

2015 INSIDER KNOWLEDGE

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environmental
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ENERGY MANAGER TODAY

2015 INSIDER KNOWLEDGE

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When it comes to building your energy and sustainability management strategy, how and where to begin can be unclear. Ecova's solution set makes sense of your utility and resource data, and our team of experts defines clear strategies that create powerful change.

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FROM THE PUBLISHER

Dear Reader,

The world's business community faces ever-growing sustainability and energy management challenges, and rising to those challenges quickly and proactively is now more important than ever. While some of these challenges have been developing for many years -- even decades -- new challenges crop up every day, and along with them comes the need for businesses to adapt and evolve, with better approaches, new tactics, and smarter initiatives. While a seemingly infinite number of resources exist to help energy and sustainability managers understand the new landscape and to guide them through new processes, it can be difficult to predict which tactics and approaches will work best for a specific problem. And sifting through the wealth of information can be an intimidating challenge on its own.

That's why we began, several years ago, to publish the Environmental Leader Insider Knowledge Report: because even the most nimble companies -- those able to turn on a dime to adapt their business processes with ease and creativity -- can learn from others.

In these pages, you'll hear from a variety of sources: from the people at the operational level working in the trenches to managers to the C-suite. You'll find answers to questions such as:

- » How did other companies solve the problems we have, and how did the initiative perform?
- » What steps did they take?
- » What worked? And (equally important), what didn't work?
- » What partners did companies work with, and how did they approach the problems or challenges?
- » What are the effects of environmental changes on a company's business -- positive or negative -- and what are they tackling first?

Here, you can randomly peruse the case studies, stories of success, and lessons learned, search through the table of contents for the specific problem you're hoping to solve, or scroll to the end of the report to search by company name if you'd like to learn from a specific organization.

We hope these stories will help you understand and solve the challenges you face in today's competitive marketplace. Environmental Leader, along with sponsors Ecova and VF Corporation, are happy to bring you the Insider Knowledge Report and hope you will find it invaluable for the stories and tactics shared here.

Sincerely,



Paul Nastu

Publisher

INDEX OF CATEGORIES

Alternative Energy

Emissions Reductions and Climate

Energy Management

Leadership

Reporting and Standards

Supply Chain Sustainability

Sustainability Programs

Sustainable IT

True Value of Sustainability

Water and Waste Management

Alternative Energy

What began in 2006 as a project to explore energy capacity expansion for the Holland, Michigan Board of

Public Works (HBPW) energy plant grew into a sustainability journey possibly unique in the municipal utility industry. HBPW began with a fairly conventional vision to expand the coal fired energy plant with newer energy generation technology. They began exploring technologies including algae biofuel, a circulating fluidized bed (CFB) boiler using coal, and carbon sequestration.

By 2008-2009, HBPW was seeking two federal grants to study and implement a carbon capture and sequestration system (CCS). The goal was to capture CO₂ from the energy plant and inject it into underground rock formations. Only one of the two grants was awarded, so carbon capture was scrapped. Meanwhile, HBPW and the Michigan Department of Natural Resources entered into an extended legal dispute over the approval of the air permit to expand the coal plant.

HBPW prevailed and eventually was awarded the permit. An additional legal battle was ongoing between the HBPW and the Sierra Club over the existing coal plant. Legal costs were mounting, and the City was no closer to a decision on power generation. Although HBPW had a permit for a coal-fired energy plant, it became clear a different solution was warranted.

In July 2011, the HBPW launched an exhaustive Sustainable Return on Investment (SROI) process with HDR (specialists in engineering, architecture, environmental and construction services) to study the financial, social, economic, environmental and health impacts of several new energy generation options. Also driving this sustainability focus is Holland's Community Energy Plan, a 40-year framework for achieving more sustainable energy and reduced demand developed by the Holland Community Sustainability Committee with an outside consultant, Garforth International.

The SROI process was also the trigger for the HBPW to pursue enhanced community and stakeholder communications. Power for the 21st century or "P21" became the communications theme. The P21 web site became a focal point (www.p21decision.com). Risk Analysis Process (RAP) sessions were set up with an assembly of community and regional stakeholders collaborating on the scope and categories of study for the SROI.



Diane Haworth

Vice Chair

Board of Directors, Holland Board of Public Works

www.hollandbpw.com

HBPW hosted several informational sessions with experts speaking on topics critical to the generation decision and intended to educate the community on potential options.

HBPW and HDR finally concluded the year-long SROI study. The results pointed to a natural gas solution with supplemental purchased power agreements (PPA) for renewable energy (wind). Once the city made the decision to pursue natural gas with wind PPAs other elements fell into place. A partial brownfield site was identified in a declining area of the city. The location was also a natural gateway into the city. HBPW assembled another community stakeholder panel to collaborate with HDR on architectural designs for the future Holland Energy Park.

HBPW began planning for extensive materials reuse from the demolition site and collaborated with local charities to re-purpose building materials from vacated properties at the 26-acre site. The lawsuit with the Sierra Club was resolved. On April 21, 2015, a groundbreaking ceremony at what is now being called Holland Energy Park kicked off the project and Barton Malow, a Michigan-based firm began construction.

When complete in 2017, the Holland Energy Park will include an architecturally distinctive energy plant with two state-of-the-art gas-fired turbines that significantly reduce the GHG emissions over the existing coal-fired plant. Walking paths through the park will connect to the Macatawa Greenway trail system. Environmentally sensitive landscaping and water retention features will also reduce runoff to the Macatawa River and wetlands surrounding the park.

When it goes fully operational, the \$200-million Holland Energy Park will showcase a variety of environmental and aesthetic considerations that include:

- » **A bold, modern building design that creates an attractive eastern gateway to the city;**
- » **A 50 percent reduction in carbon emissions and the virtual elimination of solid particle pollutants;**
- » **Double the fuel efficiency of Holland's present power generation;**
- » **The development of open, public space that will integrate with the Macatawa Greenway trail system;**
- » **An expansion on Holland's innovative snowmelt system and, potentially, district heating;**
- » **The facility will use the latest combined-cycle natural gas generating technology to produce up to 145 megawatts of power to meet the needs of a growing community.**

This successful outcome could not have happened without public involvement and support that grew from the SROI process. A municipal utility is owned by the community and needs an engaged and involved community to be successful.

Our energy reduction strategy is comprehensive, focused on reducing overall consumption, implementing energy-efficiency projects at our facilities and developing

renewable energy projects. In the past, we have done a number of projects specifically around solar. We currently have a 5,520 panel solar array that provides the Skillman campus with 48% of its annual energy use, and also have panels installed on top of our San Francisco office.

The Sustainability Team, alongside Purchasing, Facilities and Legal, collaborated on a Remote Net-Meter power purchase agreement for a solar development on two warehouses in Queens, New York. "Remote Net-Metering" enables sites with poor solar characteristics but significant on-site load to benefit from a solar system on an alternative site with excellent solar characteristics. This project is expected to produce 1.8 Million kWh of clean energy annually and 535 metric tons of carbon per year.

The project is being developed by a NYC-based solar developer, EnterSolar. The warehouses hosting the system are part of a broader real estate development project that will bring 135 permanent jobs to the local community.

The principals at Renova Partners LLC have successfully acquired, remediated, redeveloped and secured zoning and approvals for over 75 severely contaminated properties nationwide. As a company that

focuses on brownfield redevelopment, we understand the importance of economic drivers through many years of experience. In a strong real estate market, these drivers often arise from the creation of land value through the resolution of environmental issues. At other times, redevelopment can be propelled by savings of anticipated remedial costs. We have also seen how time-consuming and unpredictable obtaining public incentives can be. The public process may subject a redevelopment project to the vagaries of the real estate



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market, where a negative price movement can dwarf the advantages of the available public incentives.

Redeveloping a dormant brownfield is more desirable, for both developers and regulators, once a detailed end-use for the brownfield has been identified. This expedites the redevelopment process, as regulators are far more comfortable approving a remedial approach for a specific end use than for a conceptual future for a property. The collapse of the real estate market in 2008 presented an interesting challenge, as the lack of demand made it increasingly difficult to redevelop the brownfields after they had been remediated. However, as demand for renewable energy continued to grow, we saw solar farms as a viable land reuse option. We founded Brightfields Development LLC in 2009 as a vehicle for redeveloping mounted brownfields and landfills into solar energy projects. Brightfields owns and operates the solar project above the ground while Renova operates and manages the subsurface aspects of a property hosting a Brightfields project. This appeared to be an ideal solution for transforming an otherwise unused, contaminated property into inexpensive land hosting a renewable solar energy installation. We discovered that solar development is and remains an ideal use of dormant, contaminated or geotechnically suspect land, especially in an expensive real estate market where land is scarce.

The solar market is thriving due in part to public incentives at the federal, state and local levels. SRECs, or solar renewable energy credits, have played an integral part in the solar market by increasing the economic value of solar investments and assisting with the financing of related projects. Massachusetts, where we are headquartered, is currently featuring the SREC II program, which requires a specific percentage of the renewable energy produced in the state to be derived from solar energy. This incentive has been crucial for solar developers in Massachusetts, which currently has installed over 800 Megawatts of solar energy, ranking it 4th in the nation. With rapidly declining capital and soft costs, and with enhancements in complementary technologies, especially batteries, solar will continue to supply a meaningful share of the electricity supply in this country for the foreseeable future.

Faced with mounting fuel costs, New Jersey's Hanover Township Wastewater Treatment Plant (WWTP) has decided to use the biogas they were previously flaring to power a 100 kilowatt engine. Prior to injecting the flare gas into the generator, Hanover will condition the biogas to extend the life of the engine and avoid costly down time. My company, Clean Methane Systems (CMS), based in Tualatin, Oregon, was selected to provide the company's patented conditioning technology.



Tim Robinson

President
Clean Methane Systems
methanesys.com

As there is no natural gas line to Hanover's WWTP, the facility purchased fuel oil to power their generators and fuel their boilers. This ongoing cost is about to be eliminated due in part to the biogas-conditioning technology.

To remove the hydrogen sulfide, siloxanes and moisture, the biogas first enters a 10-foot by 4-foot vessel containing 6,000 pounds of SulfaTreat media, which is intended to reduce the hydrogen sulfide from 300 parts per million by volume to less than 150 parts per million by volume. The SulfaTreat media is only required to be changed every 48 months, adding to the cost savings, CMS reports.

After the hydrogen sulfide is removed, the gas enters a compressor and moisture removal system before entering the siloxane removal vessels. For the project the two vessels are 8 feet high and 1.5 feet wide. They are set up in a lead/lag configuration with the biogas first entering one vessel and then on to the next. Each vessel contains 600 pounds of patented SAG/HOX media, which needs to be changed out about every eight months.

The biogas project cost about \$2 million and was part of a larger \$6 million project aimed at ending the facility's dependence on fuel oil. Even with a smaller biogas project, the Hanover WWTP estimates the payback for the biogas portion of the project is 15 years.

Within the last year, General Motors has added nearly 3 megawatts of solar power to its facilities, announced a power purchase agreement that will add wind power to its renewable energy portfolio for the first time, and expanded the use of landfill gas at its Fort Wayne, Indiana assembly plant, which recently ranked No. 5 on the US Environmental Protection Agency's list of top 30 generators of onsite green power.



Rob Threlkeld

Global Manager of Renewable Energy
General Motors
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GM first started using renewable energy at its facilities in 1995 and launched its first solar project in 2005. To date, we have 46 megawatts of solar at our facilities worldwide. Procuring green power is not always easy. But we've been able to add renewable energy to our portfolio more frequently in recent years by applying lessons learned from past projects to new transactions.

Because the market for renewable energy is still relatively new, standard transaction terms for financing and contracting are not in place. When large companies, like GM, want to add renewables to their energy portfolio, they're met with hurdles like high investments and long contracts spreading payment over many years.

Traditional utilities don't always have enough renewable power available for companies to purchase, causing these buyers to work around them. Collaboration between buyers and energy suppliers is key to helping corporations source more "green power." To encourage both companies and energy suppliers to continue to use renewable energy, GM and 11 other companies signed the Corporate Renewable Energy Buyers' Principles in 2014 to better highlight the unmet demand for renewable energy and offer solutions to making this resource more available. Together with the World Wildlife Fund and the World Resources Institute, these companies developed six criteria that will help advance renewable energy procurement.

These principles asked for longer and variable term contracts, streamlined third-party financing and access to new projects that significantly reduce emissions. The central ask: a collaborative process between all parties that makes using renewable energy not only desirable, but obtainable.

Together with these companies we're sharing best practices to using more renewable power and demonstrating that there is a strong demand that should be met. We're also offering solutions for financing so these models and forecasts don't have to be developed with every purchase of renewables.

In February, GM became a co-founder of the Business Renewables Center, which aims to remove the obstacles that prevent corporations from using renewable energy. Members of the group benefit from the shared knowledge of the industries involved, bringing easily adoptable clean power solutions to every transaction.

When our 34-megawatt Mexico wind project goes online in 2016, most of our Toluca Complex will be powered by renewable energy. We were able to lock in a price for years to come, knowing that the price of our "fuel" – clean wind energy – will never rise. We're applying the success of this project to looking at opportunities to use wind in the US, and know our other member organizations can use the success of our project to grow their portfolio, too.

Through these growing collaborations among buyers, developers, utilities and financiers, we can continue to grow the use of renewable energy among the world's largest corporations, thereby driving growth and access to renewable energy markets around the world.

This year, Qantas has worked on a number of new environmental sustainability initiatives that demonstrate our commitment to sustainability.



Megan Flynn

Group Manager Environment & Carbon Strategy

Qantas Airways Limited

www.qantas.com.au/environment

In 2013, Qantas constructed the largest commercial tri-generation (cooling, heating and electricity) project in Australia. The two power plants, constructed by GridX, use natural gas to produce more efficient, lower carbon energy powering the airline's multiple multi-storey building headquarters, catering center and jet base in Sydney. The power plants will reduce CO2 emissions by 23,000 tonnes per year. Qantas' Mascot headquarters achieved a five star NABERS rating as a result of this project.

Between 2009/10 and 2013/14 we reduced total electricity consumption by 9.2% despite growth in our operations. By 2020 we aim to reduce electricity use by 20% compared to 2009/10 consumption. We anticipate our tri-generation facilities will play a crucial role in meeting this target.

Qantas has just launched an improved domestic in-flight recycling program. Each aircraft will have a recycling bin for cans, bottles, cups and other recyclable material. Coupled with other key initiatives, the program will significantly reduce the amount of waste sent to landfill each year, and most importantly will support keeping Australia beautiful for many years to come. This



The two tri-generation power plants use natural gas to produce more efficient, lower carbon energy powering the airline's multiple multi-storey building headquarters, catering center and jet base in Sydney. The power plants will reduce CO2 emissions by 23,000 tonnes per year.

initiative is crucial to meet our goal to reduce waste to landfill 30% on 2009/10 levels by 2020. The re-launch of our domestic in-flight recycling program was prompted by feedback from both cabin crew and our customers. Qantas is also working with Closed Loop to develop the capacity to recycle waste from international flights in line with quarantine regulations. Since 2013, using the container deposit scheme in South Australia, the Qantas Q-Can-Crew raises over \$45,000 per year for children's charities.

The North Kimberley Fire Abatement Project, a partnership of Wunambal Gaambera, Willinggin, Dambimangari and Balanggarra native title groups reduces carbon emissions

through traditional fire management techniques and creates employment opportunities for local native title groups. Conducting early dry season burns prevents uncontrolled wildfires, avoids the release of emissions and generates verified carbon offsets. Qantas, North Kimberley traditional owners and the Kimberley Land Council are working to develop a long-term partnership to support the sustainable environmental and cultural outcomes from the project. We enable our customers support projects like this when they choose to fly carbon neutral on our website or mobile app.

With support from Bupa, Cromwell and Taste Traders Qantas recently completed a community garden at our Mascot office. Officially launched on World Environment Day this June, the garden is cared for by members of the Green Team, a voluntary group of employees who are passionate about sustainability. Qantas worked with Timber Grain Project and Urban Growers to transform timber from a munitions store in Victoria into this beautiful communal space, featuring raised garden beds and a vertical green wall.

Qantas is proud to promote and support Australia's best sustainable tourism operators, giving customers unique travel opportunities in conjunction with organisations dedicated to conserving the natural environment. In combination with a carbon neutral flight, Qantas customers are able to enjoy a rich and sustainable holiday experience that no other airline in Australia or our region provides. Launch partners include the Earthwatch Institute, the Tasmanian Walking Company and Lirriwi Tourism.

There is a quiet but powerful renewable sea change underway in the commercial sector. Thanks to the accelerating use of power purchase agreements (PPAs)—long-term contracts between a renewable energy seller and corporate off-taker—more buyers than ever before are sourcing renewable energy and driving an explosion in both wind and solar power.



John Powers

VP of Business Development
Renewable Choice Energy

Corporates buying renewables isn't anything new; since we helped Whole Foods Market go 100% wind powered in 2006, thousands of other businesses have followed suit. Today, there are more than 1,300 Green Power Partner businesses, working with the EPA to achieve recognition for their commitment to clean energy.

