Trends in Industrial Investment Decision Making

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ABOUT THE AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY (ACEEE)

ACEEE is a nonprofit organization dedicated to advancing energy efficiency as a means of promoting economic prosperity, energy security, and environmental protection. For more information, see http://www.aceee.org. ACEEE fulfills its mission by:

- Conducting in-depth technical and policy assessments
- Advising policymakers and program managers
- Working collaboratively with businesses, public interest groups, and other organizations
- Organizing conferences and workshops
- Publishing books, conference proceedings, and reports
- Educating consumers and businesses

Projects are carried out by staff and selected energy efficiency experts from universities, national laboratories, and the private sector. Collaboration is key to ACEEE's success. We collaborate on projects and initiatives with dozens of organizations including federal and state agencies, utilities, research institutions, businesses, and public interest groups.

Support for our work comes from a broad range of foundations, governmental organizations, research institutes, utilities, and corporations.

EXECUTIVE SUMMARY

Energy efficiency investments in the industrial sector are made differently from those in the commercial and residential sectors. Retrofit opportunities are much more limited in the industrial sector, and project cycles can be substantially longer in order to coordinate with overall plant refit cycles. However, the efficiency savings in the industrial sector can be large and very cost-effective when implemented as part of a normal capital investment cycle, while also offering substantial productivity benefits.

At the *2007 ACEEE Summer Study on Energy Efficiency in Industry*, many manufacturing sector program managers noted recent changes in energy efficiency investment. Manufacturers have been reluctant to invest in energy efficiency and have further deferred domestic investment due to domestic market uncertainty and global investment opportunities. These investment changes have occurred over the past few years, and are anticipated to continue in the short run, particularly as access to capital is constrained by nervous lending markets and the uncertainty in the global outlook persists.

Economic indicators, however, suggest that the industrial sector is poised for a new period of major capacity investments because existing capacity is approaching full utilization. Without new capacity, industry will not be able to meet growth in demand for its products. We are already seeing industries such as steel begin to make major capacity investments of the kind not seen in a generation.

In addition, a number of market trends are beginning to favor a shift to domestic production for domestic consumption. One important trend is the dramatic increases in marine freight costs that are offsetting much if not all of any benefit in manufacturing overseas. Combined with a relative decrease in the price difference between U.S. and global energy markets and a weak dollar, we see some manufacturing beginning to return to the U.S.

Currently, a number of market forces appear to be encouraging many industries to defer investment plans for the immediate future. The forces deferring investments include global market uncertainty, tight capital markets, and the unsustainable tight markets certain industries have created to increase prices.

In the near future, many industries will enter a new period of major capacity investment. This period will represent a major opportunity to influence the energy efficiency of these facilities for generations to come. The challenge is that program managers must begin engaging their industrial customers now, so the programs are positioned to exploit a rare opportunity to change energy use patterns for years to come.

INTRODUCTION

Many studies have suggested that the industrial sector, and in particular the manufacturing subsector, represents one of the largest magnitude and lowest cost energy efficiency resources available in the United States (Nadel, Shipley, and Elliott 2004). Most utility and public benefit programs are under-realizing energy efficiency savings in the industrial sector (York and Kushler 2008). If programs are to realize more energy efficiency savings, they will need to do a better job of understanding how industrial firms make investment decisions.

