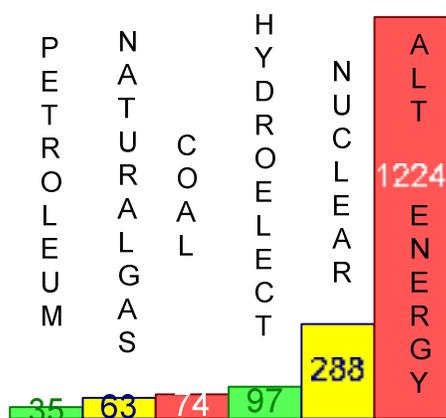


SUSTAINABILITY TIMES

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Worldwide Growth in Energy Consumption



Worldwide
Percentage Increase
In Consumption
1980 - 2006

According to the Energy Information Administration, a branch of the US Department of Energy, worldwide growth in energy consumption rose in all categories from 1980 to 2006. Total World energy consumption grew over 67% from 281 to 469 Quadrillion BTU's. Consumption of petroleum grew 35%, consumption of dry natural gas grew 63%, and consumption of coal grew 74%. But the worldwide consumption of hydroelectric power grew 97% while electricity produced from nuclear energy grew an amazing 288%. The greatest growth (a phenomenal 1224%) occurred in renewable energy categories of geothermal energy, solar electricity, wind power, and wood and waste electric power. Of course, it must be realized that in 1980, less than 0.2% of energy came from these sources.

The good news is that the growth in fossil fuel based energy was considerably lower than growth in more environmentally friendly types of energy. The bad news is that fossil fuel energy still represents 86.75% of all consumption (2006 data).

Many factors contributed to this growth in demand for energy: population increases, increases in industrialization, increases in worldwide middle classes, growth in consumerism. For example, during this time, the world's population increased from about 4.5 Billion to 6.5 Billion, about 44%.

It is clear that two major changes must occur if we are to bring our collective energy consumption into long-term sustainability. First, we must find ways of curtailing these areas of growth so that overall demand does not continue expanding at this rate. Second, we must find ways to meet growing demand through the addition of renewables, including expanding hydroelectric power sources where feasible and adding nuclear electricity. We must emphasize the need to **never add to the demand for fossil fuel** while we work to supplant these fuels with renewable energy sources in the long-term. Only by doing this will we achieve worldwide sustainability.

Curtailling the growth in demand and shifting from fossil fuels to renewables both require very difficult and far-reaching decisions be made by societies around the world. They will require many sacrifices and a willingness to spend a little extra to achieve a significant result. Politicians are loathe to discuss these sacrifices, but hiding our heads in the sand will only lead to suffocation, not sustainability.

Founder's Corner



What is Zero Waste?

By Paul McCright

Back in the 1960's the Department of Defense launched a serious campaign to improve the quality of its work. It called this effort "Zero Defects" and erected a huge banner across a building at Red River Army Depot, where my father worked. As a kid, I remember driving past the depot on the highway, marveling at the size of this banner, and wondering what it really meant.

My father explained that it meant that everyone was trying to do their work without creating defects, without making mistakes. He agreed that it was an impossible ideal, but that striving to reach it would eliminate a whole lot of bad products and services.

Now we think about reducing waste as foundational to improved environmental sustainability and to a more stable financial picture for industry. Borrowing from 60's-era DoD sloganeering, we have coined the phrase "Zero Waste" as an impossible ideal that can lead us to a fully sustainable future. As we learn more about creating a Zero Waste World, we can build a future of energy independence, sound and stable business, and opportunity for all humans.

Book Review

Solving the Puzzle: Researching the Impacts of Climate Change Around the World National Science Foundation NSF 09-202

Technically this is not a book, but it is definitely worth much more than its cost (free download at <http://www.nsf.gov/news/nsf09202/index.jsp?org=NSF>). This document expresses in laymen's terms the effects of climate change documented by NSF researchers throughout the world. The report's six main chapters are Sky, Sea, Ice, Land, Life, and People. A rather quick read establishes the inescapable conclusion that human activities since 1750 are the cause of an unprecedented warming of the globe in recent decades. Carbon dioxide concentrations in the atmosphere, increased temperature and acidity in Earth's oceans, incredible retreat of polar ice and glaciers, growing deserts, shrinking supplies of clean water, disappearing species of both flora and fauna, and reduction in human food supplies are but a few of the signs of these soon-to-be-catastrophic changes caused by global warming. But the anonymous authors of this report are not unmitigated pessimists. Signs of hope, adaptations of nature, and opportunities for human intervention are integrated throughout. This was the best freebie I have found in a long time. Of course, this irrefutable scientific evidence underscores the necessity for all of us to seek ways we can begin to contribute to reducing the effects of human life on the planet.

