

GOT GREEN? AN ENGINEERS GUIDE

NOLAN STEPHANY

WXXI Public Broadcasting Council
Rochester, NY

and

ANDREW "A.J." JANITSCHKE

Radio Free Asia
Washington DC

ABSTRACT

Making our production and transmission facilities more environmentally-friendly is probably not, unfortunately, on the "to-do" list in most station's engineering departments. Making broadcasting a more environmentally friendly industry is not new but it is undoubtedly one of the most important goals for broadcast managers and engineers in the 21st century. Conserving resources, and repurposing them when possible, is a challenge we all face at home and at work.

From global warming to a shortage of landfills, we are all concerned with ensuring we have a cleaner, greener environment. "Greening" broadcast engineering not only takes planning and coordinating, but it also takes commitment and a real human effort at the transmitter site, the studio, and in the office. We will examine the methodologies of applying greener processes and tactics to all industries, including broadcast engineering, and examine mandates that not only affect, but challenge, our current business workflows. We will examine Corporate Social Responsibility (CSR) and its applications to broadcast engineering, and highlight examples of industry leaders and broadcasters embracing green today and planning for a greener future. Everything from paper, glass, batteries, plastics, metal, liquids and more, are all resources needed to run a network and local station; they are all reusable too. Recycling and repurposing are not simply options, but an integral part of smarter, greener engineering that contributes to a better environment. Greener solutions not only help your bottom line, but engage employees in efforts to go green at work and at home.

There is much a person or family can do to green-up their lives and in the long run benefit humanity. Light bulbs, batteries, paper, metal; all one need do is accept some simple lifestyle adjustments. These have already been made by millions of people who daily are willing to put up with inconveniences, invest time or money in a long term solutions to some of the problems that plague humanity. It is incumbent upon the everyday person but also upon corporate management to pick up the banner of social responsibility in a world where fantasies of limitless resources are gone and the realities of dwindling supplies and the need for recycling are slapping us in the face. A great place for a broadcast

engineer to start is right at the top, with company management. Enlist their support in your greening efforts. A green broadcast station must have support from the top.

What does it mean to be socially responsible and how does an engineer step up their efforts today? Socially responsible means rising to the challenge: establishing and then maintaining *corporate* responsibility. A simple start is a recycling plan for paper, plastics, aluminum cans and batteries. For example, Styrofoam cups take centuries to break-down in our landfills; paper cups may not be cheaper, but they do disintegrate more quickly. Being socially responsible means having disposable paper cups available at water fountains and coffee machines. Being socially responsible also means encouraging workers to use public transportation, or providing benefits to those who carpool, van pool, ride their bikes or even walk.

CORPORATE SOCIAL RESPONSIBILITY

Corporate social responsibility (CSR) is a where companies and corporations consider the interests of society over their own and then take responsibility for the impact of their activities. What companies do has an impact on their customers, suppliers, employees, shareholders, communities and the environment. Responsible CSR extends beyond law too; it also means that the entity willingly takes steps to improve the environment, the lives of the community and that of the families of the employees; as a matter of fact, CSR is extended to society as a whole. At times, CSR can conflict with its own goal; whereas the organization can lose sight of its basic premise of making a profit in order to serve social needs. To the contrary, corporations benefit from CSR by having their 'eyes wider' to the needs of the environment and society instead of a myopic view of their own, short-term profits. Taking responsibility means the company is accountable for its actions but is cognizant of those actions and is willing to forego profit for the benefits of society and the environment. This is also known as social accountability.

In England, they simply call it corporate responsibility, or CR, but it carries the same message and meaning. According to the British government's Department for Business Enterprise & Regulatory Reform, they see CR as "the business contribution to...sustainable development goals. Essentially it is about how business takes account of its economic, social and environmental impacts in the way it operates – maximizing the benefits and minimizing the downsides. CR [is] the voluntary actions that business can take, over and above compliance with minimum legal requirements, to address both its own competitive interests and the interests of wider society."

HOW LONG ARE YOU STAYING?

The environmental website GreenMuse.com reports, "Both plastic and Styrofoam take between 500-1000 years to decompose in a landfill. Styrofoam is believed to have the second worst environmental impact behind aluminum production according to the California Integrated Waste Management Board. Both plastic and Styrofoam have low reclamation rates and more than 60% end up landfills, waterways and oceans." Duke Energy, which provides energy in Indiana, Kentucky, North and South, and Ohio, says Styrofoam has an extremely slow decomposition rate and "what you throw away today will be with us forever because it will never decompose." While there is some disagreement on exactly how long it takes for Styrofoam to decompose, it is important to understand how long it takes many of our everyday products to join the Earth again.

All man-made materials decompose at different rates depending on the environment where the material finally comes to rest: temperatures, oxygen levels, presence of moisture and pollutants can all effect how quickly, or slowly, something will break down. A major factor contributing to decomposition is water. Decomposition can be accelerated by the presence of ocean water. Many landfill sites are hermetically sealed with plastic so that water does not mix with the waste; many are covered at night to further prevent water saturation of the waste. Since landfills are used for most household garbage, let us use that as the standard for waste decomposition. Here is a generalized list of decomposition rates (Source: California Waste Mgmt Bulletin):

Banana/orange Peel	2-5 weeks
Cotton rag	1-5 months
Cigarette butt	1-5 years
Wool clothing	1-5 years

Plastic-coated paper	5 years
Plastic bag	10-20 years
Painted wooden stake	13 years
Plastic film container	20-30 years
Nylon fabric	30-40 years
Leather	up to 50 years
Rubber boot sole	50-80 years
Aluminum can	200-500 years
Plastic 6-pack cover	450 years
Glass bottle	1 million years
Others: (various sources)	
Traffic Ticket	2-4 weeks
Rope	3-14 months
Bamboo pole	1-3 years
Tin can	100 years
Newspaper	3-6 months
Carry-out food bag	4-8 months
Napkins	1-3 weeks
Plastic drink container	100 years
Styrofoam container	500-1000 years

Again, the rate of decomposition depends on environmental conditions; warm, wet conditions and exposure to sunlight and air increase the rate of decomposition. Anything that is buried underground will take longer to decompose.