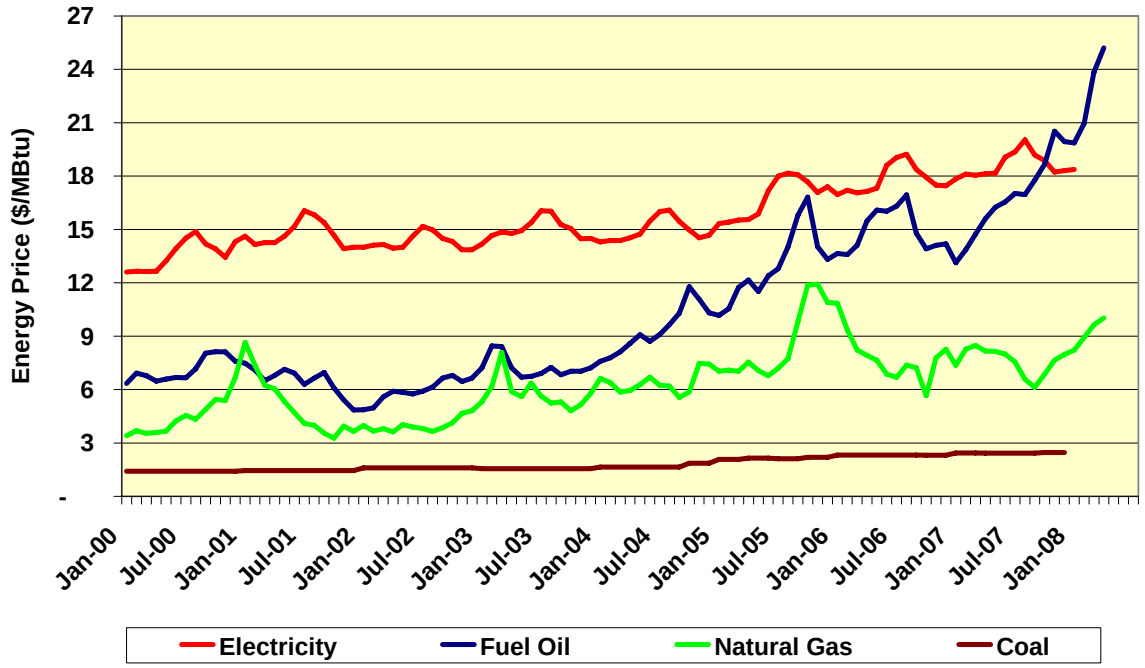
Industrial firms do not make energy investment decisions separately from investments in other aspects of their operations. However, industry makes most investment decisions differently than is common practice in other sectors of the economy such as individual or commercial consumers. This industrial decision process results from the manufacturing process-focused nature of most of the assets at industrial facilities, and the emphasis on the continuous operation of these assets. If one is to influence industrial customers toward greater investment in energy efficiency, it is important to understand how industrial decisions are made. In particular, industry makes all investment decisions in cycles that vary by industry, with multiple external market factors affecting these decisions. Understanding investment cycles and market challenges facing industry is necessary if energy efficiency program managers are to be effective in achieving energy savings for industrial customers.

Complicating the challenge for energy efficiency programs is that the industrial sector is in flux at this point in time due to various market trends. These economic trends can help inform us as we anticipate future behavior. Unfortunately, economic trends are really only seen in retrospect. While an understanding of the current situation is important, the reader needs a context of what has transpired over the past decade to frame the understanding of current and future trends.

Over the past 10 years, the economic outlook for industrial customers has changed due to the volatility in worldwide and domestic markets. During this period, factors such as energy prices (see Figure 1), industrial consolidation, and globalization have influenced industrial investment decisions. Today's energy efficiency program managers can learn a great deal about industry's probable future energy efficiency investment activity by looking at how industrial investment behavior has responded to general market trends over the past decade.

When industrial energy customers choose to make large investments, energy efficiency program managers have an enhanced opportunity to encourage them to make energy efficiency investments. Thoroughly understanding industry's investment behavior provides much needed clues to how program managers ought to respond to current market conditions in a manner that encourages maximum energy efficiency investment and provides maximum benefits to industrial energy customers.

Figure 1. Average Monthly Industrial Energy Prices



Source: ACEEE from EIA Data (EIA 2008)

This report will review industrial investment decision making, as the authors understand it, and present their insights into recent market trends. The report will attempt to address several important questions:

- How should energy efficiency programs be responding in the near term?
- What investment trends are likely to emerge over the next 3-5 years?
- How can programs position themselves for future opportunities?
- What are reasonable energy savings expectations in the near and long term?

We hope that these answers may prove valuable to industrial program managers in their planning efforts, and encourage better communication between programs and their industrial customers.

Capital Investment Cycles

Industry investments coincide with plant operational cycles (see Steinmeyer 1998). Operational cycles reflect needs for maintenance due to heavy wear, changes in product mix, and incorporation of modernized technology at a facility. However, routine outages for maintenance often occur between cycles. These brief outages focus on system reliability problems and seldom involve major equipment change-outs. The cycles vary in length, determined by the rates of technology and product change and the need for major system maintenance. For example, a glass factory's interval can run a decade or more, while a high-tech facility's interval may consist of only a few years.

Typically, these cycles can run 4-7 years, but will vary according to market forces and industry-specific needs. The influence of external markets was clearly demonstrated after Hurricanes Katrina and Rita. Petroleum-refining facilities sought to defer maintenance and upgrades as they tried to push plant output to meet demand. Although refiners were able to obtain high prices in tight markets, deferred maintenance resulted in unscheduled outages in early 2007 (EIA 2007).

Most opportunities for industrial sector energy efficiency exist within the confines of a specific process. Unfortunately, firms are often unwilling to incur additional costs and risks associated with interrupting a process for modification. For this reason, industrial program managers have had limited success with retrofit measures outside of major refit cycles. During intervals, equipment failure represents an opportunity for improvements in efficiency. These failure opportunities can be capitalized upon by replacing the failed component with a more efficient, interchangeable component. For example, a more efficient, compatible motor can often replace an older failed motor at a modest incremental cost. Most upgrades of operating equipment will be deferred until the next plant level refit when energy efficiency measures can be included among larger, cyclic investments if they were identified early in the planning cycle (typically 12-18 months prior to initiation of refit). The efficiency savings implemented as part of the process refit can be highly cost-effective, since incremental costs attributable to the efficiency measure are very small.