Waste Reduction Technique of the Month

Returnable Packaging



Have you ever looked in your trash bins to see how much cardboard, bubble wrap, and Styrofoam “peanuts” are there? You might be very surprised by how much packing materials you would find. What is it costing you to have that hauled away? What are your operations doing to your local landfill? How much more are you paying your vendors to cover the cost of this packing material you are throwing away?

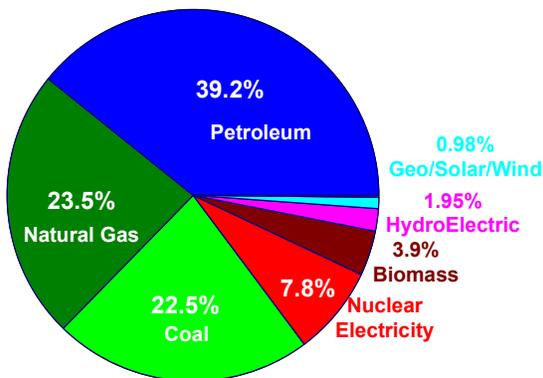
One of the waste reduction techniques mentioned frequently in Lean production literature is using returnable packaging. It reduces throw-away packing materials to near zero, saving the cost of hauling the waste away and often reducing the cost to your vendors. This Lean technique is also a great Green technique because returnable packaging reduces the wastes needing to be recycled or even placed in the landfill later.

ZWORC encourages all manufacturers and retailers to look into their product lines to determine how they may reduce or eliminate the packaging coming into their facilities. One-time costs of purchasing tubs (made of recycled plastic, of course), pallets, or wooden boxes will soon be repaid by reduced waste haulage bills.

You might also wish to look at how you package your products for sale. Is all that stuff really necessary to keep your products safe in transit? Can some of it be reduced or eliminated? If you are a supplier to an assembly operation, suggest to your customer that you explore the mutual benefits to switching to returnable and reusable packaging.

Did You Know ... ?

The Empire State Building in New York City has announced a \$20 Million remodeling effort that will concentrate on making the building environmentally friendly. The effects of the remodel will be saving substantial energy worth \$4.4 Million each year while reducing the building’s carbon footprint by 38%. This is a win for the environment and for the economic picture of the building’s owners.



U.S. Energy Sources

Considering energy used to generate electricity and energy used for transportation, direct heating, and production processes, the US obtains its energy from a variety of sources. Currently, over 85% of US energy comes from one of three nonrenewable, limited fossil fuel categories: petroleum, natural gas, and coal. The next largest energy source is nuclear, which is nonrenewable but almost unlimited in supply.

Ultimate Leanness

By Gary Bergmiller

For a couple of decades now, world-class companies have been trying to figure out ways to emulate the Toyota Production System that emphasizes effective and efficient manufacturing. Toyota is now undeniably the world's largest auto manufacturer and is arguably the world's most innovative, environmentally sustainable, and profitable auto maker, too. How can this be?

Toyota's system has been often studied but seldom duplicated. If you haven't done so already, check out the two best books on the Toyota Production System: *The Toyota Way* (2004) by Jeffrey Liker and *The Toyota Way Fieldbook* (2006) by Jeffrey Liker and David Meier. These books describe how Toyota has built a culture that supports making its manufacturing processes as lean as they can be.

Since the publication of these books, Toyota has been looking for ways of reducing the environmental footprint of its production systems by applying the same culture of change and continuous improvement to environmental initiatives. Is the maker of the world's most successful hybrid car doing this to save the environment or to save the company?

We at **ZWORC** think the answer is "Yes" to both.

Toyota and a small number of highly successful lean companies are beginning to see that there are practical limits to the positive effects of leaning the process system. After all, how can you call yourself lean if you are still using more energy than necessary in your processes? How can you call yourself lean if you are still throwing useful stuff into the waste stream? Logic says that it is not possible to reach complete Leanness if you are not also completely Green.

Bausch and Lomb, another manufacturer with a history of success in leaning its production systems, has discovered that its Lean Program has reached a plateau of success and is now looking at reinvigorating its improvement culture by emphasizing environmental sustainability. B&L sees Lean and Green as two sides of one coin. We can call this coin something like "World Class Effectiveness" or "Full Sustainability". What both Toyota and Bausch and Lomb have realized is that it takes success in both Lean Programs and Green Programs to reach the ultimate level of either of them.

These world-class companies are working hard to build employees, cultures, and production systems that will make the company economically sustainable and environmentally sustainable by incorporating a drive to be both Lean and Green. We hope many other world-class companies will soon climb aboard this Sustainability Express.

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