IS IT REALLY STYROFOAM?

STYROFOAM™ has been a trademark of the Dow Chemical Company for over 60 years though the misuse of the trademark has led to generic plastic foam products often being mislabeled as Styrofoam. Styrofoam is the term for extruded polystyrene foam.

Extruded polystyrene as a closed cell foam that resisted moisture and is perfect use as thermal insulation. Styrofoam is also used for floral arrangements and for other 'arts and crafts' projects. According to Dow, Styrofoam is not used to make disposable foam products, like coolers, plates, cups, and packing peanuts. Dow is quick to point out that these products are not made of Styrofoam and they are not made by Dow; they are made of expanded polystyrene foam and are normally white. Dow's insulation Styrofoam can be identified by its distinctive blue color while Styrofoam for arts and crafts is green or white.

Since it is resistant to moisture and very sturdy, Styrofoam is also used to pad between asphalt and the earth underneath. The Styrofoam not only insulates, but does an excellent job of preventing unplanned disturbances in the soil due to the changes from hot to extremely cold temperatures.

According to Dow, "As an insulation material, STYROFOAM brand foam helps to create more energy efficient homes around the world. STYROFOAM brand insulation is an ENERGY STAR product, having earned the ENERGY STAR designation from the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy. In North America, more than two million homes are insulated with STYROFOAM™ brand insulation, resulting in \$200 million per year in energy savings and a significant reduction in fossil fuel consumption and carbon dioxide emissions. One square foot of one-inch-thick STYROFOAM brand insulation can save up to one ton of carbon dioxide emissions over the average life of a house...All production generated scrap of STYROFOAM brand foam is recycled back to prime production or re-extruded into pellets and shapes for the secondary market...STYROFOAM brand products are durable and can be reused. STYROFOAM brand insulation can be carefully removed and reused. The assorted foam shapes used in crafts and floral designs can also be reused...All STYROFOAM™ brand products are made of 100 percent polystyrene foam and are recyclable. To recycle white and green STYROFOAM brand foam, remove all decorations and place in a "plastic recycle" collection bin or as instructed by the recycling facility...Some states and municipalities choose incineration as an option to waste management. STYROFOAM brand foam has high calorific value, and generates much higher energy contribution than paper and many other products."

So when you reach for your next cup of coffee in the office and you are using a disposable foam cup, do not think it is Styrofoam; it is just another standard foam product. While you are sipping away though, think about how comfortable you are in that room. Think for a moment about the insulation that is behind the wall keeping you comfortable at the lowest cost possible.

Yes, it might only be fiberglass insulation, but there could also be the real deal back there, Styrofoam. And rest easy knowing that if it is Styrofoam, it can be recycled, and in the long run, helps to reduce our energy needs.

ENERGY STAR: LEADING THE NATIONAL INITIATIVE

The Environmental Protection Agency (EPA) is at the forefront of America's effort to create a greener nation. The EPA is the federal agency charged with regulating chemicals and protecting our health by safeguarding our air, water, and land. The EPA has been responsible for all environmental policy for the United States since its formation 1970. Let us look at the EPA's Energy Star program.



Figure 1: Energy Star

One important step to a greener community is to purchase products certified with the EPA's Energy Star logo. According to the EPA, "The buildings where we work, shop, play, and learn account for nearly half of the nation's energy use. With help from EPA's ENERGY STAR program . . . [we] save energy and fight global warming by making many of the same green choices at work that you make at home."

Energy Star is one of the most recognized and successful efforts to educate and promote greener lifestyles. According to Energy Star publications: "Greater energy efficiency can increase the financial health of [any] organization and aid in preserving the environment for future generations." Energy Star helps businesses and private citizens fight global warming through superior energy efficiency.

We broadcasters survive by using a great deal of office equipment. Energy Star reports, "If every home office product purchased in the U.S. this year were ENERGY STAR qualified, Americans would save \$200 million in annual energy costs while preventing almost 3 billion pounds of greenhouse gases – equivalent to the emissions of 250,000 cars." Office equipment that has earned the Energy Star helps save energy through special energy-efficient designs, which lets them use

less energy to perform regular tasks, and automatically enter a low-power mode when not in use.

Most office equipment in businesses and homes is left on 24 hours a day, making energy-efficient design and power management features crucial for saving power and reducing greenhouse gas emissions. Energy Star qualified products also feature energy-efficient designs for accessories. Therefore, an external power adapter, a cordless handset, or a digital front-end, must meet the same Energy Star standards for external power supplies, telephony, or computers. This ensures that the Energy Star logo appears only on the most energy-efficient products.

In order to green your work area, you can apply many of the same green choices at work that you make at home. Here are Energy's Star's five steps that you can apply at work:

1. **Give It a Rest.** Use the Energy Star power management settings on computers and monitors so they go into the power-save mode when not in use. Additionally, use power strips at the main energy source to power down all your office equipment ensuring it is completely disconnected from the power source.
2. **Unplug It.** Unplug chargers! AC adapters for laptops and cell phones that are plugged into outlets continue use electricity even when they are done charging batteries.
3. **Light Up Your Work Life.** Replace the old light bulbs in desk lamps with Energy Star bulbs. They last up to 10-times longer and cut electricity usage by about 75%. Please remember to turn off the office lights when you leave for the day.
4. **Let It Flow.** Keep air vents clear of paper, files, and office supplies. You might be surprised how many people stack papers on top of, or in front of, air vents. This can take as much as 25% more energy to pump air into that workspace.
5. **Team Up.** To promote greener living in your company, partner with Energy Star and commit to buying Energy Star rated products. Organize a 'green team' at your organization. Promote energy efficiency and help reduce office waste. Lastly, set a goal to make your building an Energy Star qualified building. You can sign up to be an Energy Star partner, and learn more at EnergyStar.gov/Work.