Additionally, external market forces drive industrial cycles. A number of major materials manufacturing industries have progressed through macroeconomic cycles during the last 15 years. Current and anticipated market demand for the facilities' product will influence these macro cycles. Global corporate consolidation, a reduction in excess manufacturing capacity, and a shift to secondary[2] production have influenced aluminum and steel industry cycles. These effects have allowed manufacturers to increase prices relative to the cost of production, while allowing a positive rate of return on net assets. In the organic chemical industry, the domestic price of feedstocks has dramatically increased, leading to a shedding of domestic capacity. When faced with these situations, industries eliminate the least productive and cost-effective capacity. As this occurs, they shift production to higher performing, more energy-efficient facilities, thus reducing production costs. The increase in base energy efficiency of facilities is the result of consolidation and investment in more efficient technologies. We will discuss these macro trends in greater depth in the next section.

Review of Industrial Decision Making

Currently industrial energy efficiency programs concentrate efforts on improving efficiency in currently operating plants. It is evident that retrofitting equipment and practices in existing industrial firms has limited total potential. Investments for energy efficiency achieve the greatest benefits when incorporated into new plant construction or before extensive refits of existing facilities. By examining current and projected economic trends in the industrial sector, an efficiency program can anticipate when the next large cycle of construction,

[2] "Primary" refers to production from virgin feedstock (e.g., iron ore). "Secondary" refers to production primarily from a recycled feedstock (e.g., steel scrap).

infrastructure, and capital investment will occur. The program can then maximize the potential for deployment of energy efficiency technologies in the marketplace.

Timing of Investments

Calculation of simple payback is one of the most common methods to evaluate a capital improvement. The payback period is defined as the period of time during which the initial capital expenditure of an investment is recouped. Engineers in particular use payback as their economic evaluation criteria. Many firms arbitrarily select a specific payback period as a method of investment appraisal. For example, in 1995 U.S. DOE's Industrial Assessment Center (IAC) program surveyed 104 business managers of small and medium-sized facilities. Eighty-six percent of respondents stated that a payback period of 24 months or less is attractive for energy efficiency recommendations. Fifty-five percent of respondents replied that they would prefer a payback period of 12 months or less (Muller, Barnish, and Polomski 1995). In contrast, some larger companies or companies with significant corporate backing often accept 3-year paybacks, as they are generally more comfortable with higher levels of risk (Pye 1998).

Major energy efficiency investments are also sometimes reviewed on a capital budgeting basis, where the internal rate of return on a project is a way to evaluate these discretionary investment opportunities. This rate is a measure of growth of an investment, and can be compared to other large capital projects or potential external investments. Investment decisions made within this framework are made well in advance of the actual investment, as funds must be identified and approved prior to the beginning of any given fiscal cycle (Jones and Verdict 1995).

Though traditionally important in decision making, payback considerations are no longer the priority when facilities determine future investment. Currently manufacturing firms' primary concern is maintaining and improving production and output. Plant managers or business owners value increased productivity as well as compliance with building, labor, and environmental codes in order to maintain operations. Investments directly related to these aspects of business operations are the highest priority. Investments related solely to the reduction of expenses are not currently receiving the same amount of attention.

Energy efficiency usually falls under the category of "reduction of expenses," unless other benefits like additional environmental and productivity improvements can be attributed to a project. Fortunately, many technologies that improve energy efficiency also offer these "co-benefits" in productivity, safety, or environmental performance. Improvements in productivity and quality contribute to the economic attractiveness of a given technology and may be the largest deciding factor when considering technology investments (Martin et al. 2000). Unfortunately, many industrial firms, large and small, frequently fail to account for such non-energy benefits. Small firms in particular have difficulty quantifying ancillary benefits and rarely include them in cost analyses (Pye 1998).

Energy efficiency investments are also placed into a broader context by considering the plant's investment cycle — e.g., whether a proposed investment is part of a retrofit of in-

service equipment or a major refit. For context evaluation purposes, the lifecycle of manufacturing plants can be divided into four stages:

(1) *New Plant*: At this stage, all initial equipment investments in a plant are complete. No more investment is required.
(2) *Operating Plant:* At this stage, the plant expenses include operating and maintenance costs.
(3) *Old Plant*: This stage is characterized by old or outdated equipment in which basic maintenance is infrequently performed.
(4) *End of Life*: This is the point at which a plant is either completely refitted or demolished.