However, until recently, buying renewables in the form of renewable energy credits (RECs) was nearly the only game in town. Onsite installations were cost prohibitive for most companies and there were few alternatives. In the past several years, fueled by federal tax incentives, technology improvements, fluctuating brown energy costs, and the demands of consumers and NGOs, companies have begun partnering directly with renewable energy

projects in order to buy clean power. For our clients, this means that they can make a purchase that has a considerable environmental impact AND saves them money in the long-term. For example, Walmart, which uses a combination of onsite installations, PPAs, and RECs, has projected \$1B in electricity savings by 2020.

This is groundbreaking – it's the first time in US history that renewables have become less expensive than traditional fossil fuels in some markets. This is allowing companies across many industries—computing, healthcare, manufacturing, education, government, and retail—to make and fulfill commitments to renewables.

Plus, the market shows no signs of slowing down, even though renewable energy development's future is uncertain due to the expiration of wind power subsidies.

Recently, scientists have determined that the US could move to 100% clean energy by 205; corporate PPAs will play a crucial role in that shift. It's an exciting opportunity for us to advance our work in the corporate buying marketplace by helping navigate long-term PPAs with our clients. The work benefits everyone by providing companies with a reliable, secure source of energy at a stable price that also prevents additional carbon emissions. We're at the forefront of the next energy revolution – and it's an awesome place to be.

Emissions Reductions and Climate

Melink employees have to travel. A lot.

For 11 years now, Melink has equipped traveling employees with Prius's for both personal business and business use, often driving as many as 12 hours to get to jobs. The reason behind this decision was from identifying the opportunity to reduce the company's carbon footprint by reducing the negative environmental impact of purely gas-fueled cars.



Luci Carl

Marketing Specialist
Melink Corporation
www.melinkcorp.com

In late 2014, this mission was increased and led Melink's leadership to put in place an employee incentive of \$3,000 toward the purchase of a hybrid car and \$5,000 for electric vehicles plus company-provided electric charge from our solar power during the 8 hour work day.

Immediately after the announcement of the incentive, four employees purchased a hybrid or EV before the end of the year.

In 2014, 30 Priuses and 4 Electric Vehicles drove 723,590 miles, and saved 24 thousand gallons of gas, 480 thousand pounds of CO₂, and \$86,000 in fuel costs.

The percentage of Melink employee driving Hybrids and Electric Cars as of Q4 2014 was 55%. That proportion has exponentially increased after Q1 2015. It seems as though another hybrid or electric car is added to the office parking lot each week.

Conducting business travel in greener cars has benefited us more than just the above facts. In our industry, it's most common to travel in trucks and large vans. We benefit from spreading the message of an environmentally-friendly lifestyle. As well, our employees comment that the incentive leaves them feeling empowered and appreciated.

An inaugural survey examining how corporations are addressing the need to adapt their business operations to changing climate conditions

reveals that 30 percent already have experienced a material impact to their business operations from climate events. It also found that 30 percent of respondents across a wide range of sectors don't have a climate adaptation plan or strategies in place.

The University of Notre Dame's Global Adaptation Index (ND-GAIN) and Four Twenty Seven, a climate risk and adaptation consultancy, with support from Business for Social Responsibility (BSR), launched and published the "2015 Corporate Adaptation Report" to generate insights into whether and how enterprises are preparing for the physical impacts of climate change.

Key findings from 2015 State of Corporate Adaptation Survey include:

- » **More than 70 percent of surveyed companies say they're at least "somewhat concerned" that climate change will have a material impact on their value chain, in particular their supply chain, distribution and customers and markets.**
- » **Two-thirds of the respondents expressed concern over increased operational and capital costs and reported they had already experienced cost increases or thought they were a likely outcome.**
- » **Water scarcity and political instability driven by climate change are cited as the top two anticipated risks across sectors. Water scarcity emerged as the climate hazard of greatest concern for corporations, with 16 percent citing it as a risk, followed by social and political instability driven by climate change, at slightly above 14 percent.**



Joyce Coffee

Managing Director

Notre Dame Global Adaptation Index

<http://gain.org>

As leaders prepare for the 21st session of the Conference of the Parties (COP 21) on climate change in December, the Report shows climate change is impacting the corporate bottom line and there is opportunity to increase their preparedness.

The survey evolved out of a growing understanding that climate risk is a critical issue for corporations. The World Economic Forum's Global Risk Report ranks failure to adapt to climate change as fifth among 28 risks that could harm countries or industries.

On Becoming Climate Resilient

Climate resilient businesses know when and how to respond to a changing climate, and have established strategies and made investments to protect people, profit, assets and supply chains. In our new publication,

Becoming Climate Resilient, we make an executive business case for the private sector to understand the impacts of climate change and natural disasters, and provide guidance for decision-making, planning and investment in light of the emerging risks.

These insights serve as a call to action for businesses becoming more climate resilient.

Climate change and particularly extreme weather events have major impacts on business. Over the past 30 years, we have seen growing frequency and intensity of severe storms (hurricanes, typhoons), storm surges, flooding, extended high or low temperature events, droughts, sea-level rise, bush or firestorms. And numerous events have highlighted shortcomings in business preparedness and threats to business resources, raw materials, infrastructure, power and water supplies, production, supply chains--ultimately leading to stressed business viability.

Increasingly, businesses must make decisions based on new climate norms, citing the following leading business drivers:

- » **Business productivity, continuity and prosperity**
- » **Stakeholder concerns**
- » **Divestment and Investment**
- » **Insurance**
- » **Governance, Fiduciary Duty and Reputation**



Jon Philipsborn

Climate Adaptation Director-Americas
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- » Health, Safety, Security, and Environment
- » Regulation and Emerging Standards
- » Resilience to Short and Long term Shocks and Stresses

Armed with an understanding of its current status and risk profile, a business can begin to develop and implement a plan to become more resilient to climate-related hazards and disasters. Integrating resilience activities into existing business frameworks and processes helps to ensure positive results.

Begin by using a self-assessment tool to gauge current state of governance, risk, opportunity and actions related to climate resilience within your company. Once completed, apply a climate resilience framework to guide actions to increase resilience and periodically review performance against the original assessment and tool. A synopsis of our six step process, tailored to individual business sectors, outlines how such a framework and process could work.

1. **Develop the Scope** – involves stakeholder discussions to create a shared vision and determine approach options, requirements and methodology.
2. **Perform Risk Screening** – considers basic climate trends and hazards in a region and the business elements subject to them, and identifies attendant policy and planning issues.
3. **Understand the Science** – gathers new and advanced climate data and trends, and determines potential weather event scenarios, timing and scale.
4. **Conduct the Risk Assessment**– determines business and site elements subject to the highest risk climate events, models multiple risk scenarios, and posits climate risks for integrating with overall risk management planning.
5. **Identify Resilience Options** – prioritizes risks requiring resilience solutions and determines effectiveness and practicality of implementation. Integrating preferred measures into business planning processes, operational procedures and capital design is key.
6. **Implement the Solution** – justify major resilience investment with cost benefit analyses and allocate needed resources. Documenting implementation of resilience solutions and reduced risks achieved can help ensure resilience sustainability.

Climate change is altering resource availability, increasing the frequency and severity of extreme weather events; and capital losses resulting from natural disasters continue to rise. As such, it is paramount for individual businesses and the business community as a whole to take action to become climate resilient.

Thanks to an industry-leading energy management system, store lighting retrofit, and improved fleet and distribution practices, we have reduced carbon emissions by 26 percent since 2010.



Alexis Ludwig-Vogen

Director, Corporate Responsibility & Sustainability
Best Buy Co. Inc.

Our five-year-long crusade to reduce our carbon footprint by at least 20 percent by 2020 is an important part of company-wide efforts to address climate change.

Beginning in 2010, we sought to reduce carbon emissions throughout a complex network of retail locations, distribution and data centers, and transportation infrastructure. Our multi-faceted program included these initiatives:

- » Energy management systems at our “big box” stores were installed to centrally control temperature and lighting by synchronizing all systems.
- » More than 840 Best Buy stores received lower-wattage fluorescent ceiling fixtures, reducing lighting energy usage by nearly half and brightening store interiors.
- » Thousands of Geek Squad cars and trucks were upgraded to more efficient models, and strategically routed to reduce gas consumption.
- » Required EPA SmartWay certification for all transportation partners, and optimized store shipments and the transfer of recycled products to partner facilities. This led to further reductions.

In September, ArcelorMittal, the world’s largest steel and mining company, used our award-winning S-inmotion range of steel solutions to create a newly designed portfolio of light

weighting steel solutions specifically designed to help pick-up truck manufacturers reach their fuel emission targets. Our Sin-motion products for standard, C-segment cars were refined and extended over the past year to meet the specific challenges facing the North American light pickup truck market.



Blake K. Zuidema

Director, Automotive Product Applications
ArcelorMittal
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The first of the two sets of steel solutions uses currently available advanced high strength steels and presshardenable steel grades such as Usibor®1500 and Ductibor® 500 and

can reduce weight by up to 174kg (384 lbs) or 23 percent of the combined weight of a pick-up's cab, box, frame and closures, compared with a modern (2014) baseline vehicle. Reducing the average weight of pick-ups by this amount saves more than 14 grams of CO₂-equivalent emissions per kilometre, and helps ensure, when combined with other expected improvements in powertrain fuel efficiency, that pick-up trucks will meet future US fuel economy and tailpipe emissions regulatory standards.

The second uses emerging grades, which are in the final stages of development.

The original S-in-motion includes multiple solutions for 63 parts of a typical C-segment vehicle and offers weight savings of up to 22 percent for a car chassis, and a 6.23g drop in CO₂ emissions per kilometre, in a car using the lightest S-in-motion solutions. The enormous innovation potential of steel has allowed ArcelorMittal to combine latest developments in steel with powertrain developments to help all types of vehicles, not just Csegment vehicles, achieve required weight reductions to help meet new fuel emission standards. Steel is the most cost-effective material for vehicle applications, as well as being the most environmentally friendly.

Emissions reduction regulations in the EU and USA are driving auto manufacturers to develop lighter, more fuel-efficient vehicles. In the EU, OEMs have to lower average emissions to 95g CO₂ per kilometre by 2021. Policy makers in the US have proposed that cars and light trucks average 54.5 miles per gallon by 2025, compared with around 28 miles per gallon today. ArcelorMittal's steel solutions, combined with powertrain developments, help automakers reach these new targets for all types of vehicles.

Pick-up trucks represent a significant part of the NAFTA region's light vehicle market. According to IHS, more than 2.6 million body-on-frame light pick-up trucks will be produced in the NAFTA region this year. Over the past decade, advanced high strength steels have become the fastest growing material for light vehicle construction due to steel being the most sustainable, versatile and affordable material to help automotive manufacturers achieve weight reduction targets on time—without compromising strength and safety. S-inmotion Steel PickUp meets OEMs' acceptance criteria and has been validated for all major automotive standards, including crash safety and stiffness requirements. The innovative new steel solutions include advanced steel grades.

Generally, mid-tier companies have not been pressured by environmental stakeholders or regulations to examine their carbon footprint. And, often these companies view such an



David South

Senior Manager

West Monroe Partners

<http://www.westmonroepartners.com/>

exercise as an unnecessary cost without commensurate benefits. We conducted a carbon footprint assessment for a die-casting company, which revealed financial savings and community benefits when its carbon dioxide (CO₂) emissions were considered in its annual capital budget exercise.

West Monroe Partners (WMP) computed the CO₂ equivalent of all energy consuming activities at the plant, and then converted each value into a per productive hour metric. This metric normalizes the CO₂ emissions to a measure of economic activity at the plant (productive hours). Through this footprinting exercise WMP was able to:

- » **Calculate aggregated carbon emissions at the manufacturing site to define the foundation for future emissions tracking;**
- » **Shift operational strategy to implement changes on site that will significantly cut both operational costs and fiscal emissions;**
- » **Gain insight into the highest contributing consumption sources and explore potential ways to reduce said consumption sources;**
- » **Explore where the company stands amongst its competitors in environmental sustainability to help focus on future improvement that will give a competitive advantage in brand recognition and ethical manufacturing.**

Through this exercise the company learned it could realize a substantial cost and CO₂ emissions reduction through targeted efficiency and scheduling activities in its electricity load. It also modified its capital budget from expenditures for improvements in propane based torches and forklifts to electricity efficiency improvements; both had comparable financial paybacks but when CO₂ emissions were considered the efficiency improvements had greater benefits. Further, the CO₂ emissions avoided from the electricity improvements produced community benefits that would become important as the plant considered expansion, which required local approval.

WMP carbon footprinting helped this mid-tier company realize multiple benefits by considering CO₂ emissions in its capital budgeting process. Further, it realized that with minimal effort it could use its carbon footprint as a differentiator with competitors and to advance a plant expansion.

Time Warner Cable Employees Use Carbon Calculator to Save Energy, Money

Time Warner Cable (TWC) is committed to raising environmental awareness, using fewer natural resources and generating less waste in our business through initiatives that we collectively call “Go

Green”. Over the past year, our employees have been getting more involved in these efforts through their personal awareness and commitments. TWC created an employee Green Team initiative in April 2014, during the company’s first Earth Month, and within the first several months grew the program to 15 teams.



Stacy Zaja

Director, Corporate Social Responsibility
Time Warner Cable

<http://www.timewarnercable.com/en/our-company/corporateresponsibility/overview.html>

“ **The TWC Carbon Calculator builds the case for sustainability and lowering our personal carbon emissions by showing the impact of our habits.**

With the teams in place, TWC was looking for a way to engage these teams and the overall TWC employee base with an opportunity to make energy-savings commitments. Our employees shared that they’d like to learn more about how they could personally make an impact on the environment. We answered that call by introducing a Carbon Calculator tool, in partnership with the Center for Energy and Climate Solutions (C2ES), that helps

employees find out how much carbon dioxide they generate each year and suggests energy-saving steps to reduce impact, i.e., replace your fluorescent light bulbs with LED, wash clothes in cold water, and adjust your home thermostat. Employees can select these types of action items to take over the next year and learn how many pounds of carbon dioxide they can prevent from entering the atmosphere, and how much money they can save by changing their behavior. During the seven-week Carbon Calculator campaign, TWC employees in over 20 states learned their personal carbon footprint. Overall, employees committed to avoid 2.6 million pounds of CO2 emissions, which is equal to recycling over 50 garbage trucks of waste rather than sending it to the landfill.

The calculator builds the case for sustainability and lowering our personal carbon emissions by showing the impact of our habits. The TWC Carbon Calculator challenge helped raise awareness of the Green Team program, brought new Green Team members to the teams, while rallying the teams around a cause, and enabled individuals to make personal commitments to reduce their environmental impact all while furthering company-wide sustainability efforts.

Energy Management

Historically, the retail industry has collectively been perceived as a technology laggard. For years, thin margins and high investor expectations combined to force conservative technology and

operations budgets on retailers. Ironically, as it relates to energy management, the exacerbation of those problems during the Great Recession turned that historical perception on its ear. To survive rapid economic degradation in 2008, retailers turned to energy efficiency investments en-masse in an effort to reduce costs. As such, the retail industry emerged as a leader in energy efficiency improvement and has been consistent in that leadership position every year since. As the economy improves, albeit slowly, retailers, who were early adopters of energy and sustainability management initiatives, are continuing to enjoy the rewards of reduced operational costs.

Ecova's 2015 Energy and Sustainability Predictions survey indicates that retailers continue to lead other industries in adoption of energy and building management systems. Fifty-seven percent of retail respondents to the survey said their organization has implemented some form of Energy Management System (EMS), or Building Management System (BMS) to collect real time energy data.

While retailers such as Saks Fifth Avenue are ahead of the curve as early adopters, many have just begun to enjoy the fruits of real-time energy data collection and analysis. Our survey reveals that retail energy, sustainability, facility, and finance professionals are leveraging their newfound access to detailed energy data to go beyond the early strategic, ad-hoc projects that marked the survival mentality of the recession. As their EMS/BMS implementations mature, they're developing long-term energy strategies and planning capital investments that will result in a sustained impact.

While the retail industry has emerged as a leader in energy efficiency initiatives, the food service industry is coming to grips with the fact that for an energy intense business, it's got some catching up to do. Quick-service and casual restaurants, in particular, face a profound opportunity to improve energy efficiency this year. According to the Energy Information Administration, their long hours of operation, specialized equipment, and sheer demand make restaurants the most energy intensive commercial buildings in the US. Measured per square foot, restaurants consume nearly three times the energy of the average commercial building.



Jamie Daubenspeck

Director of Technology

Ecova

www.ecova.com

But while food service merchants are typically more energy intensive than healthcare, retail, and grocery businesses, they achieved lower levels of energy efficiency improvement between 2008 and 2013. Our survey illustrates that while 46 percent of respondents from the food service industry say their organizations have invested in real-time energy data collection through EMS/BMS or other devices, a full 40 percent of respondents have yet to make such an investment.

The food service industry is ripe for EMS/BMS solutions, and the financial benefits can be staggering. As mentioned in our 2015 Energy and Sustainability Predictions report, Ecova client Arby's Restaurant Group was able to uncover more than \$5.5 million in potential annual savings after implementing a comprehensive energy management solution that focused on:

- » **Operational and behavior modifications;**
- » **Lighting, HVAC and water heating systems, restaurant equipment and building shell recommendations;**
- » **Set points and schedule modifications;**

With savings stakes this high and EMS/BMS adoption in food service this low, we expect 2015 to mark a watershed year for restaurant energy efficiency initiatives.