We spend \$200 billion as a nation on electricity and natural gas each year and contribute nearly half of our nation's greenhouse gas emissions. The EPA recommends a few simple steps that managers and supervisors can take in order to reduce energy wasted in buildings and facilities, lower energy costs, and protect the environment. Here are steps that company executives can take:

1. **Take It to Your Team.** Create and distribute an energy policy within your organization and if you are able, appoint an energy director who will lead and manage an energy team; if you can get volunteers to do it, then all-the-better. Remember, the best way to start on the road to saving energy starts with you.
2. **Performance Matters.** Through the website EnergyStar.gov/Benchmark, you can use the Portfolio Manager Tool for commercial buildings to gather and track energy data, establish energy usage baselines, benchmark your facility against others, analyze your energy use patterns and trends, and prioritize areas for improvement. Understanding past and current energy use is how many companies identify opportunities to improve energy performance and gain financial benefits.
3. **Earn the Energy Star.** Buildings that use 40 percent less energy than average create a significantly smaller carbon footprint and qualify for the Energy Star. Thousands of buildings and manufacturing plants have already earned the Energy Star identifier for superior energy efficiency. Many of these are office buildings, schools, supermarkets, retail stores and warehouses, hotels, assembly plants, hospitals and more.

Broadcast engineers are oft placed in charge of managing and maintaining buildings and their infrastructure. Here are tips on making your buildings more energy efficient now:

1. **Give Your Building a Tune-Up.** Regularly examine building equipment, systems, and maintenance procedures to make sure everything operates efficiently. Tune up air conditioning and heating equipment. Inspect ducts and windows and seal any leaks. Calibrate thermostats and set them at appropriate temperatures. Insulate hot water tanks and piping throughout the building, then inspect and clean/change air filters regularly.
2. **Improve the Lighting.** Approximately 25-30 percent of the energy used in a commercial building is just for lighting. By making

improvements to your lighting systems, you can cut back on the use of electricity and increase everyone's comfort while at work. Look for opportunities to turn off lights. Replace halogen and incandescent bulbs with Energy Star qualified compact fluorescent lights (CFLs). When possible, turn off every other light in a bank of bulbs in walkways and offices. Lastly, use automatic controls to dim or brighten lights in naturally lit spaces.

3. **Look Inside and Out.** Purchase Energy Star qualified office equipment whenever possible. By eliminating inefficient office equipment and other products, you can save energy *and* save money. Since many work areas in broadcasting require continuous air conditioning, avoid wasting the cool air by installing window films, like Mylar, add insulation wherever possible, and look at adding a reflective roof coating if it will help save energy.
4. **Upgrade Fan Systems.** Air-handling systems are meant to move warm and cool air throughout a building. They directly affect the comfort of every building occupant. Upgrade or adjust fan systems to optimize the delivery of air while minimizing the energy used. The best fan systems handle optimal air capacities, have variable speed drives, and convert to a variable-air-volume system.
5. **Raise the Bar for HVAC Systems.** Heating, ventilation and air conditioning (HVAC) systems consume a great deal of energy in buildings and can offer a great opportunity for energy savings in addition to increasing the comfort of the building's occupants.

Once you've followed the steps above and have reduced a building's heating and cooling loads, retrofit or install energy-efficient HVAC systems, upgrade boilers and then upgrade or replace any other central plant systems to higher, energy-efficient standards. No matter how small or larger your network of buildings, these recommendations will help you go a long way towards greening your broadcast engineering.

NOT JUST AT WORK! GO GREEN AT HOME

According to the EPA's Energy Star program there are many small steps we can all take at home to make a difference in our environment and in saving energy. Here are just five of them:

1. **Get with A Program-able.** The average American household spends nearly \$2,000 a year on energy bills; almost 50% of that cost is just for climate control. A programmable thermostat, when used properly, can save close to \$200 on your annual costs.
2. **Choose Energy Efficiency.** Look for the Energy Star certification when buying home appliances and electronics. You might be surprised to find that you qualify for rebates or other incentives from your local utility provider.
3. **Seal the Deal.** Improve energy efficiency and comfort by caulking where air is leaking into your home. Visit EnergyStar.com to look for recommendations on sealing your home.

While you can't control rising energy costs, you can lower your energy bill further by following these simple and proven home tips recommended by the American Associate of Retired People (AARP):

1. **Follow the 10-10 Rule.** Lowering your thermostat in the winter by 10% (i.e.: from 74° to 67°) for 8 hours can shave 10% off your heating bill. Try it at night and use extra blankets when sleeping.
2. **Run your washing machine and dishwasher only when you have a full load.** Use the cold water setting when possible. And always clean the clothes dryer's lint filter after every load.
3. **Keep the lights off in unoccupied rooms.**
4. **Turn off kitchen and bathroom ventilating fans when you're done.** If left on for an hour, they can suck all the heat out of the house.
5. **During the winter, open drapes, blinds, or shades on windows facing the sun to warm your rooms.** At night, cover the windows for better insulation. Also keep the windows clean so they can let in the maximum amount of light and heat.
6. **Make sure none of your furniture is blocking a heat register;** any heat from the register will only work to warm up the item that is covering the register. To feel warmer, move furniture away from cold exterior walls and windows; humidify the air too.