Lastly, the likelihood of investment changes is based upon the facility's position within the company's overall production capacity. Necessary but less financially attractive investments are frequently made at "flagship" plants, while even some highly financially attractive investments are less likely to receive funding at marginal facilities. This apparently anomalous behavior results from the likelihood of the flagship facility's continued operation during economic downturns, while marginal faculties will be closed (Steinmeyer 1998). It is important to understand the individual plant's position within the company's assets, as well as trends in the industry as a whole.

EMERGING DECISION TRENDS

During the past 2 years, U.S. industry has endured market uncertainty along with fluctuating energy prices leading to a tenuous investment climate. Economy and industry-wide energy price uncertainty during this period began with the natural gas "crisis" of 2000-2001 when natural gas prices soared over a brief period. Surging gas demand combined with a number of market forces to create a very tight market. While these tight markets created an environment that was exploited by some market players, the market-changing events ushered in a new period of energy-resource constraints that persists today (see Figure 1). Hurricanes Katrina and Rita further tightened the supply market and compounded the growing concerns over the future possibility of climate change regulation (Elliott 2006).

Increases in the price of fossil fuels occurred in the aftermath of these storms, with further increases predicted for the next few years (Elliott 2006; *Power Magazine* 2006). As a result, industries anxious about current and future business climates are deferring their investment decisions. In addition, the increased prices of commodities like metals are increasing the costs of these investments and have further discouraged investments (Campoy and Gold 2007; Cable and Sano 2008). Dewitt and Leahy (2006) conclude that economic "uncertainty causes delay" in standard investments, while "delaying investment in the face of an uncertain future" provides a perceived flexibility gain that can feel safer than sticking money into something illiquid like machinery.

However, a number of indicators and trends suggest we may be poised to experience an increase in domestic manufacturing capacity. We will now look at some of these indicators.

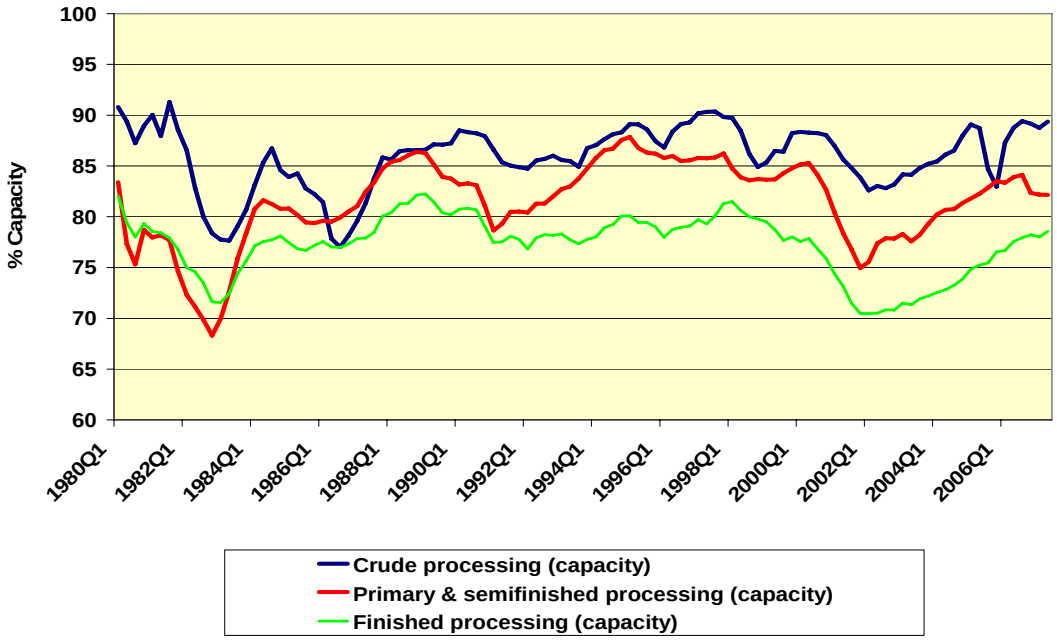
Market Consolidation and Capacity Utilization

One important economic indicator for the industrial sector is capacity utilization. The capacity utilization rate describes the extent to which an industrial sector's production capabilities are actually being used to produce the current level of output. The Federal Reserve (Yamarone 2004) defines production capacity as "the greatest level of output that a plant can maintain within the framework of a realistic work schedule, taking into account normal downtime and assuming sufficient availability of inputs to operate the machinery and equipment in place."

Industry made major capacity additions in the 1970s. A slowing economy in the 1980s resulted in a decline in utilization as available capacity exceeded market demand. Excess capacity during the 1980s depressed prices for many products ranging from primary materials to manufactured goods. Beginning in the late 1980s and throughout the 1990s, industrial consolidations and increased growth in demand eliminated much of this excess capacity. Concurrently, industry's productivity increased dramatically from the 1980s until early this decade (as is discussed in the next section), increasing industrial capacity without requiring investment in new production infrastructure and new plants.