The simplest things can be the best things. Watts down.

I contacted our local utility ,SRP to ask why they offer incentives and discounts for old last year CFL lights that have mercury when there are more efficient LED lights made in the USA that are Energy Star rated. CREE is made in Durham

North Carolina and Energy Star rated with no mercury. They were not aware of them. They checked and within 2 weeks they began offering discounts at the local home stores for these world leading LED lights. This helps reduce power demand and wasted heat that would have to get cooled by Air Conditioning in the HOT Arizona area. I tried to get them to stop giving discounts on CFL bulbs but that may take a little more time.



Jim Stack

President

Phoenix Electric Auto Association

<http://phoenixeaa.com>

Thermal Optimization elevates residential thermal performance to a level where interior comfort is maintained for the least amount of energy. With a thoroughly installed insulation “wrap”, a home’s propensity to consume energy for space conditioning can be minimized. By merging the thermal and structural shells, the largest source of wasted residential consumption can be eliminated.



Rick Barnett
Green Builder
Thermal Optimization

Utilities in any urban area affected by peak overload or power plant closure can align demand to supply by financing thermal retrofits with on-bill financing. Thermal Optimization results in measureable and permanent demand reduction: by controlling the transition to higher efficiency, a utility can project future demand more accurately. Retrofits can be offered to utility customers in any urban area on a neighborhood basis, to minimize per-house cost.

The feasibility of a utility Thermal Optimization program is based on local variables such as energy price, contractor rates and availability, vintage & size of homes, etc. In most cases, utilities should be able to finance an optimization retrofit with no direct cost to the homeowner.

In FY 2010, the City of Virginia Beach had spent almost \$20 million in utility payments for electric, natural gas, fuel, and propane. In fact, outside of debt payments, retirement, and payroll costs, electricity was CVB’s top expense at over \$15.5 million. By 2012, overall utility costs had soared to over \$24 million annually



Lori Herrick
City of Virginia Beach

“**The City of Virginia Beach has achieved much higher efficiency in our financial process because of electronic invoicing. The City’s energy management administration has developed greater accountability of energy use through accurate energy reporting.**”

for CVB’s approximately 3.3 million square feet of building space. The increases came in spite of energy-saving capital projects.

For years, the City operated under a decentralized bill review model with built-in redundancies that limited the City’s measurement and control of energy costs. Cumbersome paper-based

payment processes, coupled with utility vendor delays in remittance processing, led to duplicate charges, late payments, and fees. Departmental staff assigned to pay the bills, did not have the tools to audit them.

While City staff knew the dollar amount we were paying each of our energy vendors - we did not have a comprehensive city-wide view of all of the energy being consumed.

Chaired by a Dave Hansen, Deputy City Manager, the Joint Energy Committee was set up. It has a unique partnership comprised of representatives from City departments, the City public schools, and even the primary utility vendor—Dominion Virginia Power. As the City's utility cost crisis escalated, the committee was able to adjust and make changes that helped keep costs down – among other things.

Committee members agreed that certain long-term goals were vital as part of their mandate of energy savings:

- » **Monitor energy usage**
- » **Identify energy saving projects**
- » **Reduce building electric consumption by 10%**
- » **Reduce energy costs**

To achieve the second part of their mandate would require restructuring the utility billing process. They organized a project team that included the Energy Management Administrator and members of the Finance, Public Works, and Information Technology departments.

The project team analyzed the current system and developed a specific energy accounting and management system that would track the energy data and use it to guide budgeting and conservation efforts. The project design included:

7. **Electronic Data Interchange (EDI) which allows the utility provider to send monthly utility bills electronically to the energy software;**
8. **An accounts payable system to transfer approved payments from the energy software to the City's accounts payable system; and,**
9. **An Environmental Protection Agency's ENERGY STAR's Portfolio Manager system which allows the software to automatically benchmark our buildings nationally.**

This process is providing the City with detailed energy data to include on peak and off peak usage, rate schedules, and details on extra charges for fuel, taxes and other charges.

Total implementation costs were approximately 0.7% of CVB's annual energy expense. A

Department of Energy grant covered the cost of the EnergyCAP software.

The City's intranet site, Beachnet, provides our staff with a wealth of internal information, including that of energy usage. The Energy Office, working with Information Technology, created a new website to help accomplish the City's energy reduction goals.

Each quarter, the Energy Office uploads over 80 energy reports so that City staff may see each department's usage which includes electric, natural gas, fuel, water, and sewer. The reports provide a comprehensive view of the city's energy costs and consumption, which helps us identify specific areas where we can eliminate waste and conserve energy. Through the use of this software, the City has improved energy reporting and tracking that helps reduce energy costs, improve energy efficiency of our City buildings, and increase reporting on greenhouse gases resulting from government operations.

The City launched a new energy training program for City personnel to help educate employees on ways they can assist the City in energy conservation. It is offered each month, and after the training is completed, staff members are designated "Energy Champions" for the City. Over 100 employees have participated in the program to date.

City departments are already showing an increased awareness of energy usage, thanks to the software's ability to generate charts, graphs, and reports with granular and/or summary data.

The key to the success of the project was the project team. They came together and worked through the strict City financial requirements and reorganized them in a new, highly efficient, electronic process. The efforts of the Joint Energy Committee and the project team, coupled with a successful implementation of EnergyCAP energy management software, have allowed the City of Virginia Beach to make significant strides towards a much more energy-efficient and sustainable government.

The City of Virginia Beach has achieved much higher efficiency in our financial process because of electronic invoicing. The City's energy management administration has developed greater accountability of energy use through accurate energy reporting. The transition to electronic invoicing is helping the City to refocus resources away from the time-consuming task of payment processing to researching and resolving important issues such as skipped bills, missing bills, and reduction of incorrect charges and past due penalties.

As a result, longstanding departmental billing issues have been resolved, inactive accounts and unused meters are being terminated, and energy data is being used to research the highest priority need for City building energy retrofits propelling the energy conservation program forward at a steady pace. The City of Virginia is projecting a minimum savings of \$50,000 annually.

From October 1 – 27th 2014, Legrand, North America’s workforce engaged in a company-wide competition to save energy called the “Energy

Marathon.” As a result of persistent communication and entertaining internal marketing incentivizing behavior change, Legrand saved 588,540 kWh of electricity in just 26.2-days (the mileage of a traditional running marathon).

The idea for a 26.2-day Energy Marathon built on a successful one-day energy efficiency event called “Power Down Day” that the company organized in 2012. Like the old saying, “it takes 20 days to build a habit,” the Energy Marathon targeted long-term energy behavior change. Since natural gas usage is minimal and typically not influenced by average employees, Legrand chose electricity as the sole competition metric.

Individual sites established a baseline electricity usage one month prior for comparison during the energy marathon. The site that reduced its electricity consumption by the greatest percentage compared to its baseline reading would be crowned the winner.

The company organized a small steering committee comprised of individuals with backgrounds in marketing communications, facility operations, and sustainability to lead and communicate the event from a corporate level. Site leaders at each of the 18 participating locations drove energy savings at the facility level. For 26.2 days, site leaders read the facility’s utility electric meter and reported the readings to a central event coordinator. Employees received daily tips for saving energy and event “standings” via emails, posters, and TV monitor displays – effectively driving competition through awareness and engagement.

As a result of employees’ deliberate efforts to reduce energy consumption and some ready-to-implement technology changes at the facility level, the Energy Marathon reduced Legrand’s electricity usage by 15.4% across the 18 participating sites compared to the baseline. In total, the company saved 588,540 kWh of electricity, preventing approximately 406 metric tons of CO₂ from entering the atmosphere. This amounted to a cost savings of \$46,732 over the course of the 26.2 days.

The winning facility achieved a 63.1% reduction vs. the baseline, while half of the participating sites exceeded a 20% reduction. Since the majority of energy savings could be attributed to behavior change, savings are expected to continue into the future. As of March 2015, five facilities continued to see double digit reductions in electricity usage.

Looking beyond the event’s tangible energy and cost savings, Legrand was able to bolster



Patrick McKee

Sustainability Analyst
Legrand, North America

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the visibility of its overall sustainability initiatives and highlight the importance of energy efficiency – both in terms of competitiveness as a company and to the environment. The competition made saving energy fun and engaging for employees – something that will leave a lasting imprint on future sustainability events and campaigns.

■ was approached by a company called Colonial Needle of White Plains, NY. They own and operate out of two adjoining

buildings, one built in the 1940's and the other in the 1950's and perform office, warehousing, and light industrial activities. The buildings are essentially unchanged since they were built (same boiler, same windows, etc.). One winter day the owner was sitting in his office when he felt a gust of cold wind hit him right on his chair. He got up and walked down the main aisle of his office and saw most of his employees at their desks in parkas, half of them using a space heater. He knew something was wrong. He threw down his pencil and swore he would make his buildings more energy efficient.

He brought in our firm and we performed an ASHRAE Level III audit to determine energy usage, waste, and strategies to upgrade. Despite being a small business, Colonial Needle implemented many common sense energy upgrades, such as replacing those old, leaky, single-pane windows with modern double-pane units, upgrading insulation in the exterior walls and roof,

upgrading lighting, replacing their No. 6 oil-fired boiler with a modern gas-fired unit with thermostatic control, and installing a rooftop solar hot water system and eventually a solar PV system.

Did they ever benefit! Even before the solar PV system was installed, total energy usage was reduced by over 60% (fuel and electricity). Buoyed by that, Colonial Needle took an underused portion of the warehouse and renovated it and now rent it out efficiently to result in additional income. Colonial Needle received utility incentives and an IRS tax deduction.

When I told the owner that he made a major gain in sustainability, he shrugged his shoulders. But when I mentioned that his business (selling knitting and related needles and equipment) is a great, no energy, sustainable activity, he began to get it.



Marc Karell

Owner

Climate Change & Environmental Services, LLC

www.CCESworld.com

Creative Energy Solutions

The EPA and DOE estimate that by improving energy efficiency, K-12 schools can save \$2 billion annually. As a

result, many school districts across the country are taking dramatic steps to increase the energy efficiency of their buildings, with the most innovative turning their wasted energy into funding for mission-critical facility improvements. Through creative energy retrofit packages, schools are beginning to find ways to fund major technical infrastructure upgrades, reduce energy use and operating costs, and meet sustainability goals and requirements -- without any negative impact on the education budget or increasing the burden on taxpayers.

Specialized energy services providers, such as ABM, offer a comprehensive suite of high-efficiency conservation, facility modernization, and HVAC services that create a solution to schools' facility funding needs. This process includes an assessment and analysis of a building's infrastructure needs, innovative operating cost profile, and long-term capital needs so a customized funding plan is prepared. This approach is ideal for schools starving for capital because it packages the equipment, installation, and ongoing maintenance costs into a single turnkey project that produces guaranteed energy savings and often general fund relief. That newly created funding can plug budget gaps or pay for other educational programs.



Dan Dowell

Vice President of ABM's Bundled Energy Solutions
ABM
www.abm.com

Tulsa-based Oral Roberts University sits on 263-acres, which includes the CityPlex Towers commercial property. Built in 1981, CityPlex Towers is a large office space complex but it was intended to serve as a Christian research hospital, City of Faith Medical and Research Centers. The three towers were originally built as: a 60-story clinic, a 30-story hospital, and a 20-story research center.



David King

Director of Energy Management
Oral Roberts University
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Today, the facility is primarily leased as commercial office space under the name CityPlex Towers. Inefficiency was rampant, which is why ORU/CityPlex invested in a \$7.5 million energy efficiency project in 2007 that included a lighting retrofit, new chiller, new cooling

towers, and a new roof. This started a downward trend in energy consumption.

But it was still operating on systems designed for the original hospital – not for office space. With the 2007 upgrades in place, I was able to focus on processes, equipment, and systems outside the central plant for energy efficiency. What a difference 3 years makes.

We reduced energy consumption 40% by adding scheduling and environmental controls at the CityPlex Towers. Using in-house labor, ORU's team:

- » Replaced pneumatic controls with Direct Digital Controls
- » Installed new steam and chilled water control valves
- » Added speed controls to over 150 air handlers
- » In May 2013, we began migrating the same technology to the campus:
- » Added 180+ variable frequency drives to pumps and fans
- » Closed bylines on 3-way valves for Heating Hot Water and Chilled Water coils, providing huge cost savings by lowering pumping energy use
- » Installed 200+ thermostats with Wi-Fi and setback schedules
- » A two-pipe cooling/heating automatic changeover system project for two dormitories with a history of temperature complaints

In the last four years, ORU/CityPlex reduced electricity consumption by 32,000,000 kWh and peak demand by 4,000 kW, all while adding a new 31,000 square-foot Student Center on campus!

Our latest projects include:

- » Installing 51 electric sub-meters on buildings and substations student-accessible kiosks to monitor how the electric is used around campus
- » Humidity control for 20 surgery suites by using 34° chilled water to dehumidify the fresh air return.
- » Deploying a 50-ton chiller and 1,000 ton/hrs thermal ice storage system that will make ice after hours and melt ice during surgery hours to reduce peak demand.

We were hired to do an energy audit of a private high school in CA that was considering a cogeneration plant. They were considering a 1mw plant at a cost



Larry Thrall

Managing Director
Vireo Energy Financial
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of @ \$3m. This system would have overproduced electricity which would be sold back to the local utility under a qualifying facility.

After our evaluation, we realized that the cogen plant at 1mw was much larger than needed and that excess power could not be sold back to the grid economically. In addition, the campus due to its age and unique infrastructure, is highly inefficient. The cost of energy per student at the HS is currently at @ \$1000/student/year. The average cost per student for private high schools in California are @ \$230/student/year. In order to address these inefficiencies, we are upgrading the following:

- » Upgrade existing chilled water system
- » New or retrofit Chiller and water tower
- » Upgrade air handling units
- » New water pumps
- » New LED lighting
- » Lighting controls
- » Automated Thermostats
- » New Energy management system
- » Upgrade bathroom fixtures for water efficiency
- » Install Solar Panels which should cover @25% of post retrofit use
- » Possible 100kw Combined Heat and Power plant to create own onsite power and use waste heat for pool and water heating

These proposed upgrades will bring the HS into the 21st century and help save money and energy as well as dramatically reduce carbon waste. It will reduce energy costs by @ \$350k/year or @ \$500/student/year.

Lessons learned - Grab the oranges on the bottom of the tree and work your way up.

Built between 1904 and 1911, The Wanamaker Building, jointly owned by Amerimar



Clete Graham

Operations Manager

IPC/Amerimar Management Co.

<http://www.amerimar.com/detaildisplay.php?id=16>

Enterprises and TIERREIT and managed by IPC/Amerimar Management Co., LLC, is a 12-story urban real estate gem that occupies an entire block in downtown Philadelphia, with 1,000,000 square feet of office space and a 3 level, 660 space underground parking garage. From its construction through the 1980s, it housed a single large department store. In the 1990's, the upper stories of the building were completely renovated and converted into office space, with the exception of the first 3 floors, an additional 435,000 sf which Macy's occupies.

In 2009, we began working with EnerNOC to assist in achieving our energy management and efficiency goals. Initially, we enrolled The Wanamaker Building in a demand response program through PJM, committing to reduce 750 kW during periods of peak demand.

That commitment has since increased to 1.3 MW as the building staff has gained experience with the requirements of the program and their ability to respond. In addition to the PJM demand response program, the building is enrolled in a peak load predictor program and adjusts operations each morning based on the likelihood of a demand peak for that day.

Starting this year, we actively use EIS on a daily basis to ensure The Wanamaker Building is operating as efficiently as possible. In addition to identifying efficiency measures, we have successfully used EIS to increase building staff engagement. For example, on days when demand is predicted to approach a monthly demand limit, building engineers are actively engaged in reducing loads while maintaining comfort conditions in tenant spaces.

Typical measures include raising supply air temperatures, reducing static pressure set points, dimming corridor lights, and shutting down select elevators.

Other energy management strategies completed or underway include energy efficiency measures like installing variable speed drives on all major air handling system fans, replacing 32 watt fluorescent lamps with 25 watt lamps, converting to LED lights and installing occupancy sensors.

Electricity consumption has been reduced by 4.2 million kWh annually, using 2008 as a base.

Since 2009, the Wanamaker building has saved 18.6 million kWh, which is enough to power the facility for over a year.

Winter peak demand has been reduced by an average of 1 MW since the winter of 2008, and summer peak demand by 900 kW since the summer of 2008—this accounts for 20% and 26% of total demand respectively.

In the 2014 Environmental Leader Insider Report, we talked about our automated Energy Optimization System and the inspiration behind its development. I mentioned at the time that we were about to start a pilot project at the University Health Network (UHN) in Toronto. Well, it's my pleasure to let you know that we just finished the project at UHN's Toronto Rehab Centre (The Centre) in time to share the great results we are starting to see in this year's the Insider Report.



Arick Disilva

Director of Marketing
SHIFT Energy Inc.
<http://www.shiftenergy.com>

With 12 healthcare facilities under management and an average \$30 million in energy spend, University Health Network is one of the largest healthcare organizations in Canada and considered a leader in healthcare sustainability practices.

