

Plastechnology, Inc.: *Decisions, Decisions, Decisions*

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March 31, 2003: Mark Greene and Larry Quinn sat in a local café with apparent stress and frustration written all over their faces. They were anxiously poring over their Business Plan and doing some deep soul-searching. They wanted to be in business for themselves so badly they could taste the entrepreneurial thrill, but they were stuck. *"So what should we do?"* asked Mark. *"Should we take a chance and buy the equipment at auction tomorrow? Quit our jobs and 'go for it'?"* *"But how will we support our families?"* asked Larry. *"Maybe we should make a proposal to PrintroneX? There must be some way to pursue this idea. What is the right answer? I just wish we could figure out a course of action. I can't sleep".*

The idea: Mark Greene and Larry Quinn worked together at PrintroneX Corporation in the Plastic Materials Development department since 1999. These were intense times for PrintroneX. Their breakthrough color printing technology had been unveiled at the past stockholders' meeting, but the announcement was premature. Their printer was not ready for commercialization, and one of the glitches was custom plastic injection molded parts. Many significant quality problems persisted with these outsourced plastic components which prevented PrintroneX from launching the new color printing system. Dr. Edward Lane, the CEO, was driving the company very hard to solve the problems and to get the new printing system to market. Greene and Quinn were responsible for solving the quality control problems for the plastic components: gears, lenses, mirrors, the atomizer, the print head, and other critical parts. They traveled around the country, working with custom plastic molders to develop compliance procedures and manufacturing specifications, and to refine processes, materials, tool and part designs. After three years of this intensive traveling, Greene and Quinn began to wonder why there were so many persistent manufacturing problems. Perhaps the country needed a quality-oriented custom manufacturer of small, precision injection molded plastic parts for very demanding applications. They concluded that there was an opportunity and they began to get excited about the possibilities of launching their own business and filling what they believed to be an unmet market need. They had even thought of a name for their company: *Plastechnology, Inc.*

Mark Greene Mark, 34 years old, graduated from University of California with a degree in biology. He then went into the army for two years, doing research on optical materials. He spent two years at DuPont Plastics Company, working on improved plastic formulations as a development engineer. Currently, he is the Manager of the Plastic Materials Development Department at PrintroneX. Mark has a wife and two children - Adam, 5, and Debbie, 2 years old. They live in their own modest home, which has a sizable mortgage. Recently, Mark's father became seriously ill and his mother required considerable emotional support. Mark's family life is very important to him.

Larry Quinn Larry, 31 years old, graduated from Lowell Polytechnic Institute with a degree in Plastic Engineering. Throughout his professional career, Larry has distinguished himself as a creative product and process development engineer. Mark is Larry's boss in the Plastic Materials Development Laboratory at PrintroneX, and they enjoy a productive working relationship. Over the years, they have grown to be very close friends. Larry's family life revolves around his mortgaged home in the suburbs, his wife, his dog Winston, his children - Ingrid, 3 and Amber, 1 year old.

Professor Michael E. Gordon prepared this case as the basis for class discussions in entrepreneurship. Except for Larry Quinn's dog, all names and some peripheral facts have been disguised. Copyright © Michael E. Gordon 2010. Not to be copied, modified or used without the author's written permission. Contact the author at: AngelDeals@Yahoo.com

Injection Molding Injection molding is a high-volume manufacturing process which is capable of producing a wide variety of plastic parts from a broad range of plastic materials. In operation, plastic pellets are placed in the hopper and conveyed along the barrel under conditions of high temperature and pressure. The molten plastic is then injected into a single or multi-cavity mold, which is the negative image of the desired part. The molten plastic is allowed to solidify in the mold until the part is stable and can then be ejected. One machine has the capability of producing millions of parts per year.

