

Site Selection for the Plastics Industry

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What is the fourth largest manufacturing industry in the United States after Motor Vehicle and Equipment, Electronic Components and Accessories; and Petroleum Refining? What industry over the past 25 years grew faster than manufacturing as a whole in terms of employment, real shipments and real value added? With the exception of raw materials and resins concentrated primarily in the Gulf Coast Region, what industry is virtually uniformly distributed throughout the United States? In case you haven't guessed it by now, the answer is Plastics.

According to the Society of the Plastics Industry, the Plastic Products Industry employs well over 2 percent of the nation's workforce amounting to over 1.5 million total workers. In addition, the rate of growth approached 4 percent in terms of real value added from the period of 1980 to 2001. As a result of technology innovation, more products containing plastic are being introduced. This new product development has accounted for much of this growth, which is expected to continue in the near future and beyond.

Competitive pressures have also provided much of the impetus for this growth. The "substitution effect", one of the principle market forces espoused by Michael Porter, has created the potential for continued and sustained growth in this industry. The market has demanded products that are more durable, lighter in weight, equally functional and aesthetically pleasing to replace industry standards such as wood, metals and fibers.

And did I fail to mention? These products must be provided at a lower cost, higher quality and only when needed. This conundrum, though difficult, is the environment in which plastic manufacturers must operate. Success in site selection requires an understanding of the forces that drive your location decision.

Industry Characteristics

Plastics manufacturers undertaking site selection activities include the same variables as do most other manufacturing operations. Operating costs, capital investment requirements, logistics, human resources, marketing, taxes, finance, incentives and a host of other factors are all considered. The difference in this industry is the relative importance of certain factors compared to others in the pursuit of long-term profitability and competitiveness. Consider the industry from a macro-perspective then zoom into your individual facility to see the importance of emphasizing the correct factors to assure success.

For example, the plastic resins industry is concentrated primarily in the Gulf Coast region, due to the abundant supply of raw materials and intense petrochemical infrastructure. The basic building blocks, called hydrocarbons, are derived from petroleum or natural gas and are in abundance in this region. Since hydrocarbons are the primary raw material, product pricing for this industry is somewhat sensitive to fluctuation in oil and natural gas. However, improvements in productivity through technology innovation can, and have, mitigated the impact raw material pricing has on final product pricing.

Producers of resins and the plastic materials, however, do not account for the majority of plastics manufacturing. Rather, plastic processors and converters constitute the bulk of manufacturing activity in the plastics industry. Since plastics products are generally bulky and/or lightweight and consequently expensive to ship long distances, the major customers of plastic processors include such durable goods producers as automotive firms and appliance makers. These firms prefer to have their plastic processors located nearby. As

a result, processors tend to be located in close proximity to manufacturing operations. Captive plastics processing operations are generally found at manufacturing sites such as auto manufacturing or food processing facilities where the sheer size of the customer justifies the establishment of operations in order to avoid expenses associated with transportation. The nature of the industry for processors and converters shows a marked sensitivity to the following:

- Transportation (time and cost)
- Workforce (quality and cost)
- Energy (reliability and cost), and
- Business climate.

Transportation

Most plastics processors sell intermediate goods to final manufacturers and assemblers. Classic location theory, where the economics of transport are driven by the weight to volume relationship between raw material and finished goods, essentially dictates that the market/customer drives the location decision. The traditional model of being in close proximity to major customers puts intense pressure on suppliers to adjust to the changes in market conditions. Manufacturers and assemblers require that their suppliers exercise just-in-time (JIT) and just-in-order (JIO) practices for product delivery, while at the same time maintaining the capability to vary production output to match theirs.

Add to this the recent trend in manufacturing to share design responsibilities between customers and suppliers, and close proximity becomes both a cost and a quality issue. In some respects, the coordination and transfer of information that directly affects quality control is almost as important as the cost of transportation. To a degree, the cost relationship between supplier and customer is institutionalized such that there is very little flexibility to affect profitability except through one of the four forces mentioned above.

Excellent transportation infrastructure, then, is a prerequisite to the successful operation of a plastics manufacturer (and a key site location factor). Whether raw materials to the processors are delivered via rail or truck, the infrastructure must be able to support the most reliable, consistent and flexible means of delivery needs unimpeded by potential delays. Factors to look for include direct access from either mainline rail routes or interstate highway corridors with interconnects that allow raw material to be delivered expeditiously with the minimum amount of handling or rerouting and consequently cost.

Workforce (*Skills and Mechanical Aptitude*)

Plastics-working machine operators set up and tend machines that transform plastic compound-chemical based products that can be produced in powder, pellet or liquid form into a wide variety of consumer/intermediate products. Typically, there are three specialized occupations that include tenders, operators and setters. Tenders remove the cooled plastic form molds loading the product into boxes or pallets. Operators maintain the many gauges and digital inputs into the machine to maintain quality. Setters, or technicians, set up the machines prior to operations and are responsible for repairing any major problems. A trend in the industry is an increase in automation that simplifies the manufacturing process such that greater importance is placed upon well rounded basic skills and mechanical aptitude as opposed to simple labor intensive routines. Machinery is becoming more complex and floor organization is changing in such a way that employers are increasingly looking for persons with good communications and interpersonal skills to augment technical and basic understanding of mechanics.