As a healthcare facility, UHN has a complex mix of spaces, whereby some are in continuous use 24/7 and others are periodically or occasionally used – creating a complicated energy environment. As a result, a traditional recommissioning approach has limited potential to trim unnecessary energy waste in a manner that persists over time. This was the case when SHIFT approached UHN with their EOS solution, which promised innovative new ways to improve upon.

In early 2014, EOS was implemented at The Centre as a co-development effort between SHIFT and UHN. Infrastructure and implementation support was provided by SHIFT's partner EllisDon, and thermal optimization support was provided by IB Storey, also a SHIFT Energy partner.



By monitoring the freeze protection, tracking the run and stop times and smooth ramping of all pumps and motors, EOS was able to avoid peaks, surges and undue stress on the equipment. From December, 2014 through to April, 2015 EOS reduced the energy costs in the pilot areas by an average of 18%.

The primary goal of the EOS implementation was to explore all possible strategies in order to continuously commission The Centre as an energy eco-system, as opposed to optimizing each piece of equipment independently. To attain results in the form of avoided energy costs, EOS applied a number of patent-pending engineering strategies to attain maximum results

for the building.

One such strategy was optimizing the ventilation process automatically. Each minute, EOS examines every rooms in the building to ensure that each room is meeting its requirements, and to also determine the real-time needs from each room's upstream air handler. These assessments are compiled to determine the best output and the most efficient settings for the air handler. That way, the unit can ease back when the downstream needs are reduced. Unexpected equipment behavior is also flagged as a possible operational malfunction.

Another strategy EOS used was dynamically adjusting the equipment based on space needs and requirements. Space needs are automatically met at all times, based upon minute-by-minute feedback. Therefore, no more output is provided than what the space actually needs, avoiding any manual complaint adjustments – freeing up operators to proactively manage higher-priority situations throughout their portfolio.

Thermal optimization algorithms were used to minimize circulating pumps. Other adjustments were made by analyzing the needs throughout the building, generating the best output from the systems.

By monitoring the freeze protection, tracking the run and stop times and smooth ramping of all pumps and motors, EOS was able to avoid peaks, surges and undue stress on the equipment.

From December, 2014 through to April, 2015 EOS reduced the energy costs in the pilot areas by an average of 18%. Winter season cost savings were 16%, and during the shoulder season they were 26% on average.

We are anticipating the rolling average to climb to over 20%. Furthermore, EOS has improved occupant comfort, as measured by number of complaints, and vastly extended equipment life.

As the results start to come in, both SHIFT and UHN are looking forward to bringing this new technology to other healthcare facilities.

Interest in environmental sustainability continues to grow in the restaurant industry, according to recent National Restaurant Association research. This is largely due to the fact that according to industry estimates, restaurants use five to seven times more energy per square foot than office buildings or retail stores,



Greg Fasullo

President and CEO

EnTouch Controls

<http://entouchcontrols.com/>

with high volume quick service establishments using up to 10 times more.

Corner Bakery Cafe has used energy management as a service data to replace the “guesstimating” involved in buying HVAC systems for new stores, resulting in a right-sized system that saved them tens of thousands of capital expense dollars and provided even more ongoing energy savings.

In fact, restaurants in the chain have seen an energy usage reduction of 15 percent, reduced HVAC runtime of 21 percent and a reduction in emergency truck rolls by 25 percent. By implementing EnTouch 360°, Corner Bakery Cafe uses 8,000-plus fewer megawatt hours of electricity per year and has recognized a 7,000 ton reduction in CO2.

While with Saks Fifth Avenue, I spearheaded one the first LED lighting retrofits ever conducted within the luxury retail industry.

The project was successful in greatly reducing the company's energy usage and overall carbon footprint, and I received the AEE Energy Manager of the year for 2014. The greatest result from implementing a successful project was the education of upper leadership in the benefits of energy conservation. Thanks to a successful implementation, projects are now green-lit with regularity and we are moving to meet and exceed our corporate energy reduction goals annually.



Gary Levitan

Sr. Manager of Energy and Utilities
Saks Fifth Avenue
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Ace Hardware Upgrades Retail Support Center to Intelligent LEDs and Saves 81% on Lighting Energy

The Ace network of distribution facilities includes a roughly 1,000,000 square foot facility in Rocklin, California. Concerned about the high energy costs, maintenance burdens and low-illumination levels associated with its mixture of 400-watt metal halide and T5 fluorescent fixtures, we decided it was time to upgrade the Rocklin facility to more efficient, better quality lighting. With 1,653 fixtures to replace (1,551 T5s, 102 metal halides), it would be a massive undertaking.



Allison Parker

Director of Marketing
Digital Lumens
www.digitallumens.com


Intrigued, but uncertain, about the advantages of lighting systems with advanced controls, we reached out to our utility company, Pacific Gas & Electric (PG&E), to review lighting options. The result was an eight-month, in-depth research project conducted by

PG&E at the Rocklin facility. The project involved replacing 103 metal halide fixtures in a 44,800-square foot section to document the effects of increasing levels of control on energy efficiency.

PG&E selected Digital Lumens' Intelligent LED Lighting System – networks of sensor-rich, high bay LED fixtures with LightRules software - for the research project because it was the only fully integrated system on the market. With the ability to control all of the variables necessary to conduct its battery of tests, the system made it possible to document and quantify the energy savings that only highly integrated and controllable lighting systems can deliver to industrial facilities. The study concluded that:

- » **Systems with “aggressive advanced controls” delivered 93% more energy savings than traditional HID fixtures.**
- » **Systems with “aggressive advanced controls,” like the Digital Lumens system, delivered 43% more energy savings than basic LEDs.**
- » **The ability to centrally control settings and behaviors down to the individual fixture level provided the highest level of savings.**
- » **Even high-occupancy facilities offer opportunities to save massive amounts of energy through a combination of occupancy and daylight sensing with fine-tunable controls.**

Impressed with the results, the Ace team upgraded the rest of the facility's lighting, including more than 1,000 fluorescent fixtures with add-on occupancy sensors, to the Digital Lumens LED system. LightRules lighting management software enables the team to centrally control fixture settings - individually, by zone, or facilitywide - without touching fixtures. The information gleaned from LightRules - including energy use, facility maps that visually depict occupancy patterns, light usage and concentration zones - allows the facility management team to drive additional savings by fine-tuning lighting profiles to specific shifts and areas within the site. As a result, the Rocklin facility is:

 **Systems with ‘aggressive advanced controls’ delivered 93% more energy savings than traditional HID fixtures... and 43% more energy savings than basic LEDs.**

- » **Saving an average of 81% of the energy associated with its legacy HID and HIF fixtures since the system was installed in October 2013.**
- » **Reducing its power usage per square foot by 39.56%, while improving light**

quality and illumination levels throughout the facility.

- » Anticipating an investment payback of less than two years, with years of follow-on savings.
- » More than tripling light levels in aisles and open spaces, from a low and uneven 5 foot candles to a consistent 16 foot candles today (with fewer fixtures and new fixtures dimmed to 70%), while more than quadrupling light levels on vertical surfaces, including the upper portions of high storage racks which were notoriously difficult to illuminate.

Anticipating savings of more than \$25,000 annually in re-lamping and re-ballasting costs via a maintenance-free fixture that also eliminated the workplace disruptions associated with these maintenance events.

Comfy, intelligent software from Building Robotics for personalized temperature in the workplace, connects to a building's heating and cooling system and empowers occupants to instantly request zone-specific temperature adjustments. Over time, Comfy learns

preferences and optimizes HVAC efficiency and user comfort. Glumac, a sustainable design company working to push the boundaries of green building, has a new 17,500 square-foot office that is the first Net Zero Tenant Improvement LBC registered project in the US and occupies one floor in the 62-story, 1.1 million square-foot Aon Center, the second tallest building in Los Angeles.

With limited opportunity to implement renewable energy strategies, LBC is particularly challenging for high-rise buildings.

Utilizing data from occupant requests, Comfy teaches the building control system to adjust temperature set-points in specific zones and widen temperature deadbands according to occupancy and personal preferences. With our software, Comfy allows them to remove the zone temperature setpoint and push the thermal comfort level to the limit. Instead of the HVAC system maintaining a given zone's temperature setpoint, the system works only to satisfy occupants' thermal comfort, eliminating unnecessary conditioning.

Like many projects striving to achieve Net Zero Energy, Glumac's office utilizes a combination of low-energy radiant systems paired with supplemental ventilation and cooling via VAVs.

Glumac can now avoid using the air-based systems, and instead relies almost exclusively



Anna Lui

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on the radiant systems to keep the space comfortable, keeping energy use at its lowest possible level. Now, cooling at Glumac has been achieved by radiant alone 93% of the time.

In 2014, Powerhouse Dynamics conducted a pilot test of our energy and asset management system, SiteSage, with a major national specialty retailer. This company has about 1,000 locations across the United States, virtually all of which had programmable thermostats and mechanical lighting controls (basically timers) installed.



Martin Flusberg

CEO

Powerhouse Dynamics

<http://powerhousedynamics.com>

SiteSage combines HVAC and lighting controls with granular monitoring, analytics and diagnostics, and other functions in a cloud-based system. Because some basic controls were already in place, there were questions about the degree of energy savings a fully automated system could achieve – questions the retailer was anxious to have answered.

We installed automated lighting controls in 40% of the pilot sites, while lighting usage was simply monitored in the remaining sites. We installed HVAC controls in all locations, along with monitoring of HVAC and other equipment. The pilot was conducted over a period of about 6 months, and actual bill data was collected from the pilot locations and a group of control sites.

It became quickly apparent that the retailer's thermostats had, for the most part, not retained originally programmed overnight setbacks. Moreover, lighting schedules also no longer followed business hours. As a result, the introduction of full automation yielded considerable savings. The system also identified HVAC system problems in virtually all pilot locations. On average, the pilot locations experienced an 18% reduction in energy use compared to the control group, with savings higher in the locations with automated lighting controls. Based on these results, the retailer decided to roll out the system, with automated lighting controls at all locations.

The introduction of a fully automated energy management system provides tighter control and greater visibility into what is happening in the field, even when local managers are given discretion in changing settings and schedules. The impact of full automation with remote access can be quite significant, as it was for this major retailer.

The Australian Technology Park (ATP), located in the suburbs of Sydney, is a business and technology center that serves as an incubator



Anonymous

for high-tech startups and brings together research and commercial interests in a symbiotic environment. Five distinct buildings make up the ATP, one of which is occupied by the National Information and Technology Communications Center of Australia (NICTA). NICTA's 36,752 sq. ft. building is just five years old, boasting state-of-the-art technology. Despite already being renowned for its energy efficiency, NICTA and the ATP were looking for solutions to further reduce energy consumption.

BuildingIQ's Predictive Energy Optimization (PEO) platform was chosen to maximize the previous investments made in the NICTA facility and generate new savings. The cloud-based software monitors inputs including weather forecasts, occupancy comfort, energy prices and demand-response events in order to provide and implement the most efficient 24 hour operating strategy for a building's HVAC system. It also makes automatic changes to temperature and pressure, without the need for manual intervention. Installation requires little change to a building's existing infrastructure, but there were challenges that had to be overcome.

The central challenge for this deployment was whether BuildingIQ's PEO platform could make a difference to a facility that was already considered a well-tuned, high-performing structure. The NICTA building had a NABERS score of 5.5, on a scale that runs from 0 to 6.0, and improvements were, at best, likely to be marginal. Although the NICTA staff strongly encouraged a trial run and were extremely receptive to new technology, their expectations for significant energy savings were low.

The client's stated requirements for success were threefold:

- 1. Produce significant energy savings;**
- 2. Improve the NABERS rating of the NICTA building if possible;**
- 3. Support and elevate the government's drive for sustainable development.**

BuildingIQ initiated its incorporation with a site assessment for all four buildings, establishing a baseline of historical data, examining individual building management systems (BMS) and evaluating the ease with which PEO could be integrated for energy optimization. The team found that the NICTA building had a relatively new Delta BACnet system that would respond well to BuildingIQ's platform.

Working with ATP's facilities staff, the setup for the trial run took only about a week. The extended learning phase -- when the model learns the specific thermal dynamics of the building under changing conditions -- lasted for about a month and a half. After that, the optimization process began.

The relationship with the technical staff at NICTA bordered on a strategic alliance. The ATP staff brought the BuildingIQ team together with the four companies responsible for

onsite mechanical work and BMS operations. The parties worked collaboratively to ensure success.

Early results from the NICTA trial run have shown substantial improvement in energy savings. After running for a few weeks, energy savings had reached 17 percent of total power. ATP staff, vendors, and NICTA colleagues were not only surprised at the savings in such a high-performing building but skeptical enough to challenge the results. The transparency of the BuildingIQ system made it a relatively straightforward matter to review the historical baseline, walk through the optimization process, and display the results using charts and graphs. They could see the kWh consumption dropping day by day, and were convinced of the efficacy of BuildingIQ's model.

Despite the altered temperatures during optimization process, the client did not receive one single complaint from tenants.

In 2011 we started our sustainability journey with an energy bill of over \$260,000. We implemented an Energy Team and by 2014 our electricity was down to \$122,000. We are still improving.



Debra Sloane

Environmental, Health and Safety Engineer
Laerdal Medical Corporation
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Interior lighting upgrades include re-lamping the existing fluorescent fixtures with energy saving 28 Watt T-8 lamps and replacing ballasts with new low power electronic ballasts. The extended life of the T-8 lamps assist in not only energy savings, but also reduce the maintenance cost. In our warehouse we replaced all metal halide lamps with T-5 fluorescent lamps and fixtures. By installing occupancy sensors the overall energy wasted by unnecessary lighting has been reduced. All outside lighting has been replaced with LED's. HVAC upgraded to programmable and tamper proof thermostats.

Lighting retrofit kWh savings = approx. 95,000 kWh

Occupancy sensors kWh savings = approx. 32,000 kWh

HVAC cooling due to light changes kWh = approx. 18,000 kWh

Estimated energy savings @ \$.11 for 5 buildings = approx. \$95,700

Thermostat change savings = approx. \$43,000

Old roof was in bad condition and in need of replacement. We replaced it with a Cool Roof.

kWh savings = approx. 43,000 kWh

Window tinting was brought in to eliminate hot spots. Tankless hot water systems installed.

Toilets are all environmentally friendly low flush.

Plans for the future include replacing A/C units with SEER rating above Energy Star and ASHRAE guidelines. All new units will utilize environmentally friendly R-401 refrigerant. Replacement in new units will be mini-split systems with a 13 SEER or better and package systems to replace numerous residential 2.5 - 5 ton units. All new equipment, wherever feasible, will be the third phase.

Xeriscaping is now underway to achieve a very nice outdoor setting for our employees, customers and members of the community. This includes all low watering native plants, water retention pond, drip irrigation. It will all be wildlife friendly.

We are a global manufacturer and packing peanuts got to be a problem with bug infestations. To some countries, this could be devastating to their crops. We replaced our peanuts with paper for cost savings and space saving.

Integrated technology is becoming increasingly prevalent in the way enterprises operate. New innovations allow facility managers to run their businesses more efficiently and proactively. Implementing modern methods of facility management is immensely beneficial to businesses across various industries and businesses are able to better monitor performance and analyze the efficiency of their operations.

Facility managers understand the importance of maintaining and operating their assets in a manner that will allow their business to function smoothly. Many organizations are adopting new facility management solutions across multiple sites to increase transparency and centralize disparate management systems.

Specifically, more facility managers are recognizing that energy management is instrumental in reducing overhead costs while improving the efficiency of day-to-day operations. Connecting all aspects of facility management creates actionable data and improved decision-making capabilities by assimilating people, processes, and information in a way that reduces operating costs.

Energy management systems play a role in the connected maintenance and service



Bob Tuttle

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network that integrates the management of assets and equipment maintenance, energy use, mobile workforces, environmental efficiency, and compliance. The result is a platform which incorporates Big Data and analytics that lead to greater transparency, predictive analysis, and information-based decisions. The connected maintenance and service network is the ultimate solution for making sound business assessments that drive profits and reduce overhead costs.

Here are five elements to consider when executing a connected maintenance and service network:

- » **Maintenance Management**—manages the creation, dispatch, completion, and invoicing of all work orders. Site information, category and subcategory details (including down to an asset level), and all data comprised in a work order is stored in one database.
- » **Mobile Workforce Management**—intelligently guides, automates, and optimizes both simple and complex field service work, resulting in measurable business benefits.
- » **Energy Management**—a system that is based on collecting energy data and using that data to control energy costs with concise reports and automated energy event management.
- » **Sustainability Management**—uses a common data repository to allow data to move freely between application modules.
- » **Alarms Management**—is used to automate maintenance and energy management. It allows companies to use existing data in order to create fewer and better quality alarms, increase equipment uptime, and improve employee productivity, which results in making smarter decisions, lowering costs, and maintaining a competitive advantage.

Facility and energy management technologies allow real-time equipment monitoring to identify anomalies and exceptions that help reduce energy costs. With the addition of remote monitoring, critical assets can be continually observed and serviced on an as-need basis. The return on investment in facilities management solutions drives rapid payback, reduces costs, and improves profits.

Don't Discount Data: Leverage Analytics to Improve Energy Efficiency

Certain information-rich data streams have the power to unlock huge energy savings in individual buildings at an impressive scale. When employed in the right way, smart meter data, building address, weather information and a few other key data sources can reveal how consumers might be using energy unnecessarily (like leaving overhead lights on when a building is unoccupied), and indicate ways in which consumers can become more efficient via operational changes and retrofits.