7. Contact your local utility company to ask about a home energy audit. Costs vary, but some companies offer free audits.



AARP's Operation Energy Save also offers these useful tips:

1. Close heat vents and doors in rooms that are not being used.
2. Make sure all windows are fully closed. Lock double-hung windows to minimize drafts coming through older windows.
3. Shut fireplace dampers to prevent heated air from going up the chimney when you're not using the fireplace. Be sure all embers are out.
4. Clean registers, baseboard heaters, and radiators, and be sure that they're not blocked by curtains, furniture, or carpeting.
5. Lower the temperature on the water heater to 120 degrees. Reducing the temperature by 20 degrees can save you nearly \$50 a year.
6. Replace or clean furnace air filters. A clogged, dirty filter forces your furnace to work harder. A clean filter can save you an additional 10% on your energy bill. Normally air filters should be cleaned or replaced every 30 days.
7. Remove window air conditioning units when the summer is over to prevent heat from escaping. If the unit can't be moved, cover it to prevent drafts.
8. Use expanding foam from your local hardware store to seal the gaps around pipes that connect to the house from the outside.
9. Install weather stripping or caulk around doors and windows and place foam gaskets behind outlet plate covers on exterior walls. If there's a large gap at the bottom of an exterior door, install a door sweep. Seal and insulate ducts and joints with a non-hardening sealant. Ducts running through unfinished spaces (attics, crawl spaces, and garages) that aren't properly sealed and insulated can add 25% to your home's heating and cooling bill.

Figure 2: Check off your green efforts.

The tedium of recycling used to annoy Helen Baker of Cherry Hill, New Jersey. Like most of us, Helen disliked having to separate her paper, glass and plastics. These days, Helen is rewarded for her efforts, and there is no longer a need for her to sort her recyclables either. According to the AARP, Helen likes taking out the recyclables, "I try to put everything in recycling that belongs there." The Recycle-Bank encourages private citizens to go green through offers of discounts and coupons for items at hundreds of stores, including CVS and Home Depot. Recycle-Bank contracts with communities across the country and gives households credit for the weight of the recyclables left outside for regular pickup. Conscientious homeowners can earn over \$500 in rewards annually and make their contribution to the reduction of greenhouse gases and reuse of materials. As Helen says, "It's making the world a better place, and we're going to get personal rewards as well." For more information, visit RecycleBank.com.

GREEN – THE COLOR OF CORPORATE SUCCESS

J.C. Penney

J. C. Penney is one of America's leading retailers with 1,067 stores. J.C. Penney was named Energy Star's Partner of the Year for 2006. It was the first retailer to earn the Energy Star label for a retail store upon the release of EPA's energy performance rating for retail in October 2007. With the full support of top management, J.C. Penney's energy management program has continuously focused on refining systems and processes to increase effectiveness. J. C. Penney received Energy Star recognition again in 2007 by achieving the following results:

1. Maintaining the same energy use across all stores as they did the previous year despite opening 50 new stores and increasing store operating hours.
2. Upgrading 188 stores through its Energy Management System initiative. This saved the company an average of 7.6% in energy per store for a total savings of \$1.9 million.
3. Performed upgrades of lighting systems in 167 stores, thus saving another \$2.6 million in energy costs.

As of this writing, J.C. Penney looks anxiously to the future and hopes for Energy Star recognition again for their efforts in 2008 which will make it the third year in a row that J.C. Penney has earned the right to be called a green corporation.

J.C. Penney was very successful in helping its staff be part of the solution. Striving to make energy conservation direct, simple, and fun for its 155,000 employees, J.C. Penney designed an “Energy Captain” Portal to supplement its online Energy Center. The Portal is a one-stop shop for energy reports and support materials, as well as a forum to share ideas with peers. On Earth Day 2007, the company held a celebration at its home office in Plano, Texas, where thousands of CFLs were distributed to associates taking the Energy Star “Change a Light” pledge. J.C. Penney capped the year by sponsoring a coast-to-coast Energy Star “Change a Light” Bus Tour promoting the use of CFLs and other energy-saving practices, just proving that you can change the world, one light bulb at a time.

Giant Eagle, Inc.

Giant Eagle, Inc. is one of the largest food retailers and distributors in the United States with approximately \$7.1 billion in annual sales. The company continues to demonstrate that sustained commitment to superior energy management has resulted in significant environmental and financial savings. Giant Eagle received the Energy Star Sustained Excellence recognition a total of three times so far. Their accomplishments include:

1. Saving nearly 2% on energy bills from 2006 to 2007 alone, with a total savings of 10% since 2003.
2. Earning the Energy Star award for superior energy performance for 122 of its stores, or more than 85% of its eligible buildings.
3. Expanded its strategies and practices for improving the energy performance of its stores, including power monitoring through sub-metering, re-commissioning, and constructing new stores with energy saving roofing materials.

Giant Eagle let its 28,000 employees drive energy saving efforts by forming energy management teams, identifying an energy champion for each store, creating energy efficiency opportunity lists, and developing store-specific best practices. The Conservation Department at Giant Eagle promotes every October as Energy Awareness Month and educates team members with energy saving tips at stores, such as cycling night lighting to save anywhere from \$6,000 to \$18,000 per store, as well as sharing energy savings.



Figure 3: Green business helps earn green.

Gresham-Barlow

The Gresham-Barlow School District is one of the largest districts in Oregon, serving approximately 12,000 students across 11 elementary schools, five middle schools, and three high schools. Gresham-Barlow is the first school district to receive the Energy Star Award twice. The accomplishments of the Gresham-Barlow School District include:

1. Being the first organization recognized by the EPA as an Energy Star Leader for achieving 30% savings for all buildings.
2. Saving more than \$1.3 million in utility costs in 2007 alone, which is equal to 24 full-time teachers' salaries.
3. Earning the Energy Star label for superior energy performance for 17 out of its 19 schools.

