Financing Growth Opportunities for Early Stage Companies

L.N Innovative Technologies Ltd.
Haifa, Israel

From innovative ideas to successful enterprises...
What is a technological incubator?

A technological incubator is a framework budgeted by the Ministry of Industry and Trade established to provide a supportive and protective environment to entrepreneurs for development of technological innovations into business ventures.
Technological Incubators

- Budget per project: 2,000,000 NIS - about $500,000 US
- Government support: 85% of budget +15% private investment
- Support duration per project: 2 Years + 3rd year option
L.N. - The Green Incubator

- Founded 1993
- Klara Oren, Founder, CEO
- Currently, 10 companies in the incubator program
- Privatized 2007
- Owners: Echocycle Investors
- Focus Cleantech
- Started 70 companies; 50% are still active
- Successfully raised $80m
- Companies have partnered with Procter & Gamble, Mann Lines – Shipping, & others
What We Offer

2-3 Years Incubator Program:

- Space and Infrastructure Facilities
- Funding – initial and additional capital
- Administration and operating support
  (secretarial, accounting, legal, acquisition)
- Management Support - Business Development
- Marketing
- Networking - Close ties with the scientific community
Broad scope of Clean-tech and Bio-technology projects

3 main criteria:

- Who is the team?
- Is there real technological innovation?
- Is there a clear market need?

- Renewable Energy
- Energy Storage
- Non-polluting Transportation
- Resource Efficiency
- Biological Alternatives
- Biological Fuels
- Water Technologies
- Treatment of Gas Emissions
- Green Building
The Screening Process - I

- Application by entrepreneur
- Preliminary screening (entrepreneurs – know-how, experience, commitment)
- Basic screening (technical and marketing, innovation, feasibility, market size and opportunities, opinions of experts)
- Incubator Investment Committee
- Office of the Chief Scientist (OCS) Expert Examiner
- OCS Projects Committee
Screening Process

New Project

LN + External Consultants

Incubator Investment Committee

OCS Projects Committee

OCS Professional Examiner

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Business Model - Equity, investment and ROI

OCS (Office of the Chief Scientist)
- $450,000 Budget per project
- Royalties from sales

LN Incubator
- $100,000 Investment
- Equity 50%

Entrepreneur
- Know-How IP
- Equity 50%

Startup Company

Equity split 50%
Approach LN annually
Start DD process
Investment Committee
Enter LN
Incubator Program in Israel

**Goal**
Transform innovative technology into successful companies

**Program**
Average 2 years;
$500K budget;
incubator receives equity

**Support**
85% government;
15% incubator owner

**Numbers**
26 incubators;
8 projects/incubator;
~100 new start-ups/year

**Fields**
Medical devices;
biotech, cleantech, electronics, IT

**Acceptance**
Scientific and business expert review; approval by incubator and OCS
Targets for incubation period

• Remove the technological risks

Development of the advanced prototype

• Proof of Concept

Feasibility study at first site (is Israel or abroad)

• Learn the market (BP and road map to market entry)

Market size, trends, opportunities, strategic partners...

• Solve intellectual property issues (Strong IP portfolio)

Maintenance of existing IP and submission of new applications

• Create management capabilities

Establish leading team

• By the end of the incubation period

Raise capital and/or find a strategic partner
"We don’t inherit the earth from our ancestors. WE borrow it from our children”
David Brower
L.N.

Success stories !!
Vortex

Develops cost-effective pollution control systems for simultaneous gasses and fine particles cleaning of industrial emissions for Lime, Marine, Steel, Power, Coal and Petroleum

Developed an Advanced Vortex Chamber suitable for dry or wet cleaning

Main technological advantages:
- High cleaning efficiency, independent of apparatus diameter
- Clean process
- Easy operation and high reliability
- Compactness

Corporation with the Norway merchant marine (Ian Henning), Corporation with MAN Ltd. For cleaning ships polluted gas.
MobiWize aims to become a "must have" technology for every new generation vehicle, providing safer, more fuel-efficient and greener driving experience.