For instance, to help meet its aggressive two percent annual energy reduction target across its 125 million square feet of US commercial property, the General Services Administration (GSA) looked to FirstFuel Software to unlock customer energy use intelligence via its data analytics platform. In looking at one GSA property, the 4.1 million square foot Ronald Reagan building in Washington D.C., we discovered energy use spikes at 10 a.m. and 3:30 p.m. – a phenomenon that enabled the SaaS company to conclude that two large exhaust fans in the garage were unnecessarily operating at full speed. This finding contributed to the Reagan Building's \$800,000 energy savings over a single year.

Using this same domain expertise in data analytics, building science, and software, FirstFuel has been able to help the GSA save a total of \$13 million across 180 sites to date. Additionally, through remote audits of the program's first 25 buildings, FirstFuel uncovered more than 19 million KWh of energy reduction opportunity at a 24 percent average reduction per building.

Approximately half of the savings opportunities identified were operational in nature, enabling GSA energy managers to implement efficiency improvements at little or no cost, typically without the need for time-intensive upgrades or on-site work.



Swapnil Shah

CEO, Co-Founder

FirstFuel

<http://www.firstfuel.com/>



...Two large exhaust fans in the garage were unnecessarily operating at full speed. This finding contributed to the Reagan Building's \$800,000 energy savings over a single year.

The Path to Zero Energy

Minto Communities is currently building five Zero Energy Homes (ZEH) in its Arcadia community in Ottawa, Ontario. These homes are part of a long history of continuous improvement and industry leadership.



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In the 1970's, we began experimenting with innovative building practices including enhanced insulation and double-pane windows – items which have now become a part of the Ontario Building Code. This commitment continued, and by the 1990's Minto became one of the largest home builders to offer R-2000 homes, a leading energy standard at the time.

In 1992 Minto built the Innova House as part of Natural Resources Canada's Advanced Houses program. This house took R-2000 standards and added more features in order to push the building industry to develop new products and methods to reduce energy consumption, improve indoor air quality and reduce the home's overall impact on the environment. Innova tested many technologies in 1992 that are just now making their way into the larger market such as heat recovery ventilators (HRVs) and triple-pane windows.

In 2008, we built Inspiration – our first zero energy home. The home, located south of Ottawa in Manotick, was constructed as part of CMHC's EQUilibrium Sustainable Housing Initiative. Inspiration produced more energy than it consumed on an annual basis and featured state-of-the-art building practices such as double wall construction, air sealing for comfort and energy savings, and 3 types of solar collectors for electricity generation, domestic hot water, and space heating. It also boasted a 50% water use reduction. The home achieved the highest rating under EnerGuide for Homes rating system as well as a LEED Canada for Homes

Platinum rating and it was the highest LEED point score in Canada at the time.

The learning from each of these projects has added value to every subsequent Minto development. In 2009, Minto made a commitment to certify all of its new developments to a third party environmental program, always striving to outperform building code. Avalon Encore and Quinn's Point, two of Minto's recently launched developments in Ottawa, feature triple pane windows, heat recovery ventilation, and LED lighting as a standard and use the EnerGuide for New Homes rating system to demonstrate the value to home-owners.

The greatest learning, however, is in quality construction practices that can only be achieved through attention to detail. Along these lines, Minto recently completed an internal project across three developments, Minto Caledonia, Southshore, and Longbranch, to understand and properly address air leakage in multi-unit low rise developments.

The five Zero Energy Homes now under construction in Arcadia have a focus on affordability and off the shelf technologies. The homes are part of a larger industry partnership between NRCan, Owens Corning, and the building industry, the goal of which is to build twenty five affordable Zero Energy homes across Canada.

The incremental cost has lowered to the point where these homes are now accessible to the average home buyer. The homes will feature superior insulation levels in the walls, attic, and basement, heat recovery ventilators, in-home energy monitoring, triple pane windows, drain-water heat-recovery, and a cold climate heat pump system. These five homes strive to be the best performing Zero Energy Homes Minto has built and will test the market for the next generation of Zero Energy Home.

To meet a company objective of reducing our total annual energy consumption by one percent, Cascades huddled up and called a blitz package. Specifically, we've been making an internal commitment to "Kaizen Blitzes," a rigorous, structured approach in which multidisciplinary teams were assembled to identify viable energy efficiency solutions throughout week-long exercises.



Marie-Josée Carrier

Communications and Sustainable
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With guidance from a facilitator and support from continuous improvement tools, ad hoc groups of individuals spanning manufacturing plant managers, maintenance supervisors, equipment experts, engineers, interns and others thought hard about how and where energy is consumed in our specific paper recycling and manufacturing plants, how much is really needed and where energy might be getting lost in processes. Specific projects were proposed – re-using water from stock preparation machines to reduce steam injection, using more energy efficient shower nozzles, etc. – then vetted against Cascades' principles, funded as deemed valuable and monitored. Overall, the Kaizen Blitz exercise has been a great reminder of how impactful it can be to combine the know-how of various team members in the name of energy savings!

Already, it has brought about quick results for Cascades, but we think the greatest value will be long-lasting effects in energy performance.

Improved Acquisition, Visualization Keys to Unlocking Sustainability Big Data

The intersection of Big Data and Sustainability Management is an increasingly hectic one. At this crossroads, billions of energy and resource data points represent both a challenge and an opportunity for organizations around the globe. To realize the power in their data, energy and sustainability professionals must first capture it. This makes effective, efficient data acquisition and data visibility critical traffic signals at this junction.



John Hoekstra

Director, Sustainability - Energy
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Companies across diverse market sectors and geographies have acknowledged a real need to leverage big data. Even small and medium-sized companies are known to generate in excess of 20 million data points of cost and consumption information, sustainability indicators and efficiency metrics in a single year. While the companies themselves are diverse, their collective motivation appears to be more singular: a desire for greater operational efficiency. Unfortunately, big data analysis has become a very big job.

It's been said necessity is the mother of invention. Software that allows organizations to analyze and act on big data is only the most recent example. Necessity was certainly the business case behind Performance Analytics, our new suite of functionality within its StruxureWare Resource Advisor software.

Performance Analytics was developed to span the gap between human limitations - time, cost and in-house expertise - and the potential that lies deep within large data sets, specifically interval data. The vastness of interval data is to be expected given the number of integral building systems that generate it, such as:

- » Interval, Pulse, Smart or Flow Meters
- » Data Loggers and Gateways
- » Energy Management Systems (EMS) and Building Management Systems (BMS)
- » SCADA, Power Monitoring Systems and Power Management Systems
- » Equipment and processes

To become more sustainable and efficient, companies must first acquire data from these

sources and leverage it to better understand how their facilities consume resources. The information must be captured on a site-by-site basis in enough detail to make finding and addressing inefficiencies easier, as well as overall project management and prioritization.

Additionally, organizations need an effective way to visualize data across their enterprise. Seeing data in its proper context makes project prioritization, success measurement, internal/external reporting and competitive comparison more efficient. The “gold standard” among software solutions integrates consumption data alongside procurement and sustainability information to add much-needed context. This visualization enhances analysis, which, in turn, enables action.

Global organizations already are leveraging these capabilities to drive reductions in cost and energy, as well as to:

- » benchmark global energy performance based on use parameters (e.g., energy per facility area, production, customer traffic, weather normalization, etc.);
- » evaluate data sets to prioritize efficiency, renewable, and supply cost-management opportunities;
- » assess granular energy-use data to conduct virtual energy site assessments, target high-consuming systems and drive efficiency opportunities;
- » integrate rebate and incentive opportunities into demand projects and use interval-energy-use data to substantiate measurement and verification.

Organizational leaders around the world are under tremendous pressure to not only reduce their operating costs and risk, but also advance their sustainability initiatives in the process. Without the right data displayed in the right context, this task is nearly impossible. Resource Advisor provides the framework for this context. Through the addition of Performance Analytics, users can drill down to interval-level information to uncover the potential that lies within their consumption data.

Embrace a Different Approach to Succeed in Energy Management

In meeting a variety of organizations in the municipal, industrial, and agricultural sectors, we have seen a great variety of solutions that different organizations have come up with in an effort to manage their energy usage and costs. Often enough, what an organization ends up doing is



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based on limited resources, limited time, and available funding or incentives from utilities.

Unfortunately, many of the approaches that these organizations take are based on what is immediately available to them, which most often results in a limited, short term, unsustainable approach to managing energy within their organization. Energy management is a cross organizational activity which is impacted in many organizations by a silo approach to management with vertical, disintegrated thinking and operation. Silo thinking can adversely impact many aspects of performance, but in particular energy management.

In our experience, the organizations that we work with have embraced a different approach, which we have found has yielded sustainable energy management programs, and sustainable savings in these organizations. These organizations have embraced the following elements to contribute to a successful energy management program:

- » Reliance on multiple members of an energy team rather than a single energy manager (partial focus of many as opposed to single focus of one);
- » Energy management as part of performance metrics for all employees;
- » Mandate of support from decision makers within the organization;
- » Wide access and knowledge of energy usage data and costs
- » Energy literacy (know what items on energy billing mean, how the organization is billed for energy)
- » Up to date knowledge of energy markets

One of the key features here is the reliance on multiple members of an energy team rather than one energy manager working in isolation. This approach is often seen as contrary to what most organizations perceive as the “correct” approach to managing energy with a single individual working to manage energy within the organization. With many utilities offering funding for a dedicated energy manager, this viewpoint is reinforced.

Unless this energy manager has the support of an energy team however, the initiative is very often unsustainable. One person working in isolation, in an energy silo, will often enough get stuck focusing on just one way to conserve energy, (given that this individual is most often an engineer, the primary focus is on equipment efficiency improvements), and other actions that yield cost savings are either not explored, or ignored.

In reality, having a diverse team of individuals from a variety of departments within the organization will yield the greatest, most sustainable results. Individuals from engineering, accounting, operations, planning, and maintenance all are capable of having an impact

on energy usage within an organization through their respective roles. Additionally, having a variety of personnel that take action on energy usage and costs as part of their performance measurement yields sustainable results; if individuals leave the organization, all of the action and activity is not simply dropped through the loss of one key player.

Energy management needn't be attributed to one person's actions, and indeed should not be. Once an energy team has identified a concise, specific plan in regards to how their organization manages energy, taking action on energy should not be a time and cost consuming exercise when shared amongst many.

Leadership

Lessons Learned: Embedding Sustainability in a House of Brands

At VF, we are working to use our diverse portfolio of 30 powerful brands to lead our industry toward a more sustainable future.

From The North Face

to Vans to Timberland to Wrangler, VF brand products reflect the social conscience of our company and our focus on continual improvement.

We have accelerated our efforts in respecting the environment in recent years. In a 115-year-old business like VF, implementing transformational change requires a deep understanding of the culture, the systems, the capabilities and the most strategic starting point in order to implement new systems and ways of thinking that truly take hold.

Our task is to build a program where every element delivers value to our brands and consumers and moves us one step closer to a world where we live in balance with the planet. Here's a look at some of what we've learned as we've embedded sustainability across our company.

» **Sustainability, at the core, is about change management. Change is not linear.**



Letitia Webster

Senior Director, Global Corporate Sustainability
VF Corporation

<http://sustainability.vfc.com>

It's multi-dimensional, iterative, and messy. Embrace the change and the challenges that come with it.

» Transformational change takes vision. We engaged leaders and associates from across VF and our brands in sessions that challenged us to re-envision a new world – one with limited resources, water scarcity, increased populations and rising constraints, and changing consumer expectations. We asked ourselves, what are the opportunities within these challenges?

“ Flexibility to operate within an existing infrastructure is necessary for long-term success. We built the infrastructure for our sustainability program (from a senior leadership team to a sustainability scorecard and our first global sustainability report), while also allowing our brands and functional business teams to express their creativity and chart their own unique courses to success.

- » Transitioning to a sustainable business model is complex – no one can do it all at once. Identify a place to start. At VF, we focused first on things we could control, identified where we could generate momentum with “quick wins,” and built an infrastructure to enable decision-making, sharing, and scaling solutions across our global, decentralized organization.
- » Flexibility to operate within an existing infrastructure is necessary for long-term success. We built the infrastructure for our sustainability program (from a senior leadership team to a sustainability scorecard and our first global sustainability report), while also allowing our brands and functional business teams to express their creativity and chart their own unique courses to success. Our commitment to flexibility has already led to innovations such as our CHEM-IQ program, which is helping us change the game in proactive chemical management within our supply chain.
- » Institutionalizing and accelerating change across a large organization requires deep integration and alignment. True success requires understanding, support and enthusiasm from all levels, geographies and functions. Meaningful process through positive change is a team sport.

The path to sustainability is rarely easy; change can feel slow, incremental, and difficult. However, at scale, those incremental changes can be truly transformational. One small change in a large company can create ripples throughout an entire industry.

For more information on CHEM-IQ, visit: <http://www.theguardian.com/sustainable-business/2015/apr/30/vf-corporation-reduces-harmful-chemicals-infootwear-manufacture>

Majority of Small and Medium-Sized Businesses Not Satisfied with Current Levels of Sustainability

According to the 2014 Cox Conserves Sustainability Survey, a majority of small and medium-sized businesses want better sustainability programs but are hindered by costs and a perception that investments in these initiatives don't matter to customers.



Elizabeth Olmstead

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The majority of SMBs (52 percent) are not satisfied with current levels of sustainability, and even more (65 percent) reported that they are committed to increasing eco-friendly activities.

Nearly two-thirds (60 percent) of respondents identified cost reduction and company values as the top factors driving investment in sustainability. Monetary considerations are both the largest adoption driver (reducing costs, 60 percent) and barrier of entry (unwillingness to pay additional costs, 64 percent) for sustainable business practices.

SMBs with the largest revenues (\$100M+) are far more likely to participate in sustainability activities than businesses earning less than \$10M (85 percent and 57 percent, respectively).



Nearly two-thirds (60 percent) of respondents identified cost reduction and company values as the top factors driving investment in sustainability. Monetary considerations are both the largest adoption driver (reducing costs, 60 percent) and barrier of entry (unwillingness to pay additional costs, 64 percent) for sustainable business practices.

SMBs within certain regions of the United States are more likely to participate in sustainable activities than others - the Pacific region leads the way with 67 percent participation, while the Atlantic region lags at 59 percent.

The survey results also show that women-led SMBs currently embrace sustainability more than those led by men. Seventy percent of women are committed to increasing sustainable business activities and are more likely to offer recycling programs, material efficiency initiatives and telecommuting options, compared to 62 percent of men.

I am a Baby Boomer and am living the life of WTPF - When The plan Fails. Time to make changes. I have been in the world of sustainability for almost 20 years and realized about 3 years ago that my plan to save the world thru walking the walk and

talking the talk of going green - failed. Although I loved what I was doing - I was not making any money doing it. I thought that because 'doing good' is the right thing to do - and the sustainable thing to do - everyone would see the value of environmental sensitivity and social responsibility in business. Instead - business gave it 'lip service' - come look at my 'sustainability program' which seldom was anything more than - we recycle. They saw no value in 'circle' thinking.

The truth is - without economic value - that equals or exceeds BAU (business as usual) the world - especially this country - tends to pat you on the head and wish you well. The phrase that I have built my career and life around - do good, make money - is a hard one to build professional success around.

So now what? I am slowly but surely learning ways to help businesses see that 'saving energy' - whether human, resources, time, or utilities - is making money. It is this century's version of 6 sigma systems thinking. The business 'game' has changed - it started changing when we hit the 21st century. We can no longer make money by just being 'average'. We have to learn to exceed and be as efficient as we can. That is sustainability - which has the potential to become a tool to thrive.

WTPF - When The plan Fails has helped me see a new path towards leading with economic viability. I am realizing that in showing the financial power of efficiencies - environmental sensitivities/social responsibilities follow as tools - powerful tools - to get there. My phrase has shifted - make money by doing good.



Jyl DeHaven

Chief Visionary Officer
Stratum VIII

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America and the world is in a battle with Climate Change. Our goal is to correct this situation and not pass it onto our kids and grand kids, but what can we do?



Sid Abma

CEO

Sidel Global Environmental LLC

www.SidelGlobal.com

Increase Energy Efficiency. At home at work and everywhere in between, we have to be constantly looking for and applying energy efficiency applications.

The EPA states our electricity generating power plants are putting 45% of all GHG's produced into our atmosphere. It's not the power plant but what is coming out of the chimneys. It's considered to be a lot of wasted energy!

This is America. Lets change this problem and convert that to a product that has not yet been given a purpose. In the combusted exhaust is a lot of Heat Energy that needs to be Removed / Recovered and utilized. In the combusted exhaust is a lot of CO2 that needs to be transformed into useful - saleable products.

With the heat energy removed from the combusted exhaust, Water is being "created" and this distilled water needs to be collected as it is a precious commodity. Instead of Hot exhaust let's vent Cool exhaust reducing the effects of Global Warming

The US DOE states that for every 1 million Btu's of heat energy recovered from the combusted exhaust and is utilized, 117 lbs of CO2 will Not be vented into the atmosphere.

In every 1 million Btu's of combusted natural gas are 5 gallons of recoverable distilled water.