An economic downturn followed the 9/11 attacks. But since 2002, industrial capacity utilization for finished (consumer-level) goods has been on a steady upward trend (see Figure 2). For primary and semi-finished goods processing (the raw materials that manufacturers purchase to make finished goods), a similar upward trend is seen, with a small dip in the 3rd quarter of 2006 due to economic disruptions caused by Hurricanes Katrina and Rita. Since the hurricane-caused disruption of crude oil processing capacity in the 3rd and 4th quarter of 2005, utilization has recovered to levels close to historical records.

Figure 2. Utilization of U.S. Manufacturing Capacity from 1980-2006



Source: Federal Reserve 2007

In general, a high rate of capacity utilization is a positive indicator of economic health. When capacity rates are high or increasing, industry is more likely to make investments, as new market entrants look to get into the game and provide additional capacity, and existing players see the potential for increased revenues with expanded capacity. The data for the past 3 years indicates that capacity rates for crude, primary/semi-finished goods, and finished goods are approaching the historical highs of the early 1980s and late 1990s. This situation suggests that industry is preparing to make a new round of investments to expand productive capacity.

The steel industry is one of the most visible of the resurgent manufacturing industries. Global and domestic steel markets are booming in spite of the economic slowdown and soaring prices for iron ore, scrap, energy, and other production feedstocks. U.S. mini-mill operator Nucor and German steelmaker ThyssenKrupp recently announced plans to build new "green-field" mills,[3] and major expansions are planned at about a half-dozen existing mills, including Russian steelmaker Severstal's announced plans to invest more than a half-billion dollars in the Sparrow's Point mill it recently acquired from ArcelorMittal (Fletcher 2008; Matthews 2008a).

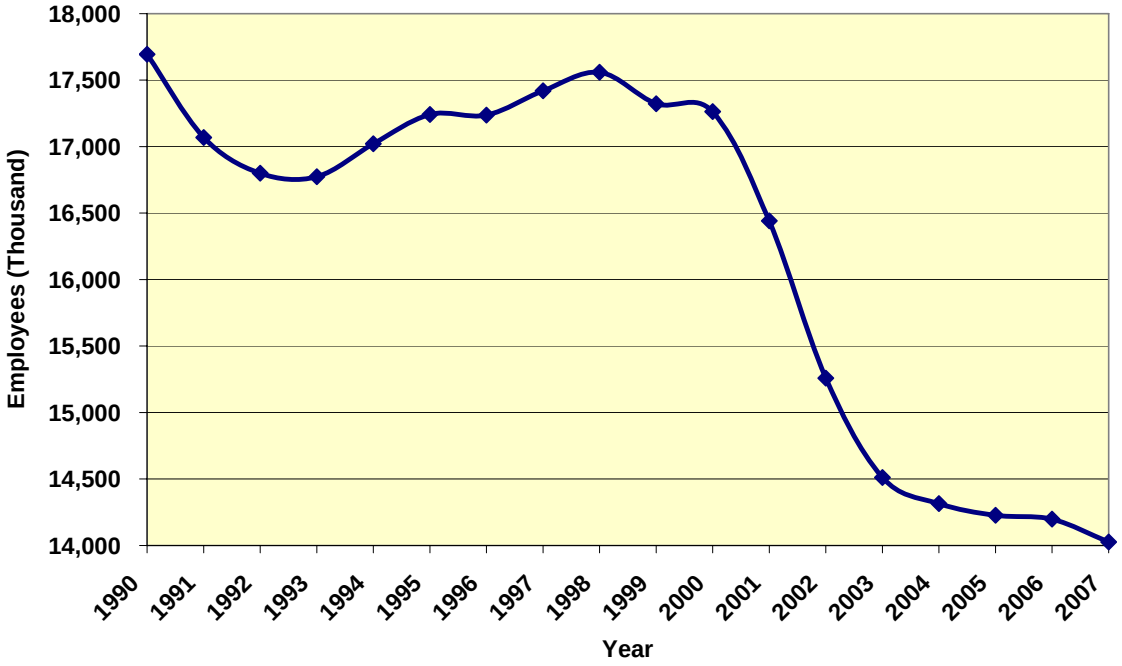
Manufacturing Employment and Productivity

Labor costs are among the largest manufacturing expenses, which also include materials, energy, and equipment costs. Labor expenses frequently compete with capital expenditures in manufacturing facilities (Monroe 2007). Investigating the trends in labor costs, unemployment figures, and employee productivity can help sharpen the view of what the investment picture may look like in the near future.