**MOBIWISE SOLUTIONS**
MobiWize develops Dynamic Mapping and Big Data driven solutions to enhance the performance of the automated driving functions, self-driving vehicles, fleet management and intelligent transportation systems. MobiWize solutions actively contribute to improved fuel economy, safer driving, road-health monitoring and other applications, ranging from vehicle control optimization to reducing the environmental impact of driving.

**MOBIWISE TECHNOLOGY**
MobiWize utilizes on-board and crowdsourced sensor fusion to dynamically map various road properties and model vehicle performance in relation to these properties. The result is on-board Vehicle Intelligence Center (VIC) that provides real-time, horizon-predictive and crowd-driven actionable insights with unique set of dynamic attributes to empower the capabilities of various driving functions.

**PRODUCT POSITIONING**
All MobiWize solutions are based on the same VIC foundation and the only difference between the products is their positioning (software / hardware / add-on / cloud data) and the type of attributes delivered to the customer.

**TECHNOLOGY HIGHLIGHTS**
- Using vehicles as data harvesting devices to dynamically map through crowdsourcing
- Mapping big data of road characteristics and modeling vehicle performance on these characteristics
- Horizon-predictive, dynamic insights in real-time

**BENEFITS**
Big-Data driven actionable insights for Advanced Driving Assistance Systems (ADAS) and drivers, contributing to:
- Improved fuel economy
- Safer driving experience
- Minimized environmental impact of driving

**MOBIWISE FOR COMMERCIAL VEHICLE FleETS**
VIC for heavy fleets is the most advanced automated eco-driving solution on the market and it saves more fuel for professional fleets. It is the only aftermarket solution that provides real-time, horizon-predictive eco-driving instructions backed by driver performance feedback, green route planning and pricing. MobiWize relates to impending road grades, vehicle weight and other characteristics that influence the fuel consumption to provide real-time, eco-driving instructions for fleet drivers with information defining the most fuel-efficient driving style on the road segment ahead. Instructions include acceleration and speed profiles, throttle position, timing to shift gears, when to activate the cruise control and at what speed. Additionally the system can accurately compare fleet drivers for eco-driving performance, fleet vehicles for fuel efficiency and routes for fuel cost per vehicle and weight.

**MOBIWISE FOR AUTOMOTIVE**
VIC was designed to empower the advanced driving assistance systems by artificially "visualizing" some of the key elements of the vehicle operating environment like vehicle/road characteristics that influence the safety and fuel economy. VIC applies on-board and crowd-driven sensor fusion in conjunction with its dynamic mapping and vehicle performance modeling to provide in real-time the necessary insights for decision making systems. These insights include dynamic information about road grades, vehicle weight, safe speed limits on road curvatures, road-tire traction quality, fuel-efficiency related information for powertrain systems and more. MobiWize empowers the vehicle control systems to realize a greater potential of automated driving functions.

**MOBIWISE FOR ROAD AUTHORITIES**
VIC for authorities in charge of road-health monitoring, uses crowd vehicles as road-health probes to deliver fully automated road-condition quality monitoring solution, providing "live" road-health data directly to control centers.

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TransBiodiesel Ltd.

Revolutionary Enzyme Catalysts for Biodiesel Production

Background
Biodiesel is an alternative fuel that is abundant, eco-friendly and politically popular. Consequently, many governments mandate the use of biodiesel within the fuel supply. However, the cost of production is high (including feedstocks and chemicals) and large financial incentives are necessary to make biodiesel production profitable and competitive.

Transesterification, the current method of producing biodiesel, requires the use of chemical catalysts to increase reaction efficiency. These catalysts are expensive, harmful to the environment and relatively inefficient. Moreover, chemical catalysts are effective only when converting high grade feedstocks into biodiesel. Much biodiesel is derived from food crops. This has led to steep increases in crop prices and crop shortages. The biodiesel industry urgently requires a new kind of catalyst: one that effectively converts cheaper, alternative feedstocks to food crops; significantly lowers costs; and improves production efficiency - all this whilst being harmless to the environment.