If everybody were to do their part at home and at work and the utilities were to apply this Gas Heat Recovery and Carbon Capture Utilization technology along with collecting the water, a major big dent would be put into America's goals to meeting these Climate Change goals.

Sustainability and Procurement: Not Mortal Enemies

More often than not, sustainability and procurement managers are not comfortable corporate companions. During my research on how sustainable Australia's supply chains are for the NSW Office of Environment and Heritage, I discovered this was overwhelmingly the case.



Tania Crosbie

Director

The Crosbie Collective

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In some instances, there was all out war between the two departments with one sustainability manager saying, “I was not consulted by the procurement manager when the waste contract came up even though I was responsible for all the KPIs around waste. I just had to push my way through. It worked but he wasn’t happy and made it very clear that he would be making the decision.”

So what is causing this divide between sustainability and procurement? The research clearly identified a number of areas including:

1. Lack of leadership

The lack of leadership, around both sustainability and procurement, is rife. There must be a desire from the top to lead real change across the organization, integrating sustainable processes including procurement, contract management and the supply chain. Leaders need to make this a priority. And if sustainability is a priority, then leaders need to take responsibility and drive strategic and operational change.

Many people told me that their board, executive and management gave lip-service to sustainability, but when a sustainable solution was presented, the questions was always: “is it the cheapest?”

However, in companies where sustainability was part of the DNA, sustainability procurement managers were embedded into the procurement team to ensure that social and environmental impacts were addressed alongside economic criteria.

“ Share the responsibility for sustainability across your organization, to alleviate negative perceptions and isolating language.

2. Incompatible language

The research is clear: sustainability and procurement specialists speak different languages. One sustainability manager told me, “the suppliers and rest of the organization have no idea what I am talking about when I use sustainability speak.”

Not only are the actual words barriers, but sustainability managers often have no contact with their own procurement teams and/or no relationship with their suppliers. “I not only wouldn’t know what to say to a supplier, but I also wouldn’t have a clue who to contact in our supplier organizations. Without another sustainability manager to talk to, I’m at a loss,” said one sustainability manager. This example clearly highlights how isolating corporate siloes are when trying to change organisational and staff behavior.

3. Internal processes

It is often the very internal processes that ensure an organization operates consistently and effectively that are the barriers to procurement and sustainability working successfully. Changing the processes rarely has a positive outcome. Just adding sustainability, as another criteria on a procurement evaluation spreadsheet, will have little or no impact.

Many sustainability specialists admit that they have little or no experience in procurement. At the same time, most procurement specialists have little knowledge of sustainability, the business case and the issues. Little wonder that the two areas are at an impasse.

This roadblock is typified by the following comment: "I am still trying to work out how we do what we do and getting visibility of our footprint, let alone understanding and measuring our thousands of suppliers' footprints."

Another respondent alluded to being "overwhelmed with the breadth covered under sustainability," while another said, "sustainability managers don't know the supply chain – simple as that."

4. Internal perceptions

When delivering presentations to procurement specialist, I often ask what the attendees know about sustainability and one comment sums up the opinion of many. "A sustainable business is an inefficient business and one that wastes money. And what I mean by that is that ethical and green goods cost more – and that is wasteful."

This comment clearly shows that this procurement specialist did not fully understand the sustainable development business case, systems introduced to reduce waste, energy, water, packaging, transport and other sustainable practices that often accompany ethical and green purchasing and sustainable supply chain management. It's clear that sustainability specialists have a lot of work to do to change perceptions in their workplaces.

5. Current contracts, arrangements and relationships

Most companies I've interviewed have contractual arrangements that inhibit innovation and delay the introduction of sustainable practices. As one respondent said, many suppliers "simply don't want to change," and "lack the expertise or personnel to be able to comply with sustainability reporting requirements."

While some of the many people I spoke to saw the contract negotiation time as an opportunity to move to more "informed and innovative" suppliers, some said that "you should work the relationship, develop trust and partner with your suppliers – this is key. We believe in giving our existing suppliers the chance to change, rather than moving to new suppliers. By doing this, we strengthen existing supplier relationships and enhance both our businesses."

So, what's the bottom line? If your organization is looking to move to a more sustainable

business philosophy:

- » **Align the values of your company, leaders and the board around sustainability themes to influence and drive decision-making.**
- » **Commit to integrating sustainability across all sections of your organization. And measure and track achievements against the sustainability benchmark, while educating and rewarding innovation and success.**
- » **Share the responsibility for sustainability across your organization, to alleviate negative perceptions and isolating language.**
- » **Engage in sustainability reporting, publicly, to drive long-term behavior change. It works!**

So the next time you hear your colleagues griping about procurement or sustainability, initiate conversation and be the change agent. Your efforts will deliver better outcomes for people, profit and planet.

This article was published on www.procurementandsupply.com in February 2015.

Mapping Toward a Vision: The Impact of a Sustainability Materiality Assessment

Do you use certified fiber? How much water does it take to make a roll of paperboard? How much have you reduced your NOx emissions since 2010?



Chris Davidson

Director, Global Sustainability
MWV
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This is just a sample of the hundreds of questions MWV has fielded from customers on sustainability topics in the past two years. While we have always been happy to answer our customers' questions, we often found ourselves in a reactionary mode. We knew this was no way to do business for the long term. And when it comes to sustainability, we don't just want to do business—we want to be trusted partners and leaders.

At MWV, we have to be good stewards of the natural resources entrusted to our care, because they are the raw material in our packaging products. Packaging matters for sustainability and we want to actively partner with our customers and NGOs in developing a truly circular economy.

So last year we took a hard look at ourselves. We found pockets of excellence, but we also noticed that our focus was largely on managing risk and preserving our license to operate: we were missing opportunities to stimulate growth for our customers through sustainability. We wanted to close this gap, and decided that the first step would be to conduct a sustainability materiality assessment.

We wanted not only to understand and manage the sustainability-related impacts of our own business, but also to better understand the sustainability priorities of our customers and consumers. Our goal is to align our business to help our customers succeed. The process was fairly straightforward: we began with research and benchmarking to analyze the range of possible topics. We then mapped our value chain to identify sustainability impacts, risks, opportunities and boundaries. The most impactful step was stakeholder engagement, where we gathered internal and external perceptions of MWV's sustainability practices and future opportunities via interviews and surveys.

We began with customers, asking them about their visions for a sustainable future, their goals and priority areas. We also talked to NGOs, including voices all along the spectrum—from pragmatic partners to activist campaigners. Every one of them graciously took our calls and engaged in candid and productive conversation with our team about what mattered to them most. And finally we turned the lens inward, interviewing MWV business and commercial leaders about their strategic priorities, and how aspects of sustainability could differentiate their business.

All of this work resulted in our “materiality matrix,” reflecting feedback from stakeholders, peer benchmarking, relevant industry standards and studies. Viewing the data in this way helped us to clearly see some key priorities: greenhouse gas emissions, energy and water use, responsible sourcing practices, chemical transparency, packaging innovation and employee health and safety.

We validated the data through further internal discussion with MWV leaders. Lastly, we are mapping the assessment against our strategic priorities so that we can ensure sustainability is at the center of our business strategy.

We know that packaging matters to sustainability, and now we have the data. The materiality assessment is not only a means to developing a sustainability strategy but is the next step on our journey. Through the process, we built trust and strengthened relationships with customers and key stakeholders, enhanced connections between sustainability and corporate strategy and highlighted opportunities to lead.

At Staples, we place a high priority on our sustainability initiatives and always strive to reduce our environmental impact.



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Over the years, in my past positions held at different companies, I have observed a common theme to driving initiatives within an organization. I have named it the "6E Approach." Every time I have used this strategy we have been successful in what we aim to accomplish.

The 6E Approach to cultivate a culture of sustainability:

1. Educate your associates on what the initiative is about, what you are trying to accomplish, why it is important to the business and how they can personally contribute to make an impact.
2. Engage your associates by inspiring them to get involved. Consider the way in which you present to them the initiative so it will spark motivation and influence them to take action.
3. Empower your associates with the tools and resources they need to be able to get the job done. They are already onboard and motivated to take action so all you need is to ensure they have the support and tools required to accomplish the job and to do it well.
4. Execute your initiative with confidence because you know your associates are well informed (educated), motivated (engaged) and competent (empowered) to successfully implement your initiative and achieve results.
5. Evaluate your results, establish baselines and set new objectives and targets that are specific and measurable. What gets measured gets managed and what gets managed gets improved upon. Having a continual improvement (CI)



Evaluate your results, establish baselines and set new objectives and targets that are specific and measurable. What gets measured gets managed and what gets managed gets improved upon. Having a continual improvement component is critical to maintaining longevity [of a culture of sustainability].

component is critical to maintaining longevity.

6. **Evolve your strategy based on your learnings and results. Being flexible to adapt to changing business needs and external circumstances beyond your control is crucial to survival and maintaining your competitive edge.**

Sustainability should not be the sole responsibility of one individual but rather it should be the culture. By using my 6E Approach you will be able to transform your ideas on paper to reality. Never underestimate the power of your associates who really do influence the culture of your organization. By tapping into these engaged, motivated associates they become your catalysts of change and are instrumental in driving your sustainability initiatives.

In our ongoing research on corporate sustainability, George Serafeim, Associate Professor Harvard Business School, and I are finding that organizational leadership and culture continue to affect how companies deliver on their sustainability commitments. Our research reveals that most large companies lack one unified culture. Rather most have many diverse subcultures.



Kathleen Miller Perkins

CEO

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Our study of Chief Sustainability Officers (CSOs) showed that one of their primary responsibilities is to drive change throughout these complex subcultures. Thus, we were not surprised to hear that CSOs emphasize the importance of possessing a keen sense of culture and how to lead transformations.

To succeed with a transformational strategy, they have to understand enough about all of the subcultures to design an approach that is customized to the unique needs of each. Not surprisingly, the CSOs in our study recommend diagnosing the culture before planning the change strategies. They describe their organizations as organisms with moving parts.

Successful CSOs say that they gauge their strategies on a granular level within their organizations. For example, Steve Howard, CSO of IKEA, told us, "The hardest thing about leading the change is managing the complexity, especially in a company like IKEA where the public is interested and watching our actions." Beth Heider, CSO of Skanska USA stated that it is important to understand that this is not a "once-and-done" process. It will continue to morph and change.

Our CSOs advised those who are new to their positions or planning to devise new strategies to gather baseline data about their cultures. This data allows for more targeted

tactics for embedding sustainability attitudes, policies and practices into the organization.

Eleven years ago, we decided to expand our portfolio of environmentally conscious products. As we started to drive product sustainability, we put enormous pressure on leading sustainable product innovation, pushing ourselves so hard that we created a product that didn't have market appeal – and thus poor sales.



Katie Davies

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To expand our sustainable product portfolio, we started to rank all of our product ideas in an Eco-Product Rating system. This proprietary system evaluates the environmental consciousness of all of our products' design ideas and classifies them as Premium Eco, Good Eco, and Eco. A product's eco-rating is based on three primary factors: 1) resource efficiency, 2) energy efficiency, and 3) environmental hazards. Other elements are also considered, such as recyclability, use of single materials, and unbleached chlorine-free paper.

We use this system to proactively drive sustainable innovation in our product portfolio. We've found it to be incredibly successful in bringing cutting-edge products to market. One particular product was our 2009 Blue Earth phone. The phone featured plastic from only recycled water bottles and advanced chemicals management. It unveiled some of the features that are now standard on all of our phones including eco-mode (an energy savings



We've since learned that we needed to embed sustainability into existing market demands. Now our product developers concentrate on eco-features that have direct consumer benefits. These features tend to center around energy efficiency and eco-materials that reduce the product price.

setting) and a pedometer. It also had a solar panel on the back cover. While it was heralded by environmental stakeholders as an icon, the sales fell flat.

We've since learned that we needed to embed sustainability into existing market demands. Now our product developers concentrate on eco-features that have direct consumer

benefits. These features tend to center around energy efficiency and eco-materials that reduce the product price.

This year, the Samsung Galaxy S6 mobile phone emerged from the Eco-Design Process as a Premium Eco product because of its advanced sustainable technologies and materials. Samsung's Research and Development team worked diligently to improve the recyclability of the phone – reaching 99.9%. They improved the functionality 20%, found ways to increase recycled plastic in the charger, used soy-bean ink in the print materials, and packaged the phone in 100% recycled cardboard.

All of this sustainable innovation still has top-of-the-line performance that would appeal to any consumer. The phone has a 2k resolution screen, a high dynamic range quick-start camera, and wireless charging capability.

Sustainability challenges are incredibly complex and there are always competing tensions. It's the kind of problem we love to solve. Our Galaxy S6 mobile phone is the culmination of all this hard work – it's both environmentally innovative and focused on the consumer need. Through today's technical innovations, we believe we will find the solutions to tomorrow's most stubborn sustainability challenges.

Practice Greenhealth released the Healthier Hospitals 2014 Milestone Report, announcing the impact of nearly 1,000 hospitals across the country that

reduced their environmental footprint, lowered costs and improved health of patients and staff. Launched in April 2012, the program was designed as a three-year national campaign to promote a more sustainable business model for health care, while reducing the health and environmental impacts of the industry.

The Report summarizes three years of progress among hospitals that submitted data across six challenge areas: Engaged Leadership, Healthier Food, Leaner Energy, Less Waste, Safer Chemicals and Smarter Purchasing. While 2015 marks the culmination of the initiative, Healthier Hospitals will continue as a free program of Practice Greenhealth, providing hospital systems with tools and resources to drive change.

A few highlights of the 2014 Milestone Report:

- » Trends around purchasing and serving local, sustainable food and healthier beverages continue. The US spends billions of dollars annually to treat diet-



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related, chronic diseases: \$147 billion to treat obesity, another \$116 billion to treat diabetes, and hundreds of billions to treat cardiovascular disease and cancer. This year, even more hospitals committed to modeling healthy behavior and reducing diet-related chronic diseases by creating healthier menus, buying antibiotic-free meat, reducing the amount of meat served, procuring more local and sustainable food and serving non-sugar-sweetened beverages.

- » There was a decrease in the average amount of meat served per meal from an average of 0.115 lbs. per meal in 2013 down to 0.103 lbs. per meal in 2014.
- » Forty-eight hospitals increased their healthy beverage purchases, with many phasing out soda for healthier alternatives like fruit juice and tap water.
- » 115 hospitals spent \$35,805,740 on local and sustainable food in 2014, and 64 percent (74 hospitals) purchased at least 15% local and sustainable food.
- » More hospitals are reducing exposure to toxins by using safer chemicals. Products like furnishings, cleaners and medical devices expose patients and staff to harmful chemicals linked to health issues. Hospitals worked throughout the past year to transition to PVC- and DEHP-free devices, to purchase more “green” certified cleaning products and to purchase at least 25% of furnishings (chairs, exam tables) without halogenated flame retardants, formaldehyde, perfluorinated compounds and PVC.
- » 172 hospitals made at least one product line DEHP- and PVC-free in 2014.
- » There was an 11.2% increase in spend on certified cleaning chemicals compared to total spend from 2013 to 2014.
- » In 2014, 18 hospitals reported that an average of 59.8% of furnishings purchased were free of the targeted chemicals.
- » Fourteen hospitals purchased more than 25 percent of healthy furnishings.
- » Reductions in energy use and waste continue to drive cost savings. US hospitals emit 8% of our nation’s greenhouse gas emissions and create 28.4 lbs. of waste per hospital bed per day. Reducing energy use in hospitals and increasing recycling and re-use improve the sector’s environmental footprint.
- » In 2014, the Leaner Energy Challenge reduced energy use equivalent to avoiding 73,600 metric tons of CO₂e in greenhouse gas emissions.
- » 395 hospitals in 2014 recycled 122,000 tons of waste, and 68.4% (270 of 395) met or surpassed the 15% goal of recycling as a percentage of all waste, with an average recycling rate of 26%.

This report solidifies the changes that the leading health systems are undertaking—not just reducing their impact, but actively using sustainability to improve the health of patients, staff and communities.

At Hormel Foods, we reward and recognize internal teams of employees who have taken the time and effort to identify areas for efficiency improvements each year.

Through our annual Environmental Sustainability Best of the Best competition, we honor teams who have implemented efficiency improvements throughout the year. Each project is evaluated and scored in the categories of goal setting, teamwork, problem solving, achievement and cost savings.

In 2014, there were 52 entries generated across all Hormel Foods business segments that resulted in significant resource savings -- an 82 million gallon reduction in water use, a reduction of more than 17,400 MMBtu of energy, including a 2.7 million reduction in kWh of electricity, and a reduction of more than 1,500 tons of solid waste. This year, we recognized an international winner for the first time: Project Blue Sky at the Beijing Hormel Foods Corporation Plant in Beijing, China. The plant's energy conservation project reduced carbon dioxide emissions in 2014 by 60 percent from the previous year. The team at the Beijing plant replaced two boilers with more efficient steam generators and moved them closer to ovens to reduce energy loss, as well as used heat recovery technology and thermal solar panels to heat water for sanitation.

The previous year, we named Century Foods International in Sparta, Wis., as the 2013 Best of the Best champion for projects that reached a recycle rate of 93 percent and zero waste to landfill status at all four of their plants. Since we began the competition in 2008, we have named seven Best of the Best champions across a wide array of geographic regions and sustainability projects.