A flexible workforce is common due to 40-hour weeks that typically include overtime and 3-shift operations. The ability to perform multiple tasks in the manufacturing process requires basic skills in math and reading comprehension. Market forces are requiring less labor inputs and consequently increased skill levels to accommodate technology and productivity improvements. The SPI (Society of Plastics Industry) has established a certification program in the industry as a de facto standard. For instance, to achieve a machine operator certification, 2 years of experience operating a plastic-processing machine is recommended and

passing a competency based exam is required.

When considering communities and regions for your next site, be sure to negotiate or require the existence of local training programs. The quality of the workforce (and your bottom line) can be significantly impacted by the availability of a technical school curriculum. In the best-case scenario, this curriculum should be available at both the high school (i.e. a tech-prep program) and at the local community college that offers an associate degree (or equivalent). In the absence of such a program in the community, whether due to community resources or simply the lack of industrial demand, an active customized training program should be provided by the state. This training program should be capable of ramping up quickly to meet the needs of the manufacturer for both the short- and long-term, and available for training new hires, or retraining of existing employees. Subsidies to the employer from state and/or local agencies are typically available in some fashion; however, it is usually contingent upon the creation of new jobs. An innovative approach, though exceedingly uncommon in practice, is the consideration of either new job creation, or capital investment in technology investment, as the qualifying criteria.

Energy

Plastics manufacturing is relatively energy-intensive and energy costs and reliability play an important role in the location decision. Since proximity to the customer is an important consideration, it may appear that the manufacturer is captive to the whims of the local power company. However, if you consider the relationship between the processor and customer, it becomes apparent that non-competitive power rates will funnel through the entire supply chain and could have a significant impact on more than just the plastics processor. In some instances, the real benefactor of low-cost energy is not the plastics processor. Rather, it is your customer base because of the very close and structure supplier/vendor relationship.

In the current deregulation environment, competition has driven down the cost of power in many regions, which is a double-edged sword. While the adjusted cost of power over time has increased much slower than just about every other input into manufacturing, this benefit is not without a cost. Many utilities are no longer willing to provide deep discounts. Moreover, they oftentimes will not supply capital investment to serve customers without a long-term purchase agreement (a condition most customers are reluctant to do). A compromise can be achieved by offering to assist in design and load control planning to lower costs, or capitalizing investments in equipment/improvements that are incorporated into a power purchase agreement acceptable to both parties. Typically, plastics manufacturers provide a fairly constant load, a desirable trait for most power companies and a key point of negotiation.

Reliability can be as important as the cost of power. Fluctuations in power and power interruptions could result in a major shutdown, extensive maintenance, debugging/cleaning and restart of equipment – a very costly event. Even minor fluctuations that do not result in a shutdown can cause major problems. The trend of substituting plastics for traditional materials (such as metals and wood) while still maintaining strength, aesthetics and precision fit, requires that quality control measures are implemented and maintained throughout the production process. A "parts reject incident" cascades throughout the entire supply chain, affecting both the supplier and customer as well as other vendors dependent upon the customer's smooth and efficient operations. As a result, reliability of power is a very important consideration, too often taken for granted by both sides of the table.

Business Climate

This phrase has many definitions. The business climate for the plastics manufacturer can best be described as that location that provides a clear and distinct path to efficient and timely start-up, manages ongoing operational compliance with the minimum amount of bureaucratic intervention, is highly cost-effective and maintains an environment of both legislative and community goodwill and support.

This definition is not much different than would be expected for any manufacturer; however, the plastics industry has a few nuances that are important.

From a regulatory perspective, environmental compliance should be relatively easy. Manufacturing processes are well documented with abundant historical data that can be acquired from multiple sources. However, in some cases, the business environment of a community can be less than stellar. Be cognizant of a permitting and regulatory environment that is onerous due to excessive paperwork or lack of attention. An inefficient government agency can be very burdensome to you and should be an area to avoid, if possible. The community that provides streamlined procedures and accommodates your needs is something to consider.

Low cost operations and efficiency are the watchwords of this industry. The availability of trained and skilled workers can have a significant impact on total costs, particularly in a highly automated facility. Therefore, a crucial element to seek is a community pre-employment and ongoing training program. These programs allow manufacturers to select highly motivated and capable workers. A community that shapes the culture of the workforce, as well as develops skill sets is a good candidate to consider.

Last, but not least, is an atmosphere amenable to doing business that is manifested not only in the actions of the community's leadership, but also demonstrated in legislation that encourages employment, capital investment and growth. Traditionally, this means incentives in the form of credits, abatements, in-kind services or other means to encourage industry not only to locate in the region, but also to expand.

Conclusion

The plastics industry is growing at a healthy rate with employment and investment consistently expanding. Opportunities abound, whether you are looking to expand to gain market share (or new markets), or move your facility to reduce costs. The industry is changing, with technology becoming an integral part of the cost equation. By concentrating on the important factors for site selection, you can find the optimal site and increase competitiveness for your company.

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