Applications for thermoplastic injection molding are limitless. Virtually every sector of the economy uses plastic injection molded parts: medical, automotive, sports, recreation, electronics, custom industrial components, toys and other consumer products. The industry segment that concerns Mark and Larry is the demanding end of the market for small, custom injection molded plastic parts requiring close tolerance, lot-to-lot precision and unique materials. Because plastics are so ubiquitous, the industry is well developed and very mature. In fact, there is intense competition for work. Price undercutting is one main way for companies to try to gain a competitive advantage. Since the customer owns the molds, he can remove them at any time and place work with another molder. There are thousands of custom injection molders in the United States; most of them have thin profit margins. They range from unsophisticated 'garage shops' to highly sophisticated, highly instrumented manufacturing operations.

The market characteristics would be described as regional, engineering-oriented, equipment intensive, and strongly competitive, with a lack of competitive advantages.

The Auction Used molding equipment can be purchased 1.) from dealers, 2.) from private molders with excess equipment and 3.) through auctions. Although it is cheaper to purchase at auction, often times it is the wrong equipment and there are no warranties. The equipment is sold 'as is' - 'caveat emptor'. The molding equipment that Mark and Larry had seen at the auction preview was older technology, larger machines than they wanted, dismantled, but they were quite affordable. They estimated that they could buy the equipment for \$10,000 (two molding machines along with peripheral equipment). If new, they would have needed \$150,000. They could afford \$10,000 from their personal resources, but if they didn't purchase the equipment at auction, they had no idea how they could finance anything more expensive.

April 1, 2003 "OK, Larry. It's decision time. Today, April Fool's Day, is the auction. What are we going to do?" Mark and Larry had lumps in their throats from the excitement and uncertainty as the two of them pondered their future.

Questions for class discussions:

1. *Is this an opportunity, or just another idea? Should they pursue it?*
2. *What risks face Mark and Larry?*
3. *Are they truly entrepreneurs? Are they capable of actually starting this business?*
4. *Should they make a proposal to PrintroneX? If so, what is the proposal?*
5. *Either way, what are the next steps?*
6. *Should they buy the equipment at auction?*
7. *How do they raise money for this venture?*
8. *Would you invest if they approached you for capital?*

Custom injection molding is a B2B service to manufacture parts to other companies' specifications.



Injection Molding Machines



Horizontal Molding Machine



Vertical Molding Machine

Plastechnology

Executive Summary

January, 2011

The Company

Plastechnology, Inc. is a concept-stage company that will manufacture custom injection molded plastic parts for demanding applications. Custom injection molding is a subsector of the plastics industry wherein plastic parts are manufactured for original equipment manufacturers (OEMs) to their specifications. Our company will serve the niche market of customers that require small plastic parts, precision tolerances, unique materials and tight process control. Applications include optical plastic lenses, conductive plastics for static control, micro-switches, magnetic switches, self-lubricating gears, fire-retardant components, and the like. Plastechnology, Inc. will commence operations in Boston, Massachusetts beginning January 2012. Our value proposition for our customers is based upon unrelenting quality, technical expertise and our commitment to customer satisfaction.

Our Mission

To build a very profitable plastic injection molding company serving customers with technically demanding applications in the northeastern United States.

Strategic Keys to Success

- Aggressively go after prototyping business. If a customer is willing to spend significant money during product development, we will be the logical choice for volume manufacturing
- Productize the custom molding by producing double the order. The next order can then be shipped from inventory, eliminating the manufacturing set-up losses
- Selling, selling, selling to Fortune 1000 customers with demanding high-volume repeat applications

Market Characteristics

Applications for thermoplastic injection molding are limitless. Virtually every sector of the economy uses plastic injection molded parts: medical, automotive, sports, recreation, electronics, custom industrial components, toys and other consumer products. The industry segment that Plastechnology, Inc. will serve is the demanding end of the market for small, custom injection molded plastic parts requiring close tolerance, lot-to-lot precision and unique materials. Because plastics are so ubiquitous, the industry is well developed and very mature. In fact, there is intense competition for contracts. Price undercutting is one main way for companies to try to gain a competitive advantage. Since the customer owns the molds, he can remove them at any time and place the job with another molder. The market characteristics would be described as regional, engineering-oriented, equipment intensive, and strongly competitive, with a lack of competitive advantages.