Our annual Environmental Sustainability Best of the Best competition demonstrates we can get results and make an impact with hard work and a spirit of continuous improvement. It really is a competition that brings our entire company — within the United States and across the world — together for an important cause. Through our success with internal initiatives and the support from our employees through the Best of the Best competition, we surpassed our 2020 solid waste goal in 2014, and we've made significant strides toward our other 2020 goals to reduce water, energy and greenhouse gas emissions.



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At Ingersoll Rand, sustainability is an integral part of our culture. Employees want to take action to improve sustainability performance, and the Design for Sustainability (DfS) Certificate

Program created in partnership with UL Environment helps promote sustainable thinking and builds competency throughout the Ingersoll Rand Product Development Process. While UL Environment traditionally certifies products, this certificate program is a first to distinguish people and certifies participants to:

- » **Advocate for sustainability with product design teams;**
- » **Analyze and articulate market-specific value propositions of sustainability;**
- » **Expand risk and opportunity assessments to include sustainability;**
- » **Incorporate sustainability related attributes into all product design;**
- » **Understand the trade-offs and opportunities during product design.**

Through the launch of the DfS program, we've found the principles of sustainability can be easily incorporated into every facet of an organization and every employee's work routine. The key is to understand how to make sustainability training meaningful to employees, and not just another requirement to add onto their daily work.

Based on our experience, tips for success include:

- 1. Provide flexible training options that work within a variety of different schedules.**

Taking employees off line and bringing them into a physical classroom setting proves nearly impossible given the increasing demands of the professional workforce. Tech savvy employees appreciate learning at their own pace and using their "plugged-in" capabilities to learn on their own time.

- 2. Offer certifications that are appreciated outside your organization.**

Employees want value. Instead of making employees feel training is another mandatory task, empower employees with a learning program that leaves them inspired and recognized by the broader industry. A frequent comment of employees is, "We want something with external validity that develops our capabilities, is recognized outside the company and makes us more personally



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marketable.” Look for a training partner with mass appeal. By offering certifications recognized outside your organization, employees may be more eager to get involved.

3. Deliver sustainability tools which easily integrate into employees’ day-to-day routines.

There are many tools at a company’s disposal that can make sustainability part of employees’ day-to-day schedule, including strategies to implement new products into an organization, ways to assess the current state of products, and tactics to reduce consumption of natural resources.

A new product checklist can ensure sustainability is a priority throughout its beginning stages by pointing to the most common and potentially impactful environmental issues that must be addressed before product implementation can begin. Additionally, while evaluating current products, a sustainable product opportunity assessment tool can be used to identify the appropriate product strategy in response to market needs.

Alongside these tools, a natural resource consumption checklist can be instituted to help project team members identify potential opportunities to reduce consumption of natural resources.

With these three elements in place, your employees will learn to naturally speak the sustainability language and in turn will create a new type of conversation with your customers. Teams across your organizations will have access to new tools to better evaluate how to exceed customer expectations and to make better decisions regarding product function and design, manufacturability and make up.

Improving today for a better tomorrow: the mandate

As one of the world’s largest protein producers, the company that approached us for assistance is highly aware of its responsibility towards society and the leverage it can exert. Even though the company is no stranger to sustainability, the

decision was made that a materiality analysis should be conducted to identify the internal



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and external perceptions of key sustainability issues in the beef, poultry, pork, and lamb industries. The objective was to form the basis for addressing sustainability in a more holistic manner.

To acquire the internal and external perception of sustainability in the industry and the company's sustainability performance, we conducted a literature analysis as well as an online survey and telephone interviews with both internal and external stakeholders. The internal survey covered approx. 100 employees from various countries and functions representing more than 60% of the employees contacted. Approx. 250 external stakeholders from academia, capital market, customer, government, industry, and NGO/NPO groups were contacted, of which roughly 50% participated. Furthermore, the project took into account more than 800 literature sources making use of approx. 1,700 quotations.

Participants showed a keen interest in the company and could also provide some valuable recommendations on how to further improve certain aspects. In addition, our client received very positive feedback on the fact that they had taken the first step towards engaging in a continuous and structured dialogue on sustainability.

While we found a number of critical sustainability issues in the protein industry, stakeholders are very impressed with the company's sustainability performance and even see them as a leader in the industry. According to external and internal perceptions, a total of 21 critical environmental, social, economic and product responsibility issues of very high or high relevance were identified for the industry and thus, also highly relevant for our client. The top three issues were found to be animal health & welfare, land management, and technology in agriculture.

In addition to the different sustainability issues, stakeholders also evaluated the sustainability impacts of the industries' different value chain phases. The results showed that slaughtering followed by finishing and agriculture/ feed production were perceived to be the most critical phases along the value chains of the four proteins.

The two-day materiality workshops brought experts from the US, Australia, Canada, Mexico, and Brazil together and provided a forum in which they could exchange ideas. Consequent to the materiality workshops, our client has swiftly begun to implement identified measures for improvement for the most critical sustainability issues.

Additionally, the results of ensuing workshops have provided a good basis to:

- » **Decide on measures with which to address critical sustainability issues for each protein and throughout the company, i.e. concrete objectives, timelines, responsibilities and required resources;**

- » Develop sustainability strategies for each protein, issues category, and an overarching corporate sustainability strategy for the company to differentiate in the market;
- » Compare with the sustainability situation in other markets and to possibly transfer knowledge and know-how in either direction (sharing of best practices);
- » Develop a sustainability report according to the GRI G4 standard.

Hence, the materiality analysis conducted was another important step in our client's continuous improvement process towards sustainability.

I've been fortunate to work with companies such as Nike and DuPont that had leaders that committed to sustainability early. In some cases they championed climate change (against popular sentiment) and drove change across their organizations and down their value chains, often beginning with energy savings and greenhouse gasses. Whether by vision or necessity, these leaders created environments that encouraged and allowed sustainability thinking to emerge, be developed and, eventually, operationalized to varying degrees within their organizations.



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In early 2013, I began serving on the Private Sector Advisory Group (PSAG) of the UN International Strategy for Disaster Risk Reduction (UNISDR). The UNISDR focuses on reducing the risks from climate-related disasters. With improvements in climate science and data, sensing and communications, the PSAG is driving the reduction of risks and the prevention of losses, both human and property from those risks which, in turn, contributes to increasing levels of community and institutional resilience.

Within a year of joining the PSAG, it became clear that there were practical reasons as well as tremendous opportunities to bring climate change, sustainability and resilience together. These are interdependent, interlocking and enabling agendas that will benefit from converging.

Managed separately, they're taxing. When combined and brought into coherence, they can

“ **Resilience is the conditions that result and enable individuals, communities, businesses, regions and so on to survive and even thrive at best, or collapse and succumb at worse.** ”

help build and support a world that's beginning to feel the pressures of population growth and the global development required to meet the expectations of a fast-growing middle class.

A simplified construct for thinking about these three agendas is that climate is an impact, providing positive, neutral or negative effects. Sustainability is a set of mindsets and behaviors that guide what we do (or don't) which helps or hinders our sustainability. Resilience is the conditions that result and enable individuals, communities, businesses, regions and so on to survive and even thrive at best, or collapse and succumb at worse.

Pressed into service as part of my advising role at the UNISDR, I began articulating this coherence relative to the private sector, first for the UN General Assembly Open Working Group on Sustainable Development Goals (January 2014) and later during the UNISDR Americas Regional Platform in Ecuador (May 2014). The learnings from each block of work provided a clarifying view of the private sector's strengths, weaknesses, capabilities and challenges as they work to integrate and operationalize climate change, sustainability and DRR/Resilience more fully into their business models and research and development streams.

Here are my topmost learnings for the private sector on bringing these agendas together for success:

- » The lines of communication between the public and private sector are weak and clogged with mistrust.
- » Working across all aisles and putting preconceptions aside is critical. Consider using coherence as a framework to define actions that are cooperation- and collaboration-worthy.
- » Acting on the three agendas is particularly difficult because the fields of concern are extremely broad, complicated and distributed across multiple functions and areas of responsibility and power. The Rockefeller Foundation, through their Resilient Cities campaign, has suggested that organizations consider appointing a Chief Resilience Officer. This new role could expedite the connections urgently needed between and across the functions (CSR, Sustainability, HSE, Sourcing, Finance, HSE, R&D, Capital...) as well as effectively bridge public and private sectors.

Finally, to quote my favorite sustainability director, "Let's not let perfect stand in the way of progress." Doing nothing is not an option.

We had to do our Sustainability Report (reporting to multiple groups) and we had to take historical data from the previous three years (Axalta was created from DuPont Coating Systems in 2013). Our challenge was that multiple sites used multiple units of measure, globally and the original data was in a unit of measure not requested by GRI or other agencies to which we had to report. Multiple calculations and transformations were required, and sometimes, it was different between two different years at the same sites.



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With the collection for the 2013 year it was decided to let our sites report “as they wished,” creating even more calculations, doubling back for data, and more than a fair share of errors in both aspects to “mop up” before submission.

Lessons learned as we are creating a Sustainability Module for our EHS & Quality Data Applications:

1. Go no further than one step from a GRI required measurement. A single transformation/calculation is the maximum. If possible, pick a UOM that is easily available to the engineers!
2. Standardize on a UOM that is easy for everyone to submit...no “shorthand notations,” no “but the water company reports in gallons!” This is a little easier elsewhere in the world, as the metric system eliminates much of this issue.
3. Pick an easy reporting date and frequency. For example, if the electric supplier reports monthly, put that data in monthly. If the water company supplies the data quarterly, then put that data in quarterly. Compliance and data accuracy will go up, allowing better metrics and more achievable Sustainability Goals.

That means everyone wins.

For nearly 30 years, Environmental Services, Inc. (ESI) employees have worked to minimize environmental impacts through mitigation, management and expert science. During that time, it never really considered ourselves a sustainability management company.



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ESI employees thought “sustainability” was just another business buzzword - like vertical cross-functional synergy - that was reserved for annual conferences “live-tweeted” by 20-somethings watching the webinar from their couches. We could name every tree along the highway and recite the 3R’s like everyone else Reduce, Reuse and Recycle - but it wasn’t until our founder, Rhodes Robinson, made the connection between what we have been doing all along and what we could be doing in the future, that everything became clear.

I encouraged us to forget what we thought we knew about sustainability and demonstrated what an integrative, systems-thinking approach to sustainability was capable of accomplishing for ESI and other industries. I explained that sustainability is about using less, to do more, better and for longer. The company saw that developing a vibrant economy and diverse community can be accomplished while improving the environment. We learned that advanced technologies and techniques without education won’t solve all of the world’s environmental issues.

As we have grown into our ever-evolving, sustainable way of thinking, we have bumped up against a number of sustainability barriers and myths. Hopefully, the following list will help you avoid the same obstacles and pique your interest enough to leave you wondering what sustainability management could help you, your family and your business achieve.

Myth 1: Sustainability is all about the environment.

Sustainability’s goal is to balance and maximize the economy, society and environment. These three sectors are often referred to as the Triple Bottom-Line, or “People, Planet, Profit.” Even the foundation of most environmental laws in the U.S., the National Environmental Policy Act of 1969, stressed balancing social, economic and environmental needs.

Myth 2: Sustainability and “Green” are the same.

“Green” is primarily focused on producing, using and disposing of goods in an environmentally superior and conscious way, which is a good thing. However, it often falls short of its goal because it doesn’t always take into consideration the economic and social impacts of those goods.

Example: A product that is biodegradable is, generally, better for the environment than something that isn’t. However, if that product is disposed of and sent where it cannot biodegrade, like a landfill, it is no better than something 100% non-biodegradable.

Myth 3: Implementing sustainable solutions into your personal and professional lives is expensive.

Initially, incorporating sustainability into your daily life might be more complex or time-

consuming than what you've done in the past. However, if you add up all of the benefits of incorporating sustainable solutions and compare them to conventional solutions, sustainability cost you less money in the long run.

Example: Take the de facto mascot of sustainability, LED lightbulbs. It is a fact that an LED lightbulb costs significantly more than its CFL or incandescent counterparts but, once you factor in the energy savings, improved lifetime (leading to fewer bulb purchases and cost associated with replacement), and the reduced heat load (leading to lower A/C costs), the LED bulb out-performs all other options.

Myth 4: I have to buy something new to be sustainable (like LED lightbulbs).

Using a new product or piece of equipment certainly can help, but it isn't required. Examining what and why you do what you do will likely reveal the potential for a more sustainable option.

Example: Turning off your lights when you leave a room or opening a window's blinds and using natural sunlight uses 100% less energy than a LED, CFL, or Incandescent bulb.

Myth 5: No matter what I, or my business does, we aren't making a real difference.

If your sustainability initiatives never leave your desk, then this is true. However, if your business truly engages its employees and teaches them how to be more sustainable at home, then the impact has been multiplied. Furthermore, engaged employees will share how they saved money with their friends and family, who will then share with their friends and family and workplace, multiplying the impact again. This cycle is what makes sustainability work and THAT is what will change the planet, one family and business at a time.

Reporting and Standards

Metric to Determine If RoHS/REACH Declaration Collection Is TOO Slow

Far too many companies are not



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watching the performance of their material compliance efforts. The attitude is that as long as there is apparent compliance, there is no reason to change anything. So these efforts are frequently found to be performing poorly. It is very well known that what is monitored gets better, and the other things not. While the company is not paying for the material declaration, there is a significant burden on resources to successfully perform these tasks.

A good, but simple metric is needed to provide a relative measure of the performance. You can quickly determine the average time to collect a declaration by asking, "How many man-hours were applied last month to collect declarations?" and "How many acceptable declarations were loaded into the archive last month?" Simple division of the total man-hours by the quantity loaded will give you your answer. The result of the division is the average time (man-hours) needed to complete the full collection process for the average part declaration.

You can now check again next month and observe if the processes is working faster or slower than last month.

You might attempt to find other companies to benchmark against. This might be very difficult, since we have observed that so few companies are watching their efforts.

Another option is to benchmark against typical industry results. I have personally observed that a well functioning effort can perform at 0.15 hours/declaration or 9 minutes/declaration. If your calculated time is less than this, the material declaration collection effort is doing extremely well. It is more likely that your calculated time is far greater. In this case your company might benefit from some improvement activities.

If you have gotten this far, you have been asking questions, so why stop now. While no one may care about the man-hours consumed, someone is very likely to care if the collection effort has a negative impact on the business. The business leaders will be interested if customers are not receiving declarations for your products, if the sales guys are taking their time to expedite delivery, or if lack of CE Mark delays sales in the EU. Are these or similar business issues occurring frequently? These observations are most likely to support efforts to reduce the man-hours to collect a declaration.

Fortunately, once the business becomes interested in their RoHS and REACH part declaration collection, it is often easy to make significant improvements by applying Six Sigma and Lean methods to the material declaration collection processes.

Boston, New York City, and Seattle All Require Benchmarking in Energy Star Portfolio Manager... Will Your City Be Next?

In most metropolitan areas, commercial and industrial buildings can account for nearly 70% of a city's carbon emissions. Fortunately, more and more cities and municipalities are becoming aware of this staggering statistic, and are taking steps to reduce their impact on the environment. Today, commercial and industrial building owners are provided with a variety of resources and tools to assist them with monitoring and tracking energy and water consumption.



Gary Brooks

CMO

Urjanet

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One of the most commonly used applications is the EPA's Energy Star Portfolio Manager.

Because Energy Star Portfolio Manager is so widely adopted across the United States, it serves as a great tool to benchmark building performance against similar buildings throughout the country. Portfolio Manager is seen by many as the national standard for energy management, with numerous building owners and managers, healthcare organizations, sports teams, cities and municipalities already using the tool. To date, Portfolio Manager services 40% of commercial buildings in the US and 35% of the Fortune 500. In fact, some cities, including Boston, New York City, and Seattle, are requiring that commercial and industrial buildings use Portfolio Manager.

“ With an automated data solution, it's easier to focus on the insights provided by the data. The benefits of leveraging building benchmarking data insights add up in quantifiable dollars and cents: compared with their peers, Energy Star certified buildings use 35% less energy, generate 35% fewer greenhouse gas emissions, and cost \$0.54 less per square foot to operate.

These cities are among a growing list of those that have created ordinances that require building energy consumption data be disclosed within ENERGY STAR Portfolio Manager. Even if your city doesn't mandate the use of Portfolio Manager, there's a chance that it has perhaps launched a voluntary campaign or incentive program leveraging the tool. These

ordinances and voluntary programs are generally developed in conjunction with a city's commitment to aggressively reduce its carbon emissions in the near future.

With many of our nation's most progressive cities leading the pack in energy benchmarking with Portfolio Manager, there is no question that many others will soon follow suit. When they do, commercial, industrial, and even residential buildings will be expected to get their act together to make sure their building data is accurately represented within the tool. This task can seem daunting to building owners or real estate investors managing multiple facilities who haven't taken the steps to benchmark with Portfolio Manager yet, especially if they aren't currently working with a third party to help get the data into Portfolio Manager.

With an automated data solution, it's easier to focus on the insights provided by the data. The benefits of leveraging building benchmarking data insights add up in quantifiable dollars and cents: compared with their peers, Energy Star certified buildings use 35% less energy, generate 35% fewer greenhouse gas emissions, and cost \$0.54 less per square foot to operate.