According to the Bureau of Labor Statistics, manufacturing employment continues to fall (see Figure 3) as jobs shift from manufacturing into the service sector. Hourly wages continue to increase (see Figure 4) for both manufacturing and non-manufacturing jobs. While manufacturing wages have historically been higher than for other private employers, it appears that the wage gap between manufactures and non-manufacturers has closed. Since 2006, wages between these two sectors have equalized. Labor productivity (see Figure 5) has mostly declined since 2002, suggesting that there has been a slowdown in capital improvements. Equipment investment typically coincides with increased output per employee. This situation suggests that the industrial sector may soon experience a new capital investment cycle.

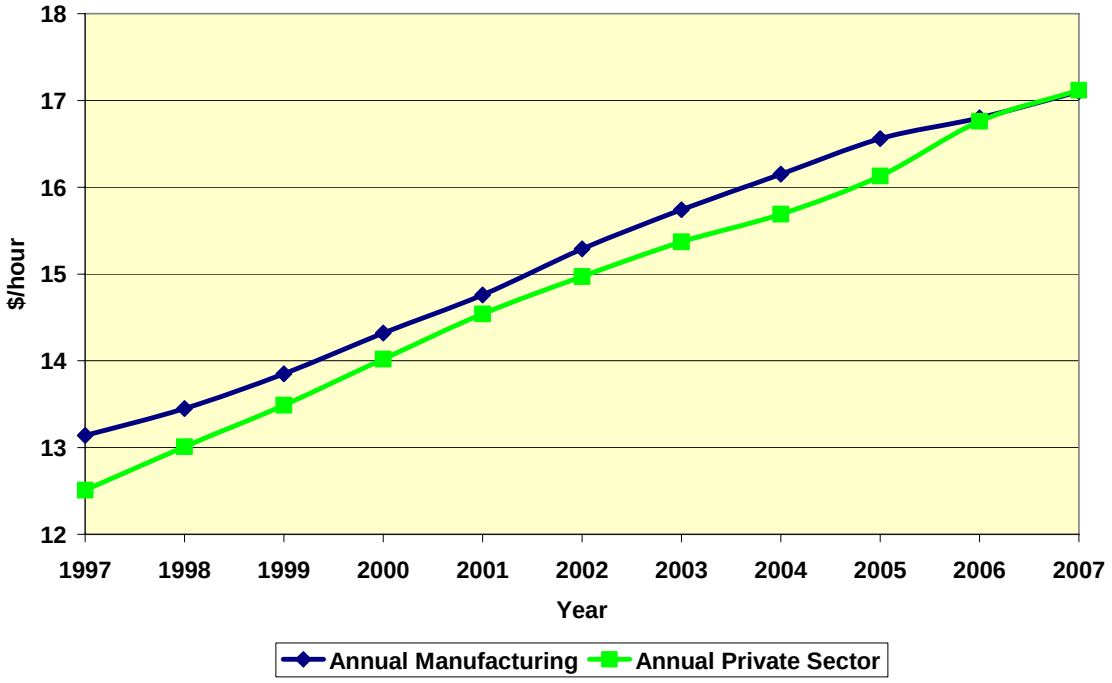
[3] A green-field manufacturing plant is a facility built on a site that was not previously used for manufacturing.