Gresham-Barlow set a goal of having all of its schools earn the Energy Star and worked towards a goal of 50% savings in energy use compared to 46 percent the previous year. Gresham-Barlow School District management and staff continue to successfully grow an energy and resource conservation culture throughout the district using Energy Star strategies. The district integrates technology and empowers each school by providing energy management information to help make better decisions. One elementary school saves an average of \$800 a month through its “Watt Watchers” program where students patrol the school and hand out red tickets for empty classrooms where lights were left on.

Continental Airlines

In early January 2009, Continental Airlines was the first U.S. commercial air carrier to conduct a demonstration flight powered in part by alternative fuels. Continental flew a Boeing 737-800 without passengers for about 1 hour, 45 minutes from Bush Intercontinental Airport in Houston, Texas, its large hub. Just a week before, Air New Zealand tested a passenger jet powered partially with oil from jatropha; a bush with round, plum-like fruit that is found in parts of South America, Africa and Asia. Seeds from jatropha are crushed to produce oil that is refined and mixed with diesel. Continental's flight was the first to also algae as a fuel source. While long term, large-scale use of such fuel is still several

years away, the goal of the experimental flight was to analyze technical aspects of using biofuels, including the effects on the plane's mechanical systems. In this case, the alternative fuel was derived from algae and the same type of jatropha plants use by Air New Zealand.

Many in the airline industry acknowledge that it will be several years before biofuels replace jet fuel used by Continental and other major carriers as the supply is not available, and the facilities to make biofuel have yet to be completed. Airlines have been experimenting with alternative fuels as a way to reduce carbon dioxide emissions and more importantly, lower fuel bills for many cash-strapped airlines whose stock tumbled in 2008 while oil prices skyrocketed.

Continental has a company-wide commitment to environmental responsibility. On average, Continental burns approximately 18 gallons of fuel to fly one mainline revenue passenger 1,000 miles, which represents a 35% reduction in greenhouse gas emissions and fuel consumption since 1997. Continental has also reduced nitrogen oxide emissions from ground vehicles at Bush International Airport by 75% with electric vehicles and other new technologies.

Ford and Honda

The dashboard in your next new car may help transform your efforts of going green into a video game. One can usually expect annual improvement upon a car's design or in the technology. Ford and Honda will not disappoint the buyers of their new hybrids as they will include next-generation instruments in the dashboards that will help drivers learn to *hypermile*. Hypermiling is the conscientious effort of maximizing fuel economy. The greener gauges will pay particular attention to your fuel economy and whether or not the car is being driven as efficiently as possible. Virtual trees or vines will grow on the display panel with softer acceleration and a lighter touch on the brake pedal. If you drive like you have a brick tied to the end of your shoe, you will see withering plants. Drive with a lead foot, and the plants wither and die. Automobile manufacturers are hoping the new displays will help drivers ease up on the gas by showing them where they can improve. Some automakers are even thinking about including in-car Internet technology to let people compare driving statistics and make green driving a social activity. Both Ford and Honda will debut their greener gauges this year.

GREEN – IS IT A FAD OR OUR FUTURE

With so much publicity on the greening of our economy and culture, it does not seem to be a simple fad. Though time may prove otherwise; we believe environmentally friendly practices will surpass jargon and become fundamental. We are seeing jobs going

green too! We are no longer a nation of blue and white collar workers, but also green collar workers. For example, new homes are weatherized by construction workers; charter boat captains ask smokers to dispose of cigarette butts in used aluminum cans instead of tossing them overboard; and electricians now install solar power and solar heating systems. These are green collar jobs and they are in high demand in some parts of the United States.

The Green For All organization promotes green jobs as a way to decrease poverty and get people on a sustainable career track. They envision that the new, green-minded economy can support those jobs and more, not just in larger companies, but green jobs just might be more easily provided by, and be a better fit for small, private employers.

Green-collar jobs are good, decent, respectable jobs. Like blue-collar jobs, green-collar work pays honest wages and provides opportunities for advancement. Green For All says a job that does something for the planet, and little to nothing for the people or the economy, is *not* a green-collar job. Most green-collar jobs are middle-skill jobs requiring more education than high school, but less than a four-year degree. Green For All recommends that all green-collar job strategies also provide opportunities for low-income people so they too can move from a life of poverty to economic self-sufficiency.

The green economy demands workers with new skill sets. Some green-collar jobs -- such as renewable energy technicians -- are new and require further education and training, but there are many more jobs today can easily be transformed into greener ones. Green For All exemplifies "computer control operators who can cut steel for wind towers as well as for submarines; or mechanics who can fix an electric engine as well as an internal combustion engine" can easily be classified as green collar workers. All that needs to be done in each case is "identify the specific skills the green economy demands. Then we need to invest in creating new training programs and retooling existing training programs to meet that demand."

We salute the laborers working on an assembly line powered by greener energy. For more information, visit GreenForAll.org.

Green Mayor Sees Red

In October 2008, a federal judge in New York City blocked legislation that would have required all new taxicabs to be fuel-efficient hybrids. The original law was part of Mayor Michael Bloomberg's aggressive goal of making all taxicabs in New York City go green by 2012. The judge's ruling clearly said that the

legislation was pre-empted by federal law. As you may already know, federal law supersedes local or state laws.