TransBiodiesel Solution
TransBiodiesel has developed an environmentally friendly and economically viable enzyme catalyst for the mass production of biodiesel. The company’s patent-pending technology modifies standard lipase enzymes to enable their application with short-chain alcohols, (typically methanol) used for the production of biodiesel.

The modified enzymes are combined with natural ingredients in a batch or continuous process that allows their discovery and reuse. TransBiodiesel’s catalysts maintain more than 50% of their initial reactivity after over 200 reaction cycles. As a result, the cost per kilo of catalyst is competitive with that of any conventional technology. It is projected that the next generation of TransBiodiesel biocatalysts will maintain activity up to 400 cycles.

Value Proposition
TransBiodiesel’s biocatalysts significantly cut the cost of biodiesel production, enable increased biodiesel production from alternative low-grade feedstocks, and reduce harm to the environment.

Approach to Market
The company established partnerships with leading enzyme and biodiesel producers. Partner companies will sell TransBiodiesel’s enzymes to their existing customers base. TransBiodiesel will therefore leverage its OEM and distribution partner’s existing marketing channels and operational capabilities to achieve faster penetration into multiple markets.

Market
Europe is the world’s largest producer and user of biofuels. Over 2 billion gallons of biodiesel are produced annually, equivalent to 50% of the global market.

Competition
There are currently no alternatives to the chemical catalysts used for the core transesterification reaction. Several companies have attempted to develop enzyme catalysts but the enzymes became deactivated during the production process. TransBiodiesel is the only company in the world to have succeeded in producing viable enzyme catalysts for biodiesel production.

Opportunity
TransBiodiesel is seeking a capital investment of US$5 million to increase its current production capacity from 100 tonnes to 500 tons p.a. of biocatalyst.

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Key Personnel
Dr. Sobhi Basheer, Co-CEO. Leading expert in enzyme technology with over 23 years of enzymatic technology experience; founder of Zeituna Ltd. and Enzymotec Ltd.; Recipient of the “Israel Start-up Company” award by the Israeli Ministry of Trade and Industry for the year 2009.
Mr. Nehemya Zamosh, Co-CEO. Entrepreneur and experienced executive, ex-CEO of Inran USA and head of the business activity of Transbiodiesel.

Dr. Ahmad Tafesh, Business Development. Entrepreneur with a comprehensive knowledge of organic chemistry; Formerly Marketing Director at Palindot Fine Chemicals (part of Israel Chemicals Group); Head of Homogeneous Catalysts at Raschig AG Frankfurt, Germany; Director of NPD at Lonza Group, New Jersey, USA; Inventor of over 30 patents in diverse areas in chemistry.

Company Status
Founded in 2007 at L.N. Technology Incubator
Status. Raised over US$12 million, including US$2 million in VC funding from Aquagro VC Fund, and US$4M from Zamosh group. TransBiodiesel has reached initial sales in Israel, USA, Canada, and Japan, set up the world’s first factories for the production of biodiesel.

Revenues
Company ID:

Established: 2009

Anaerobic system and process for the treatment of wastewater with high organic loads using a bio-stabilizer, a polymer-base impregnated with pre-treated microorganisms.

Main Applications:

- Municipal Waste Water Treatment Plants- WWTP
  - Upgrading of wastewater plant to improve throughput and cope with seasonal peaks.
  - Retrofit of plant to cut energy costs, produce more biogas, sludge volume reduction and other benefits
- New plant
- Agro- Industrial applications
  - Wineries
  - Olive Oil Mills
  - Dairy WW
  - Milking centers
The Technology (The product)

Pre-treated biomass, immobilized in a polymeric matrix mainly for high rate anaerobic systems.

