<td>7,339,000</td>
<td>18,081,500</td>
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<td>COGS</td>
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<td>1,611,592</td>
<td>3,718,800</td>
<td>8,967,450</td>
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<td>Gross Margin</td>
<td>87,796</td>
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<td>3,620,200</td>
<td>9,114,050</td>
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<td>Expenses</td>
<td>1,576,469</td>
<td>1,713,116</td>
<td>2,691,168</td>
<td>5,144,233</td>
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<td>EBITDA</td>
<td>(1,488,366)</td>
<td>(273,690)</td>
<td>1,004,032</td>
<td>4,070,317</td>
<td>7,350,469</td>
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Management Team

**Mark Owen, CEO**
Prior: Phoseon Technology – Founding CEO - $1 Billion in revenues from products involving his patents.

**Ed Kolasinski, Chief Operating Officer**
Prior: President and CFO of United Pipe. Three other start-ups through exit.

**George Jendrzejewski, VP Sales**
Prior: VP-S&M of Boise Cascade through LBO and IPO. BS OSU, Harvard AMP.

**Roland Jasmin, Director of Engineering**
Prior: Engineering Manager at Phoseon Technology. Five other start-ups through exit.

Award Winning Company and Technology