Just a month prior to the ruling, the Metropolitan Taxicab Board of Trade, a trade association claiming to represent at least 25% of all the city's taxicabs, sued to block enforcement of the rules. The Board argued that only the federal government, not the city's Taxicab & Limousine Commission, has the authority to regulate emissions and fuel efficiency standards. It also claimed that hybrids are not safe enough for use as taxicabs on the city's streets. It seems the federal judge agreed with their sentiments. The new rules would have gone into effect November 1, 2008, and would have required a new cab to maintain at least a 25 miles-per-gallon (mpg) standard. This year it would have increased to 30 mpg. Ford's Crown Victoria is the standard yellow cab used in New York City. It gets about 14 mpg while some hybrid models get as much as 36 mpg. Of the 13,000 taxicabs in New York City, approximately 1,500, or slightly over 10 percent, are hybrids.

Mayor Bloomberg vowed to continue his efforts to pass the law, stating "Greening the taxi fleet is a major priority, and we are going to use every mechanism at our disposal to make New York a cleaner, healthier city."

Greening In Greensburg

Greensburg, Kansas, became model for going green after the townspeople had to rebuild their homes and businesses after a tornado destroyed about 90% of their community in 2007. Where windmills once graced the local horizons, Greensburg is embracing newer, more efficient wind turbines to generate enough wind energy to power the entire town. Since there is only about 20 inches of rain in Greensburg per year, this town of 700 ensures that runoff is collected and used to water plants. Greensburg's public buildings now meet or exceed some of the most stringent standards for efficient energy usage. Even the local tractor dealership is applying for certification from the U.S. Green Building Council, and in addition to selling tractors, it plans on selling wind turbines for private and commercial purposes.

One building that was reconstructed is Greensburg's National Building Museum; its current exhibit is 'green' to say the least. Visitors to the Museum view examples of sustainable living in an exhibit called "Green Community" which runs through October of 2009. The exhibit breaks some traditional rules by not having precious artifacts on display and few actual objects to tell the story of green communities. Nor will you find any remnants from the tornado here -- instead the museum planners use photos, videos and interactive

displays to show visitors how their own towns can be greener and more fuel efficient.

Visitors see scrap, like old shredded tires and aluminum cans, filling transparent columns that reach to the ceiling. Statistics posted on the columns describe recycling or the use of mass-transit in various cities. One column shows that Houston's 2.6% is the lowest recycling rate in the nation while San Francisco recycles as much as 70% of its waste. The entire exhibit offers an abundance of green initiatives from around the world. This effort to promote green in our daily lives has helped the Greensburg's residents remain optimistic about recovering from their 2007 losses.

From Our Nation's Capitol

In the greater Washington DC area, Virginia, Maryland and District officials are joining forces with the federal government to promote the Chesapeake Crescent Initiative (CCI). The Crescent extends from the northeast corner of Maryland to Hampton Roads, VA. CCI hopes to promote regional collaboration, the environment, innovation, the local economy, and sustainable development. With over \$2 million in combined resources, the CCI along with developers and entrepreneurs will help local and federal authorities maximize the resources of the Crescent.

One CCI project encourages the federal government to buy more plug-in hybrid vehicles for its area fleets. Another project hopes to attract new investors with improvements to the area's infrastructure. Other Crescent Initiative projects push for the use of cleaner energy, increasing transportation options, and developing affordable housing for the local workforce. Washington DC's Mayor Adrian Fenty states, "To build a truly globally competitive region, we have to think across jurisdictional lines when it comes to building a more green and sustainable economy, driving innovation and investment, and making our transportation network efficient and effective."

OTHERS LEADING THE GREEN

Levi Strauss

Levi Strauss; the garment company is taking action, too. The main ingredient in Levi's blue jeans is cotton; cotton makes up 97% of every pair of Levi's sold. Growing good cotton takes a huge amount of water and chemicals. Changing weather conditions and the shifting of climates has created a water shortage in some parts of the world. In response, Levi Strauss has begun research and development into alternative fibers that can be readily available should the world's cotton supply fall short.

Levi Strauss has also joined forces with Nike, Sun Microsystems and Timberland to launch a business coalition called Business for Innovative Climate and Energy Policy. "BICEP" plans on using the strength of its name to influence the national dialogue on climate change. Their first agenda is to aggressively promote the reduction of pollution and the transition to a clean energy economy. Like Levis Strauss, Nike has issues with their suppliers and they worry about the availability of the natural and manmade resources that go into their products. We will examine Nike closer in a moment, but how was your coffee this morning?

Besides making a good cappuccino, did you realize that Starbucks is a leader in promoting action on global warming? Starbucks success relies entirely on the success of the world's coffee bean crop. Climate shifts have hurt coffee bean producers around the world. Through their involvement in helping to solve the issues effecting global rainfall and harvest patterns, Starbucks is working to ensure their future by helping reduce operating costs and minimize the impact extreme weather conditions place upon local economies.

Like Levi Strauss and Starbucks, Nike has more than just agricultural impacts to worry about; Nike also has supply chain issues. With over 700 factories working under contract for Nike, the manufacturing of their products contributes to Nike's carbon footprint. All of the Nike products need to be distributed to Nike's transportation system; this transportation system contributes to 25 percent Nike's carbon emissions alone.

With all of the members of BICEP having huge operations and supply chains, they realize they significantly impact the environment. BICEP's goal is to reduce their reliance on oil-based fuels and rely more upon clean energy, and bring more environmentally friendly products to their consumers.

GREEN – HOW YOU CAN PROFIT

One of the credos for being in business is to make a profit and going green can help you in that effort. You can do this by embracing the concepts of going green and responding to it within your company, no matter what your job or title. Any one little thing you do, or can do, helps make the Earth greener.