The matrix provides physical protection for the microorganism, it has high stability and very large surface area. It enables the loading of X400 the amount of microorganisms compared to biofilm system.
The Need

Wastewater treatment plant (WWTP) are sensitive to high organic loads
In agricultural areas During the harvest period, the wastewater streams typically contain high organic loads that causes severe damage to the bacterial population leading to a complete termination of the WWTP operation for a period of up to 2 months.

Currently existing HR Anaerobic System are:

☑ Unstable
☑ Sensitive to “Suspended Solids” and Toxic compounds

The Challenge is to provide a solution that increase the stability of the treatment process.
Our solution - Pretreatment using immobilized microorganisms

A patented technology for a Bio-stabilizer, a multi-polymer base with embedded microorganisms

The stabilizing briquettes allow the microorganisms to tolerate higher toxicant

- A much stable process
- More consistent operation
- Higher effectiveness in the removal of inhibitory compounds

Green Technological Incubator Ltd.
The Result:

More stable process

substantial reduction of the organic load that enters the secondary aerobic treatment unit. -30%

Lower energy consumption required for the aeration tank- Potential savings

Lower quantity of sludge generated in the aerobic treatment stage

Lower operational cost- Reduced OPEX/CAPEX

Potential revenue from biogas
The core technology protected by a patent application at national phase (Europe and US)

2nd patent- Total solution for Wastewater plant patent-provisional submitted 2/2015.
Current status - From Lab to Demo Scale

- Lab-Scale (1 L) Domestic WW
- Pilot-scale (8 L) Cheese Whey
- Pilot-scale (150 L) Pre-Gat WWTP - Agro-Industrial WW
- Demo-Scale (4000 L) Karmiel WWTP Domestic WW
Karmiel WWTP- Upgrade Primary Settlers to Combined Settling/Anaerobic High Rate Systems
Karmiel WWTP scheme

- WW Inlet
- Bar Screen
- Grit Chamber
- Balance Tank
- Primary Settling
- Secondary Settling
- Tertiary Filtration
- Disinfection
- Effluent Outlet
- RAS
- Anoxic Tank
- Aerobic Tank
- Biogas production
- Sludge Thickening
- Sludge Digestion
- Sludge Dewatering
- Sludge Evacuation
Selected results

- COD$_1$ (mg/L)
- Hydraulic retention time (h)
- COD strain removal (%)
- TSS (mg/L)
- Hydraulic retention time (h)
- Influent
- Effluent
- HRT
- COD$_1$
- COD$_2$
- HRT
- TSS
- HRT
- TSS
Selected results - summary

- The removal COD of was 60% and 48% for retention time (HRT) of 8 hours and 4 hours respectively.
- The removal of TSS was 75% and 68% for the hydraulic retention time (HRT) of 8 hours and 4 hours respectively.
- The methane content is about 71-77.5% of the total biogas composition for the entire period.
- The biogas production rate is 1185 L/d and 997 L/d for HRT of 8 and 4 hours respectively. This rate is equivalent to COD removal that fits the observed COD removal.
Roadmap

Current (4 m³ pilot)

2015 (50 m³ Demo-scale)

2016 (Full-scale system - 500 m³)
LipoGreen has developed an environmentally-safe, nano-technology based solution to oil spill remediation

LipoGreen technology was developed at the Hebrew University By the international renowned professor Y. Barenholz (the inventor of the anticancer medicine DOXIL®)

Products applications:
• Highly effective Hydrocarbon physical leaching (from earth)
• Strong enhancer of bacterial oil decomposition
• Oil sheen condensation and Wetting effect (in salt/sweet water)

Company main achievements
• 2013 – End of 2 formulations development
• 2014 – Successful large scale field tests in Israel
• 2015 – End of second round fund raising

Company Goals
• Third Round fund raising - $2 mil.
• Establish large scale field test in the U.S/Europe
• Establish US and Europe client base
• Break Even, expand operations

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