Figure 3. Manufacturing Employment



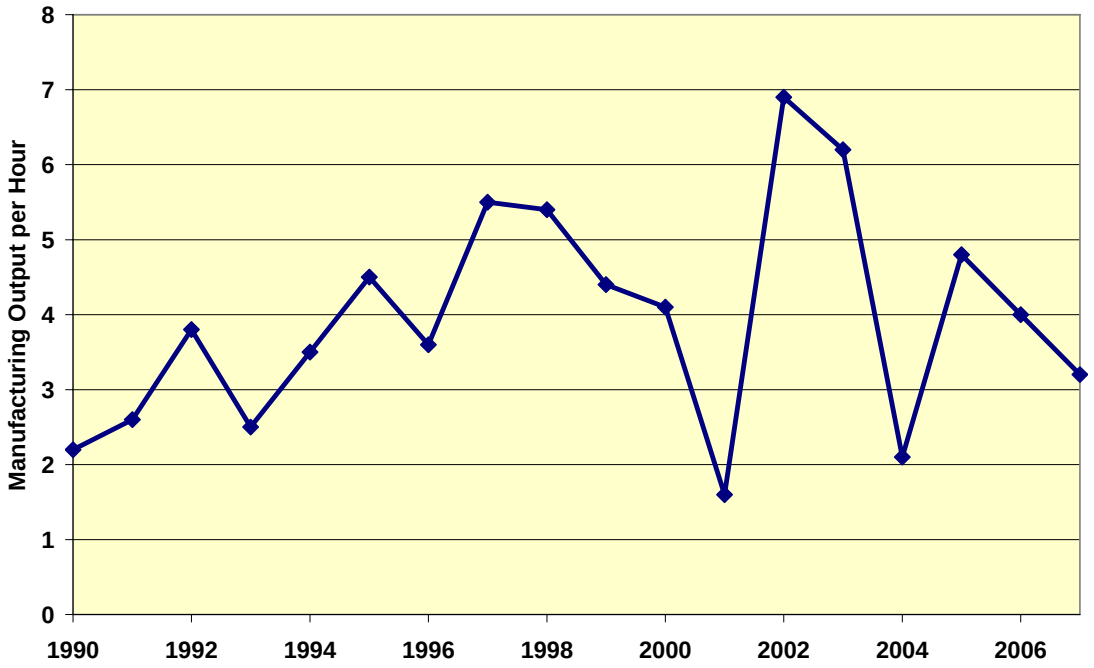
Source: BLS 2007

Figure 4. Average Hourly Earnings



Source: BLS 2007

Figure 5. Change in Labor Productivity Index



Source: BLS 2007

Freight Costs versus Domestic Production

Further complicating the outlook for domestic industry is the high cost of global freight. The cost of marine freight has dramatically increased over the past few years due to a shortage of ships and increased energy costs. For example, the cost to ship a 40-foot container from Shanghai to the U.S. has increased from about $3,000 in the early part of this decade to close to $8,000 currently, with bulk commodity shipping rates having increased almost 280% in just the last year (Matthews 2007, Aeppel 2007, Rohter 2007). These increased fright costs have made domestic manufacturing more attractive. CIBC World Markets estimates that the recent increase in marine freight represents the equivalent of a 9 percent trade tariff. "The cost of moving goods, not the cost of tariffs, is the largest barrier to global trade today," the report concluded, and as a result "has effectively offset all the trade liberalization efforts of the last three decades." (Rohter 2007).

Additionally, carrying cost of shipped inventory further offsets increased domestic costs of production, and with container ships having slowed their top speed by 20% to save fuel, the inventorying costs are increasing further (Rother 2007).

Change in Global and Domestic Relative Commodity Prices

The domestic price of energy (and in particular natural gas) adversely affected domestic manufacturing in the early part of this decade (Elliott 2006), resulting in significant demand destruction in the energy-intensive manufacturing subsector. While commodity prices including energy have soared in the past few years, the increases have been global and much

of the dramatic price differential seen early in the decade has diminished or reversed (Cable and Sano 2008). For example, plans to site aluminum smelters in the historically low energy cost Persian Gulf have stalled as energy costs have soared in the region and the aforementioned marine freight increases have made these investments less attractive (Matthews 2008b). Tight demand has allowed firms to pass along the increased costs of production to their customers (Campoy and Eaton 2008; Tattum 2008; Dorfman 2008; AP 2008).

In some cases, these tight markets have yielded what might appear to be anomalous behaviors. For example, some manufacturers have said that they are able to pass along, and in some cases even earn, a return on increased energy costs (Monroe 2008).

OUTLOOK FOR INDUSTRIAL INVESTMENTS

These trends combined with recent declines in the dollar relative to other currencies make domestic production even more attractive. Current economics suggest there will be increased investments in domestic industrial capacity, much as we are already beginning to see in the steel industry (Fletcher 2008). However, there is a seeming perplexing domestic hesitancy toward making new capital investments in many industries. A number of near-term factors may be discouraging companies from entering a new investment cycle.

Capacity cycles are also an important consideration for plant managers looking to invest in energy efficiency improvements. While investments may not be being made today, that does not mean that they are not being planned. ACEEE's recent private discussions with individual manufacturers and state-level associations suggest that this planning is already taking place and that these projects are awaiting the next major plant refit cycle.

Investments are positively related to product prices. Investment is often high when product prices are high relative to historic levels. However, when facilities make low-priced products, they face problems when faced with high input prices such as energy, labor, or inefficient equipment. They cannot pass along these increasing costs since they typically compete strongly on price, and have minimal available investment funds to direct toward plant improvement.

Somewhat counterintuitively, the current ability to pass on energy costs removes a traditional motivation for energy efficiency investment — reduction of cost. As a result, in the current environment, a firm may be motivated to tighten the market (or at least not rush to expand production) to make an additional profit in the near term, while also readjusting the market's price expectations for its product in the longer term. Tightness in a market is rarely sustainable, because an abnormally tight market is likely to add additional capacity. As new entrants seek to reduce their manufacturing costs to gain greater market share, they will drive down prices.

Recently, ACEEE has begun to hear a new concern emerge that may also be discouraging expansion — work force. This issue emerged at a recent U.S. Senate briefing on the U.S. DOE's Industrial Assessment Center program, where demand for trained staff for the

manufacturing sector was identified as a major concern (Muller 2008). ACEEE's conversations with companies and associations suggest that some companies see this as a limitation to the rate of expansion (Monroe 2008; Murray 2008; Vassey 2008).