Many companies have smartly realized the issues and have capitalized on them by producing new products and services for a green-minded customer base. This not only provides those companies additional visibility and strengthens brands, but it just makes darned good sense. In 2005, General Electric's (GE) launched its environmentally friendly program called

Ecomagination. Within a year, GE's portfolio of energy efficient and greener products and services increased 20% to more than \$12 billion with backorders for services and products amounting to almost \$50 billion; that is one heck of a lot of green. During that same year, Goldman Sachs publicized their own environmental policy that specifically addressed their lending guidelines. In March of 2007, Bank of America announced their own program that set aside \$20 billion over 10 years to finance green buildings and technologies, assisting companies in trading carbon-emissions credits, and provide financial services to businesses that are developing and producing green products. During that same period, Citigroup said it would invest \$50 billion over 10 years to promote climate change through investments and financing of alternate energy and green technology.

Setting the example since the 1990s, DuPont has dramatically cut the amount of greenhouse gasses it produces and has saved over \$3 billion in the process. Since then, DuPont has been focused on developing products that reduce greenhouse gas emissions and set a goal of raising at least \$2 billion from their products that reduce greenhouse gasses.

RADIO WORLD



Figure 4: Radio World Newspaper

Last year, Radio World newspaper launched a series called Green Radio where they provide readers articles on how radio is "going green" in an effort to save energy and reduce costs. From their Green Radio archives, comes this very green story from Bagdad, Arizona about KFTT (103.1 FM); better known as K-FAT. Unbelievably in Arizona, there is green everywhere at K-FAT. In their August 2008 article, Leslie Stimson wrote, "[This] 900 watt Class C3 facility runs 100 percent solar at its transmitter site in Bagdad and uses solar power for its STL. Soon, the company will add about 180 solar panels to feed power to the Bagdad studio and then onto the roof of the adjoining, co-owned bar and grill." Stimson continues to write, "In addition, the company also plans to install solar panels to its 5,000-square-foot media center in Lake Havasu City, where studios and offices for five stations are located."

K-FAT is owned and licensed by Murphy Broadcasting which is based in Lake Havasu. As part of Murphy's group of five radio stations, K-FAT brands themselves as playing all the hits from the 80's to today, and where "We play what we want." Murphy Broadcasting is

owned by Rick Murphy who is known to say that Murphy Broadcasting is one of the largest small-market broadcast companies in the U.S.



Figure 5: Radio World's Green Radio

LEED In Broadcasting

In another of Radio World's Green Radio pieces, Tom Vernon wrote in his article, Systems Green: Conserving in New Facilities, that today "many broadcasters [are thinking] about the environment when planning renovations or construction of new facilities. Yet most managers and engineers are unfamiliar with the terminology, technologies and standards involved in green building. As broadcasters approach a green building project or renovation, Leadership in Energy and Environmental Design, or LEED, certification may become an area of interest...getting LEED certification has several advantages. LEED-certified buildings use key resources more efficiently than conventional buildings. They are also healthier work environments, as demonstrated by higher employee productivity and less absenteeism. Among other advantages of LEED certification are reduced environmental impact on the construction site, improved air and water quality, and reduced solid waste."



Figure 6: USGBC

The US Green Building Council (USGBC) developed a set of standards for design, construction and operation of environmentally sustainable buildings. This set of standards, as mentioned previously, is known as LEED and addresses a number of environmental concerns such as air and water quality, energy, efficiency, pollution and the responsible management of natural resources. The LEED Green Building Rating System is a third-party certification program and the nationally accepted benchmark for the design construction and operation of high performance buildings. LEED provides building owners and operators with the tools they need to have an immediate and measurable impact on their buildings' performance. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

The LEED for Existing Buildings Rating System helps current building owners and operator's measure operations, improvements and maintenance on a consistent scale, with the goal of maximizing operational efficiency while minimizing environmental impacts. LEED for Existing Buildings addresses whole-building cleaning and maintenance issues, use of chemicals, recycling, exterior maintenance programs, and systems upgrades. It can be applied both to existing buildings seeking LEED certification for the first time and to projects previously certified under LEED for New Construction, Schools, or Core & Shell. There are both environmental and financial benefits to earning LEED certification. LEED-certified buildings:

1. Lower operating costs and increase asset value.
2. Reduce waste sent to landfills.
3. Conserve energy and water.
4. Are healthier and safer for occupants.
5. Reduce harmful greenhouse gas emissions.
6. Qualify for tax rebates, zoning allowances and other incentives in hundreds of cities.
7. Demonstrate an owner's commitment to environmental stewardship and social responsibility

In 2008, the Weather Channel followed the LEED standards for new construction when building their new High Definition (HD) studio in Atlanta, Georgia. The Weather Channel has covered the climate and the environment for more than 25 years, so when it came

time to build their new HD studio, it was only natural to build the new structure with the environment in mind. In 2008, Weather Channel Executive VP and General Manager Wonya Lucas said, "Green is really the new black...we look at the world through the lens of weather, and now we're also looking at it through a lens of green." The new 5,000-square-foot studio has landscape irrigation provided by an underground storm-water retention pond. Products that are low in volatile chemicals were used for painting and more than 50 percent of all disposable items are sorted and hauled to recycling centers. Lastly, the Weather Channel staff is taking additional steps to reduce fossil fuel emissions, plant new trees and conserve energy.



Figure 7: Plants provide many benefits.

The use of greening in engineers is not only about applying newer technologies but also about relying on things we know are good for us. The benefit of having plants in our office space, or a water fountain, is worth considering too. Real plants, not fake ones, can give someone a chance to personalize their office space and put oxygen, created by the plant, into the air. The feelings of comfort and warmth that a plant provides can immediately improve the atmosphere in any room. More importantly, plants help remove toxins, like benzene and formaldehyde, that are naturally emitted from building materials; some of which can be detected a much as a year after the building is completed. Research also indicates that those companies that have plants in their offices show reduced rates of absenteeism, lower levels of stress, greater levels of creativity and lower incidents of illness. Small water fountains not only provide a soothing sound effect to office environment, but as the water evaporates, the humidity is added to the air supply. Naturally we all realize that designing broadcasting spaces is not all about the Feng Shui, but combining functionality with anything to makes people more comfortable in their environment is a by move towards a greener setting.

