

**Situational Analysis**

The manufacturing industry is one of the largest and most diverse energy-consuming sectors in the United States. Recent energy price increases have focused industry attention on saving energy. Often, the manufacturing industry is unable to meet the challenges of improving energy efficiency because of the large capital requirements needed to decrease its energy use. Many examples through the years have proven that a small improvement in efficiency can yield large energy savings, not only in the primary manufacturing plant, but across many industries.

The manufacturer's first priority is to make product and get it out the door, not to save energy. Every box on the company's personnel chart has a job description, accountabilities and incentives—all tied to production. Departments within a company often compete against each other in the budget process. For example, energy efficiency projects might be expensed from the maintenance budget, but the savings accrue to the production budget. Unless top management assigns responsibility, energy efficiency is a duty that occupies the blank space on the personnel chart—the space where there are no boxes.

Many industrial facilities only have one utility meter to measure consumption for an entire plant. In this situation, traditional accounting practices treat plant-wide energy as an overhead cost, which is then allocated across departments according to their numbers of workers or square feet of space. The cost of any one department's energy waste is distributed to all departments. Even worse, this accounting system is a disincentive to any one department's taking the initiative to improve energy efficiency, because that department's results will be diluted by the artificial allocation of costs. Improper allocation of energy costs may distort financial decisions such as product pricing, income and tax declarations, production mix, compensation and bonuses, and capital investment allocations. Today's advanced energy metering technologies can monitor actual consumption by substations within a facility, improving department managers' abilities to control their energy costs.

A manufacturer's budget and finance functions can impose procedural barriers to energy efficiency initiatives. Operating budget strategies may simply trend each line item from year to year. The manager who saves energy this year will risk getting a reduced budget for the coming year. Low-bid or least-cost purchasing requirements may be imposed by front-office procurement personnel without thorough consultation with operations staff. Consequently, this arrangement leads to purchases based solely on upfront costs, ignoring energy and other operating costs over the life of the asset.

Reducing energy costs can be as easy as adjusting a dial.

**Objective**

Encourage businesses to develop voluntary initiatives that reduce energy use in industrial facilities and increase energy efficiency in manufacturing processes.

**Proposed Strategies and Recommendations**

The following strategies and recommendations are presented for further discussion and development at the Governor's Manufacturing Summit:

**Strategy #1 – Develop individualized energy profiles for manufacturing companies**

Recommendation	Task	Time Frame
A. Identify key opportunities for savings that, in turn, can improve an industrial plant's bottom line by reducing energy use	o Conduct an energy assessment to understand how production impacts energy; how it is being used within the plant; and how to save energy and money	Short-term
	o Duplicate effective policies and processes at all facilities to increase the benefit	Long-term
B. Stay informed	o Review best practices and improvements in industrial energy efficiency technologies	Ongoing
	o Provide incentives to employees to participate in advanced training programs such as Total Productive Maintenance (TPM)	Ongoing

**KEY:** Time Frames: Short-term (0-12 months), Mid-term (13-36 months), Long-term (37-60 months)

**Strategy #2 – Encourage cross-departmental cooperation to promote energy efficiency**

Recommendation	Task	Time Frame
A. Assemble a "Plant Energy Champion" and an energy team that has the support of management	o Promote equipment purchases that consider energy and other operating costs over the life of the asset as well as upfront cost	Short-term
	o Assign achievable energy efficiency goals in each department	Short-term
	o Identify no- or low-cost projects and potential funding sources to save energy	Short-term
	o Encourage full compliance with energy-saving goals	Ongoing
B. Set manufacturing and energy saving goals	o 10-15 percent reduction of electricity sales by 2020 from a baseline established in 2008	Long-term
	o 5-10 percent reduction of natural gas sales by 2020 from a baseline established in 2008	Long-term

**KEY:** Time Frames: Short-term (0-12 months), Mid-term (13-36 months), Long-term (37-60 months)

**Strategy #3 – Revise outdated accounting techniques**

Recommendation	Task	Time Frame
A. Track and monitor energy consumption	o Utilize EPA certificates, showing their energy efficiency compared to a reference benchmark with the EPA's Energy Star Portfolio Manager	Short-term
	o Employ energy-metering technologies which can monitor actual consumption by substations within a facility	Short-term
	o Develop an inventory of equipment time-of-use/energy consumed to showcase the effects of programs to reduce energy consumption	Short-term
	o Utilize tools such as an Energy Management System	Mid-term
	o Audit manufacturing and equipment performance periodically to improve inefficient and energy consuming manufacturing processes and equipment	Ongoing
B. Evaluate equipment operating practices with manufacturing processes	o Identify pieces of equipment and processes that represent extensive use of resources such as energy, material, flow and labor	Short-term
	o Conduct economic life-cycle analyses for proposed equipment purchases, and consider the impact of carbon emissions and energy consumption over the expected life of the equipment/manufacturing process	Short-term
	o Recover or eliminate waste heat from your steam system, optimize manufacturing-process systems flow, source and eliminate quality issues that present excess material usage and energy consumption resulting in costly rework	Mid-term
	o Streamline the flow of the manufacturing process with lean manufacturing programs such as Value-stream mapping and Enhanced Visual Indicators	Long-term

**KEY:** Time Frames: Short-term (0-12 months), Mid-term (13-36 months), Long-term (37-60 months)

**Strategy #4 – Review budget and fiscal criteria for implementation of energy efficiency methods**

Recommendation	Task	Time Frame
A. Learn how others have saved	<ul style="list-style-type: none"> <li>o Engage expertise available through, but not limited to:               <ol style="list-style-type: none"> <li>1. Department of Energy's Industrial Technologies Programs</li> <li>2. Environmental Protection Agency's Energy Star Program</li> <li>3. Local Utilities' Demand Side Management Programs</li> <li>4. Universities</li> <li>5. Equipment suppliers</li> <li>6. Trade providers</li> <li>7. Energy service companies</li> <li>8. Engineering Firms with an Energy Focus</li> </ol> </li> </ul>	Ongoing
B. Integrate energy-efficient and renewable energy technologies into new construction, upgrades, and new cooling and heating equipment installations	o Provide effective lighting, indoor air quality and conditioned space temperature/air/noise control where and when needed	Short-term
	o Utilize local utilities demand-side management and federal incentives funding for continuous improvements	Long-term
C. Develop an ongoing strategy for creating a continuous improvement legacy	o Authorize funding to implement energy efficiency improvements and programs	Ongoing
	o Avoid deferred maintenance programs which result in short-term gains yet carry long-term impacts to energy consumption and manufacturing downtime	Ongoing
	o Engage in cost-effective maintenance programs such as predictive maintenance, condition monitoring or reliability-centered maintenance.	Ongoing

**KEY:** Time Frames: Short-term (0-12 months), Mid-term (13-36 months), Long-term (37-60 months)

**Proposed Outcomes**

The development of cohesive, energy-efficiency initiatives will enable Arizona's manufacturing industry to minimize energy consumption while stimulating productivity, reducing quality issues and improving environmental performance within the community.