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## The "Greening" of a Manufacturing Facility

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Historians who have studied the relationship between governments and private manufacturing companies know there have been times when the two entities were in sync in their thoughts on many issues and times when they were miles apart.

About 50 years ago, the expression "What's good for General Motors is good for the country" became the motto for government/industry relations in the U.S., and large manufacturers were often allowed to take a variety of liberties – within reason – to succeed and make a profit.

In the 1970s, the tables turned dramatically, and the auto industry in particular was hit the hardest. After the 1972 oil crisis, the U.S. government instituted a barrage of regulations that forced auto manufacturers to produce cars that were not only more fuel efficient, but also less polluting. Auto manufacturers did their part, developing new technologies and designs that met and often exceeded government requirements.

However, today something very interesting is occurring. In a variety of ways, from not signing the Kyoto Accord to relaxing industry air and water pollution regulations, the current administration has been easing environmental regulations in several segments of American industry. At the same time, though, many U.S. manufacturers have been stepping up to the plate and making their factories more sustainable and protective of the environment. No longer being pulled or pushed, they are now taking the lead and "Greening" their facilities themselves.

### Texas Instruments: Case-in-Point

One of the best and most recent examples of this trend is the new chip/wafer factory built and operated by Texas Instruments (TI) in Richardson, TX. Before deciding to build another new factory in the U.S., many industry analysts suspected TI would build in China or Taiwan to take advantage of the low wages, subsidies, tax breaks, and minimal building and environmental regulations these countries offered.

However, TI wanted to stay near its design and technology centers in Texas – if they could find a way to build the new factory for \$180 million *less* than its last Dallas factory erected in the late 1990s. This was the only way the company believed it could produce chips that would be cost competitive with those produced overseas.

Although TI architects, designers, and engineers were initially skeptical this could be done, careful planning, engineering, and the adoption of Green alternatives and operating procedures helped reduce energy and water consumption – creating a healthier factory and keeping 1,000 high-tech jobs in the U.S.

Some of the measures the facility incorporated included:

- Previous TI chip factories had three floors because of the complicated cooling and manufacturing process involved in making chips and wafers. The TI design team came up with a way to build the Richardson factory with just two floors, which resulted in huge savings in building mass, construction costs and energy consumption

- Large water pipes with fewer elbows were installed in the building to help reduce friction loss – allowing for the use of smaller, more economical water pumps that also save energy

- Various passive solar innovations were built into the building, including roofs that use a white reflective coating to reduce heat

- Improved air circulation systems helped cool indoor air so efficiently that one huge industrial air-conditioner was eliminated, again saving building costs and energy

- Specialists in Green building design and operation were hired to help design a factory with a healthier work environment – incorporating materials and products more sustainable and environmentally preferable, reducing absenteeism and enhancing worker productivity.

- Overall resource consumption was lowered so that, over the life of the plant, any additional costs to go Green would be re-paid in energy savings.

“What TI did is show the world that a more cost-competitive, less energy demanding, and environmentally responsible factory can be built with today’s technologies,” says Kevin Gallagher, vice president of The Environmental Choice Program (ECP), an independent, third-party certification organization that encourages manufacturers to develop products, that are safer and healthier to use, derived from renewable and sustainable sources. “This is a great example of how a Green factory can be healthy, efficient, and profitable – all at the same time.”

### **To Go Green you Must First Define Green**

According to Gallagher, one of the past stumbling blocks to “going” Green for manufacturers was the many different definitions of Green.

“Many advocates had their own definitions, meanings, and explanations of what an environmentally preferable building or product was, whether it was used for building construction, in office furniture, or cleaning,” says Gallagher. “With the creation of independent, third-party certification organizations such as ECP or its sister organization, Green Seal, it is now clearer and easier for building designers, factory managers, manufacturers, and customers to understand.”

In order for a product to be certified Green by ECP, it must go through a rather extensive testing procedure, according to Gallagher. The manufacturer of the product selects a recognized laboratory to verify the product’s ingredients and ensure that it meets specific ISO and quality control standards, as well as ECP compliance standards and criteria for this type of product.

The manufacturer submits these reports to ECP along with any related materials for review. If successful, a site audit is conducted to confirm the information the laboratory has provided. “One very important aspect of the site audit is that we try to trace a product back to the very day it was manufactured,” says Gallagher. “That way, we can verify the actual ingredients in the product, and if the product passes our evaluation, it becomes ECP certified and can bear our EcoLogo seal.”

Gallagher believes the creation of organizations such as ECP have assisted architects, planners, facility managers, and manufacturers in knowing how to build, design, and produce environmentally responsible facilities and products.

“The parameters have been established, and once that is accomplished, you can build from there,” says Gallagher.



## Green Building Operations

“Very often when Greening a facility, architects, designers, and facility managers are unaware of how important cleaning and maintenance is to the health of building occupants, the users of cleaning chemicals, and the environment,” says Mike Sawchuk, vice president and general manager of Enviro-Solutions, a manufacturer of Green cleaning chemicals and products for the professional cleaning industry.

For example, Sawchuk says, architects and designers will often select hard-surface flooring for a facility because it has reduced Volatile Organic Compound (VOC) emissions, a proven enemy of indoor air quality.

“However, the entire selection process can be defeated the very first time the floors are finished (stripped and re-waxed),” says Sawchuk.

Studies indicate that finishing a floor just one time with traditional floor care products can equal or surpass the VOCs emitted from a typical hard-surface floor over its entire lifetime.

“Unfortunately, this means that for a manufacturing facility, which may have thousands of square feet of hard-surface floors, any extra expense or plan to install healthier flooring becomes a waste,” Sawchuk says.

According to Sawchuk, the use of environmentally preferable cleaning chemicals and products in the factory setting is essential to a healthier working environment. However, he stresses that Green chemicals are not enough.

“Green cleaning is a system that incorporates a variety of products,” says Sawchuk. “These products all work together to protect building occupants and the environment.”

Along with Green cleaning chemicals, Sawchuk advises manufacturing facility managers to include:

- High-performance matting systems to help keep soils and contaminants out of the facility
- Floor machines with active or passive vacuum systems to help capture and trap the dust generated when polishing floors
- Vacuum cleaners that have high-filtration filtering systems to prevent impurities from becoming airborne
- Microfiber cleaning cloths and mops, which are more absorbent than traditional cloths and mops.
- The use of no-touch or spray-and-blow-dry cleaning equipment, which more thoroughly cleans large restrooms – commonly found in a manufacturing setting.

“The new Texas Instruments factory is just the beginning,” says Sawchuk. “We are already seeing other manufacturing facilities incorporating Green designs, construction, and building operation.”

Gallagher adds that “what has been most impressive is that this initiative has been industry driven in an effort to protect our resources and the health of this generation and generations to come.”

**Environmental Choice Program** [www.environmentalchoice.com](http://www.environmentalchoice.com) 800-478-0399

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