As part of Radio World's Green Radio series mentioned earlier, they provided the following list of top ten technologies that help radio, television, and as a matter of fact, all of us go green. Here it is in its original form:

1. Green roofs, both reflective and vegetative, help reduce the urban "heat island" effect by minimizing a building's absorption of solar radiation.
2. Gray water systems recycle water from sinks and water fountains to be used in toilets and other non-drinking applications. Captured rainwater may also be used.
3. Geothermal heat pumps transfer heat from the ground to buildings in the winter and reverse direction to provide cooling in the summer. They may be built anywhere in the United States.
4. Tubular skylights are less costly than conventional skylights, distribute light evenly, are energy efficient and don't cause ultraviolet damage to carpets and furniture.
5. Eco Machines treat wastewater in natural processes that combine microorganisms, plants, snails and fish to clean water, which can then be used for irrigation.
6. Daylighting uses exterior light through windows and skylights to illuminate a building's interior, reducing electricity demand during the day. Taller floors and light shelves permit natural light to penetrate further into the building. Daylight sensors turn off artificial lighting when daylight is sufficient.
7. Right-sized HVAC guidelines enable more accurate estimates of heating and cooling loads. A right-sized system will operate for long periods of time, rather than cycling on and off, resulting in longer equipment life and better control of the indoor environment.
8. Wireless controls and sensors for heat, lighting and security require less installation time than their wired counterparts and add flexibility. To control multiple pieces of equipment or temperature from multiple locations, just wall-mount additional wireless thermostats or controls.
9. High-performance windows have triple-pane glass and double-skin windows that reduce heating and cooling loads as well as draftiness and moisture condensation. On some double-skin windows, the inner windows can be opened to increase ventilation.

10. Concentrator photovoltaic (CPV) technology achieves greater efficiency than flat panel photovoltaics by using mirrors or lenses to concentrate solar energy onto smaller areas of PV material.

NOT THE END – IT IS THE BEGINNING!

Electronics improve the way we live, work and play but there is one place where electronics should have no impact—the environment. Through responsible use, reuse and recycling of electronics, the consumer electronics industry and consumers can protect and preserve the environment together. Many organizations offer free recycling of used electronics, so it's easy to be green. At MyGreenElectronics.com, you can find links to many major manufacturers like Apple, Dell, Gateway, HP, Panasonic, Sony and Toshiba. You can also find links to corporate cellular phone manufacturers and their recycling programs, including the United States Postal Service which provides bags in 1,500 post offices to recycle ink cartridges, blackberries, PDAs, and MP3 players for free; the postage is included as part of their incentive for people to recycle.

The credo at MyGreenElectronics.com is, “Enjoy your electronics; protect the environment.” To do that, they promote the four R’s of electronics; they are: reduce, reuse, recycle, and rethink.

Their simple point to us is first; reduce energy use and e-waste. Responsible, energy-conscious use of electronics not only saves energy; it can save you money, too! To manage the growing problem of e-waste, or electronics being thrown away, you can extend the life of your electronics with proper care, fix your gear first before trying to recycle, or donate your used electronics since your outdated model could be a welcomed resource for someone else. Therefore, reuse, or give someone else a chance to reuse your electronics; older electronics that still work can still be put to good use. Many charities, community programs and schools are in desperate need of usable electronics. For example, Goodwill partnered with Dell Computer to create RECONNECT, a comprehensive electronics recovery, reuse and environmentally responsible recycling opportunity for consumers in participating communities. RECONNECT offers free drop-off recycling and reuse options for unwanted electronics.

The third R, recycle, should require little explanation at this point. Should you recycle your electronics? First ask yourself these questions: Can my product be reused or sold? Is it possible to repair my product? If you've answered "No," then recycling is your best choice. As mentioned earlier, there are a great many corporate

recycling programs and chances are the companies you buy from today will help you recycle tomorrow.

The fourth and final R, rethink, has little to do with what you did yesterday, but more with what you are planning to do in the future. Make smarter, more environmentally-friendly and more energy efficient choices by purchasing green electronics. Find electronics and accessories that use less energy, are made with recyclable and recycled materials and are easier to upgrade, fix and recycle. Look for the Energy Star label!

Consumer electronics, as a whole, are more eco-friendly than ever. Today, virtually every product we buy for the broadcast station or for home contains fewer chemicals, is more energy efficient, and is easier to recycle, repair and upgrade. Many manufacturers have developed green electronics lines. These products go the extra mile to contain fewer chemicals and are more energy efficient. In order to be labeled green, a product must meet a stringent checklist of criteria. There are hundreds of green electronics from plasma TVs and computers to MP3 players and cameras. Surprisingly, most green products are priced no differently than regular lines, though they may have cost the manufacturer a little more to produce. Most of these products are not marketed as “green” in the United States, so be sure to make your salesperson do the homework for you as most retailers do have green electronics for sale.

SUMMARY

From global warming to a shortage of landfills, we will continue to worry over ensuring a cleaner, greener environment for ourselves and future generations. The application of 'greening' to broadcast engineering not only takes planning and coordinating, but it also takes commitment and a real effort no matter where we live and work. Methodologies of applying greener processes and tactics to all industries, including broadcast engineering, are important to our business workflows. Everything from paper, glass, batteries, plastics, metal, liquids and more, are all resources needed to run a broadcast station and thankfully almost all are reusable too. Recycling and repurposing are not simply options, but something we must all do as part of a greener world. Green solutions, and greener engineering, not only contribute to a better environment but also to your station's bottom line and they help engage employees in efforts to go green at work and at home.