The near-term outlook for the U.S. economy and a number of global factors (including climate change, political instability, and globalization) increase the uncertainty of domestic capacity investments. Often, multinational companies have investment opportunities in other countries to serve rapidly growing markets, such as we currently see in Asia. As a result, these companies may defer major domestic projects in order to invest in growing markets. As was previously noted, with aluminum and steel this trend is beginning to reverse.

Further, the recent economic problems stemming from the unraveling of sub-prime mortgage investments and related financial products have also reduced the availability of financing options as some lenders have less funding available and many are currently seeking lower level of risks. Thus, some firms may be awaiting a more favorable lending environment to move forward with major new capital capacity investments.

These current market conditions are not sustainable in the long term. Once the economy outlook for the U.S. becomes more certain, the industrial sector is likely to enter a long-term period of capacity investment as is being seen in steel. It has been 30 years since the last period of major infrastructure investment, and industry observers suggest we are due for a new investment cycle (Monroe 2007, 2008).

SUGGESTED ENERGY EFFICIENCY PROGRAM RESPONSES

Considering the current investment climate, what should energy efficiency programs do? There may be two different answers: one for the immediate future and one for the longer term. And, to be sure, an important element of any strategy is engagement with individual firms, since investment decisions are usually facility-specific.

Strategies in the Near Term

Cost savings has been the primary selling point of energy efficiency measures to industrial consumers in the recent past. But some facilities are currently investment-averse, and thus find this approach less compelling than in the past. For facilities in tight markets, smaller investments that can increase the productive capacity of the existing facility present a more compelling case for investment because they allow the firm to produce more high-value product without the expense and delay associated with major new capital investments.

Program managers should use this period of deferred investment to establish a relationship with the facility and its industry. A close relationship will allow the program managers to obtain advance indications of changes in the firm’s strategy for the facility and better position themselves to become involved with new investment decisions when planned. Managers should develop:

- A firm relationship with industrial consumers;

- An awareness of investment plans for specific firms during or prior to a planning phase, and;
- An understanding of the market forces that are currently influencing industrial customers.

It is also important to have reasonable expectations during this investment-averse period. The ability to encourage major new energy efficiency investments and savings will be somewhat modest in this period. The earlier described uncertain investment environment is compounded by the fact that most energy efficiency projects require 3-5 years to reach full implementation in the sector, due to the individual facility's capital investment cycles.

Strategies in the Longer Term

In the longer term, many firms may be poised to enter a period of major new capacity investments. This period represents an unprecedented opportunity to make major changes in the energy efficiency of new production capacity that will be operated for years to come. Many future investments will represent major re-engineering of existing production processes, and in some cases, entirely new "green-field" facilities (i.e., new facilities built on new sites) will be built. There is an upcoming opportunity to merge energy efficiency into facilities and their processes in a way that has not been feasible or cost-effective in existing production processes. Many of the efficiency opportunities will be found in the optimization of systems, rather than in equipment that is more efficient. Therefore, the incremental costs of efficiency will be modest, compared to the large savings.

It is not clear when the market will favor new investment. As noted previously, the global economy will likely drive this change. Suggestions have been made that this transition in investment behavior could begin in the next 3-5 years (Monroe 2007). It is important to remember that investment planning for many firms may have already begun. Therefore, energy efficiency programs should deploy the short-term strategies now. By engaging today, program managers build a foundation for substantial energy efficiency savings in the long term.

SUMMARY AND CONCLUSIONS

Energy efficiency investments in the industrial sector are made differently from those in the commercial and residential sectors. Retrofit opportunities are much more limited in the industrial sector and project cycles can be substantially longer in order to coordinate with overall refit cycles. But efficiency savings in the industrial sector can be large and very cost-effective if they are implemented as part of a normal capital investment cycle.

Economic and market indicators suggest that the industrial sector is poised for a new period of major capacity investments because existing capacity is approaching full utilization at the same time that global trends are encouraging domestic production for domestic consumption. Without new capacity, industry will not be able to meet growth in demand for their products. Currently, however, a number of market forces appear to be encouraging many industries to defer investment plans for the immediate future. The forces deferring investments include

global market uncertainty, tight capital markets. and the unsustainable tight markets certain industries have used to increase prices and pass along increased costs.

In the longer term, many industries will enter a new period of substantial capacity investment. This period will represent a major opportunity to influence the energy efficiency of these facilities for generations to come. The challenge is that program managers must begin engaging their industrial customers now, so the programs are positioned to exploit a rare opportunity to change energy use patterns for years to come.

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