Competition

There are thousands of custom injection molders in the United States; most of them have thin profit margins. They range from unsophisticated 'garage shops' to highly sophisticated, highly instrumented manufacturing operations. Our major regional competitors in New England are tabulated below:

Competitors in New England	Capabilities	Facilities / Equipment
Injected Solutions, Inc. Lanesboro, MA	Product design Engineering Prototyping Assembly / decorating	32 Injection machines 50 – 720 tons 5 to 120 ounce capacity 25,000 sq ft
Plastic Molding MFG Hudson, MA	Tool / part design Insert molding Laser Printing Hot stamping and staking	Glass, carbon, steel filled Liquid crystal polymers 80 – 770 tons 1.5 ounces to 10 lbs
Johnson Precision, Inc. Amherst, NH	3D Rapid Prototype Assembly / decorating Laser Marking Micro-welding	20 machines 28 to 200 tons 50,000 sq ft Mold making facilities
Northeast Mold and Plastics Glastonbury, CT	Two shot molding Insert molding Prototyping Process control	15,000 sq ft 28 to 300 tons Hi-technology Process control Tool design / engineering
Mars Plastic Products, Inc. Providence, RI	Thermoset Thermoplastic 3D Modeling Vacuum forming	100,000 sq ft 32 new molding machines Robotics CAM tooling

The Team

The Company has a strong management team of two seasoned technologists, having extensive experience in plastic engineering: materials, part design, mold design, process control and quality control.

Mark Greene, Joint CEO and VP Marketing: Mark, 34 years old, graduated from University of California with a degree in biology. He then went into the army for two years, doing research on optical materials. He spent two years at DuPont Plastics Company, working on improved plastic formulations as a development engineer. Currently, he is the Manager of the Plastic Materials Development Department at PrintroneX.

Larry Quinn, Joint CEO and VP Technical Development: Larry, 31 years old, graduated from Lowell Polytechnic Institute with a degree in Plastic Engineering. Throughout his professional career, Larry has distinguished himself as a creative product and process development engineer. He has developed several patents for PrintroneX. Both partners will share the CEO responsibilities of Plastechnology, Inc.

Financial Projections: (all numbers in \$ 000)

	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
Revenue Streams:					
Prototyping (\$ K)	30	50	1 80	320	750
Production (\$ K)	150	500	2,500	5,400	9,500
Consulting (\$ K)	30	70	120	180	250
Total Revenue (\$ K)	210	620	2,800	5,900	10,500
Cost of Goods Sold (\$ K)	170	420	800	3,600	6,300
Cost of Goods Sold (%)	80%	68%	64%	61%	60%
Gross Profit (\$ K)	40	200	1,000	2,300	4,200
Gross Profit Margin (%)	23%	32%	36%	38%	40%
Sales, General & Admin. (Total overhead expenses)	50	160	880	1,650	2,600
EBITDA (\$000) (Earnings Before Interest, Taxes, Depreciation, Amortization)	(10)	40	120	650	1,600
EBITDA %	-	6%	9%	12%	15%

Summary of Opportunity

Several factors have resulted in an attractive opportunity for Plastechonology, Inc.:

- o The management team is strong, motivated and experienced. Both partners bring technical, engineering and innovation talent to the business.
- o Revenue will come from three sources: Prototype development, production and consulting.
- o Technological expertise will drive the brand
- o Profit margins are attractive and will improve with volume and process refinement.
- o Timeliness. No competitor has emerged to completely fill this niche.

Plastechonology, Inc

302 Cary Ave, Boston, MA 02020

Tel: (617) 890-XXXX Fax: (617) 890-YYYY

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