Benefits of ISO 9001/14001 Registrations

ISO 9001 and ISO 14001 Registrations create value, identify cost savings, help the environment and benefit your customers. Having corporate ISO 9K/14K Registrations require 1) support from upper management and 2) resources dedicated to

managing these internationally recognized certifications. These registrations are designed to ensure the company follows a set of defined guidelines that has the customer and environment's best interest at heart. However, much of what is required to be done or in place for ISO should be done regardless, as it makes good business sense and mitigates risk.

ISO 9001 focuses on the quality of product or service delivered to customers and ISO 14001 ensures that we identify, evaluate, manage and reduce our environmental impacts associated with our activities, products and services.

In maintaining compliance to ISO 9001 we are able to drive customer satisfaction and performance excellence in all areas of our business. For ISO 14001, we ensure compliance to environmental legislation, minimize pollution and instill continual improvement. It is only when we seek to go beyond the compliance to these registrations is where we see the fruits of the labor invested in managing these registrations.



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By having environmental programs in place that not only ensure we comply with legislation and benefit the environment, we can also realize programs that help us identify cost savings and streamline operations to drive efficiency. An example would be an environmental program focused on energy savings. By implementing lighting retrofits at various locations, we are reducing energy consumption which positively impacts the environment but also helps reduce our energy costs. Another example would be an environmental program focused on waste reduction. By increasing our recycling efforts we positively impact the environment by less waste to the landfill and also we lower our waste disposal costs by fewer trips to the landfill.

Innovation and creativity are critical to staying competitive in today's marketplace. Going green is about doing more with less and hence driving innovation and creativity. Having ISO Registrations help foster this mindset that challenges associates to think outside the box and brainstorm new ideas resulting in operational improvements, which in turn can help to exceed customer expectations and positively impact the environment.

On Global EHS Auditing Insights

The collective experience of 55 environmental, health, and safety (EHS) audit directors and managers from some of the world's leading multinational companies



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provides valuable insights for companies of all sizes and audit-maturity levels in guiding EHS auditing activities. With the goal of promoting continuous improvement in EHS auditing effectiveness and practices, AECOM's International Audit Protocol Consortium (IAPC) has published its Seventh Biennial Environmental, Health, and Safety Audit Practices Survey Report--a 123-page report presenting the results, analysis, and lessons learned for its membership in critical EHS areas of: Audit Scope versus Depth; Auditor Independence, Competency, and Training; Compliance Point versus Control Failures; Audit Program Metrics and Evaluations; and Stakeholder Value.

Following are examples of EHS audit insights and lessons learned from some of the leading multinational corporations based on the survey results and analysis:

- » As the scope of global EHS audit programs has expanded over the past decade, there generally has not been a commensurate increase in audit resources (budget) for these programs. Audit directors presently are confronted with the

ever-growing challenge of maintaining a quality-controlled audit service and meeting the increasing needs of stakeholders. Some global audit programs are meeting this challenge through more in-depth deployment of risk assessment processes to focus audit resources in areas of greater risk while still maintaining the overall program scope desired by key stakeholders.

- » Greater attention is being devoted to effectiveness of corrective actions being implemented in response to EHS audit findings. Although often viewed as a “back-end focused” activity (i.e., assuring quality corrective/preventive actions are established during the post-audit period, followed by objective evaluation of corrective/preventive action implementation), leading EHS audit programs are placing greater attention on identifying control failures versus stopping at more traditional compliance point failure findings. This approach promotes a more robust evaluation of the effectiveness of management systems and leads to more effective corrective/preventive actions.

AECOM founded the IAPC in 1996 as a forum for EHS managers to share best practices and information regarding global EHS auditing and oversee development of leading-edge EHS audit protocols for jurisdictions around the world. With 56 member companies in North America and Europe, the consortium maintains industry-leading EHS audit protocols for 35 countries and jurisdictions. The audit protocols describe regulatory requirements, laws, codes of practice and guidance documents for use in compliance auditing, self-assessments, and regulatory reference.

Published for IAPC members, the EHS auditing practices survey report, prepared biennially since 2002, is by far the most complete compilation and analysis of EHS audit program data available anywhere. The survey data can be used to not only track changes in EHS audit practices over time, but also to benchmark or validate current EHS auditing practices and support the need for program changes that may be needed. Also highlighted are significant challenges—and emerging solutions—for EHS audit stewards.

NYC Code Pushes Building Performance beyond LEED

With the roll-out of New York City’s 2014 Energy Conservation Code (NYCECC) on January 1, 2015 and the reveal of Mayor DeBlasio’s One City: Built to Last plan in September 2014, NYC is leading the way in resilient and sustainable community development.



**Whitney Smith,
Helen Rubinstein,
Casey Cullen**

Sustainable Services
Cosentini Associates

New construction and major renovation projects that file with the Department of Buildings after January 1, 2015, are now held to the 2014 NYCECC, which references ASHRAE 90.1-2010 and has more stringent requirements for daylighting and lighting controls. With each successive version of ASHRAE 90.1, the energy standard requires more efficient building systems and design. New York City is poised to follow this trajectory with updates to the NYC Construction Code every three years. In addition, NYC local law requires buildings with over \$10M in public funding to demonstrate a minimum energy savings of 20% over current energy code.

US Green Building Council's LEED 2009 green building rating system references ASHRAE 90.1-2007, which means projects complying with the current NYC energy code easily meet the LEED prerequisite and can recognize greater energy savings under EAc2: Optimize Energy Performance.

One City focuses on improving the energy efficiency of existing buildings and infrastructure as well as significantly reducing waste, with a target of 80% carbon reduction by 2050. The plan frames several local laws which require retro-commissioning, utility benchmarking and reporting, and efficiency upgrades for buildings. The plan also expands the City's composting program to reduce household waste.

LEED for Existing Buildings: Operations and Maintenance provides credit for retro-commissioning, but does not require the service for certification. It does require the project to report water and energy usage to document performance. This certification also provides credit for diverting 50% of operational waste from a landfill.

In our work with LEED projects also complying with the NYCECC or the One City plan, our firm developed the following best practices for a successful project:

- » Utilize an integrative approach – determine project's energy code pathway early with input from the entire design team.
- » Conduct early energy analysis to evaluate building performance with varied design options.
- » Engage ownership to facilitate key decision making.
- » Cost estimate in SD or earlier to understand true cost of design decisions.

“ With each successive version of ASHRAE 90.1, the energy standard requires more efficient building systems and design.

- » Capitalize on passive design techniques and appropriately size operational equipment.

The commercial real estate sector has long been a significant contributor to energy use and greenhouse gas emissions in the City of Boston. Unfortunately, in many buildings, lease structures give property

owners and tenants few incentives to invest in energy saving technologies. Because of this, green leasing has increasingly become an important tool for landlords and tenants to align incentives and meet collaborative sustainability goals. Green leases (also known as “smart leases” and “high performance leases”) are leases that contain sustainability or environmental provisions as a part of a landlord-tenant agreement. By increasing landlord-tenant collaboration, buildings are more likely to meet Boston’s Climate Action Plan goals as well as increase energy and water reductions for the Building Energy Reporting and Disclosure Ordinance (BERDO).

A Better City (ABC) has offered a number of green leasing resources and events to the Boston business community including: co-hosting a Green Lease Forum with the Boston Bar Association targeted at Boston-area lawyers and property managers; publishing a Green Leasing report providing effective tenant/landlord strategies for energy efficiency; and hosting a meeting for ABC’s Challenge for Sustainability participants featuring representatives from the Institute for Market Transformation’s Green Lease Leaders program and from one of the Challenge for Sustainability participants, Jamestown, L.P., which was a 2014 Green Lease Leader.

Through these efforts, ABC identified the most commonly included components of green leases including energy efficiency cost pass-through clauses, operational clauses, sustainable purchasing clauses, and reporting clauses. In gross leases (landlords assume the responsibility for operating expenses), tenants can be disincentivized from making energy efficiency improvements since they do not pay monthly utility bills, creating what is called a split-incentive. The energy efficiency cost pass-through clause allows for a capital cost pass-through from efficiency investments to the tenants, thus addressing the split-incentive. Green operational clauses are perhaps some of the simplest to implement in a green lease. They include establishing recycling and waste practices and setting formal building operating hours and temperature ranges in order to support both tenant and landlord sustainability goals.



Yve Torrie and Andrew Belden

Manager of Sustainability and Director of MCG’s US state and municipal consulting practice

A Better City

<http://www.abettercity.org/>

Green operational clauses are flexible and may be just as effective as building rules and regulations in formal lease documents. Sustainable purchasing clauses are also fairly accessible and feasible for tenants and landlords. They require the purchasing of

sustainable materials for common-area spaces and tenant build-outs. For example, they may include requirements for green cleaning supplies, VOC-free paints, and ENERGY STAR certified electronics and appliances.

As a way of tracking progress towards shared tenant/landlord sustainability goals, some green leases include reporting or benchmarking agreements that may take the form of short reports showing building energy and water performance. If sub-metering is available, tenant energy use can be placed in context. Since BERDO requires all Boston buildings to use ENERGY STAR, the ENERGY STAR benchmarking results may be used as part of these reporting practices.

ABC also identified barriers to wider green lease implementation. These include a lack of knowledge of potential green lease clauses, and brokers and lawyers being unfamiliar with green leasing practices. Both these barriers can complicate lease negotiations. Additionally, after the initial drafting of the lease, there are a number of next steps that need to be fleshed out. These include engagement with utilities around tenant fit-outs, integrating green leasing with BERDO outreach, targeting outreach to area brokers and real estate training programs, and sharing best practices and case studies.

ABC's Green Lease Report includes two case studies and an annotated bibliography that may be of interest to landlords and tenants planning to pursue green leases in the Boston area.

Link to report: <http://bit.ly/18eX6j6>

Supply Chain Sustainability

Due Diligence Management Systems for Supply Chain Sustainability

Companies must exercise "due care" or "due diligence" under major global laws that prohibit the sale or import of illegally harvested wood or wood products. These major



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laws include the U.S. Lacey Act, the EU Timber Regulation, and the Australian Illegal Logging Prohibition Act.

But what does “due care” mean, and how do we carry it out? The major laws don’t provide much guidance on this point. Lawyers understand “due care” from our law school training, but how to explain this, and translate it for purposes of implementing compliance programs?

One answer may be a Due Diligence Management System Approach. In our work on conflict minerals, we became familiar with the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict Affected and High Risk Areas (2011), as applicable for downstream companies. This Guidance outlines a basic 5-step framework for a management system that implements “due care” or “due diligence.” We carried this over from our conflict minerals program to our program for legally harvested wood and plant materials.

We are also using it as a basic framework for supply chain sustainability (environmental and social expectations beyond legality) around harvesting of wood for our paper and pulp products.

The five-step framework is as follows:

- 1. Establish Strong Management Systems (including a Policy)**
- 2. Identify and Assess Risks in the Supply Chain**
- 3. Mitigate Identified Risks**
- 4. Audit Program Implementation**
- 5. Report on Program Activities**

In our 3M Pulp and Paper Sourcing Policy, we expect our suppliers to have a due diligence management system and require the same of their suppliers. We open-sourced a basic framework for a due diligence management system, in case our suppliers don’t already have one. (It’s available on the Pulp and Paper Sourcing page on 3M.com/suppliers.) We also cite as a reference the good work that’s been done by the Conflict Free Sourcing Initiative in their Five Practical Steps to Support SEC Conflict Minerals Disclosure, which is available on the CFSI website under Guidance. This guidance has more information and ideas on each of the five steps.

It can be challenging for a downstream company like 3M to engage with and build the capacity of suppliers in multi-tier supply chains to pass information up and down the chain and ultimately take ownership of their piece of supply chain compliance and sustainability. The benefit of the five-step approach is that it provides a common framework to do just

that, in any type of supply chain. Under the umbrella of this framework, suppliers at each step in the chain can work together to achieve compliance and social and environmental goals. We believe that this is a solid foundation for overall supply chain sustainability.

This year we launched our first clothing line. When we set to create Constant Simplicity we wanted to create clothing lines that have a lower eco impact. Unlike traditional retailers we decided to use a Life

Cycle Analysis to help us make better decisions. Most of the suppliers we approach are deterred by our very detailed questions, but we were amazed to what level of transparency some suppliers are willing to go. This has helped us to build our own supply chain, increase energy efficiency by 20% compared to other similar supply chains, and not only achieve 400 gallons water savings per item but also ensure all garments were done ethically. We realized that retailers simply don't ask questions and we managed to not only get a better product and a more environmentally responsible one, but also to engage our customers. By sharing our findings, our tractability enables our sustainability and fuels our marketing efforts with content.



Atnyel Guedj

Founder

Constant Simplicity

<http://www.constantsimplicity.com>

With the establishment of a new closed-loop recycled plastics supply chain, we are moving toward a true circular economy for technology, with real benefits to customers and the planet alike.

But what, exactly, is "closed-loop?" Closed-loop systems are the backbone of a circular economy – one which looks to keep materials engaged in a circular way, recycled and reused throughout rather than used once and turned into waste. Recycling is the engine of this process, but poor design can limit recoverability. That's one reason we put a premium on designing for recyclability, and we were proud to receive ISRI's 2014 Design for Recycling award. Earlier this year, Dell also



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“ One thing customers frequently explain is that they want products that are better for the environment, but they don't want to pay more and it cannot affect performance.

received the inaugural Accenture Award for Circular Economy Pioneer in Davos.

When something gets recycled, a common misconception is that it gets easily and immediately turned right back into the same thing it was. The reality is many materials are “downcycled,” meaning they are converted into new materials that are usually of a lesser quality or reduced functionality. Closed-loop systems, however, recycle and reuse materials repeatedly. This reduces the need for virgin materials while avoiding the creation of waste.

A key component of closed-loop systems is the idea that recycling comes from the same product or same industry. In the case of Dell, this means recycling computers back into new computers. We have used recycled-content plastics derived from water bottles and other plastic sources for some time in our monitors and OptiPlex desktops. Our closed-loop system uses plastics derived from the computers we take back.

With the launch of the OptiPlex 3030 All-in-One, we became the first in the industry to offer a computer made with third party-certified closed-loop recycled plastics. The process begins with customers who recycle their old systems through our take-back efforts. In the pilot project, we are separating out plastics collected through Dell Reconnect partners in seven US states. The plastics are separated into types and shipped to our manufacturing partners in China. Meanwhile, other materials from the computers are similarly recycled and separated, then sold on the commodities market for reuse by others. When the plastics arrive, they are shredded at the manufacturing facilities, melted and blended (currently 35 percent recycled-content), then molded into new parts. With the OptiPlex 3030, this includes the stand and the back-plate of the computer/monitor. These parts are then assembled into the final computer.

The OptiPlex 3030 is the first product certified by UL Environment to their closed-loop standard, with the result that at least 10 percent of the product is made of closed-loop plastics.

One thing customers frequently explain is that they want products that are better for the environment, but they don't want to pay more and it cannot affect performance. The closed-loop plastics supply chain delivers exactly that – in fact, the closed-loop process delivers an energy-efficient product made from recycled content that is nominally less expensive, with the potential to show greater cost savings as the program scales.

Other benefits kick in as we scale: lifecycle analysis shows the process could potentially produce 62 percent fewer carbon emissions as the percentage blended increases. As this pilot project further expands it will help us capture other materials like metals for closed-loop recycling. Additionally, as recycling and take-back efforts increase, we can increase the number of products made using this process.

Transforming this vision into a reality at Dell required implementing a major redesign of critical processes in key business functions, including alignment across marketing,

planning, engineering, industrial design, procurement, services and logistics. Dell hopes to raise the bar for all technology products by improving overall recycling rates and leading in the use of closed loop plastics in its product ecosystem. With this program, Dell has created a circular economy both inside and outside the company that can be leveraged for future closed loop solutions.

Eastman Chemical Company's commitment to sustainability is demonstrated in its sustainability-minded supply chain strategies.



Jim Harlan

Vice President, Global Supply Chain, Eastman
Eastman Chemical Company
<http://www.eastman.com/Pages/Home.aspx>

As part of the company's efforts to improve efficiency, reduce waste and minimize its environmental footprint, Eastman's supply chain approach includes:

- » **Using renewable materials that are less expensive, renewable and safe;**
- » **Developing and using packaging materials that are reusable and recyclable;**
- » **Managing the sale of by-products to converters who recover and convert material into useful products that would otherwise become waste;**
- » **Identifying alternative methods of supply to eliminate unnecessary shipments;**
- » **Managing distribution networks to maximize efficiencies;**

In order to take its supply chain strategies to the next level, Eastman began a multi-year Supply Chain Network Optimization Initiative in 2014, designed to analyze its global supply chain footprint – from raw materials to customer delivery. The goal? To reduce costs and minimize environmental impacts associated with transporting and storing raw materials, intermediates and finished goods across the globe.

While Eastman historically had optimized individual routes, lanes and modes, it set out to collect a holistic view of the entire network to ensure it operates as efficiently and sustainably as possible. An external consultant (Supply Chain Acuity) was selected to analyze the distribution network, including:

- » **Global shipping lanes (ship from and ship to volumes) to identify opportunities to optimize the physical distribution of finished products, including opportunities to change routes, aggregate shipments, use alternative carriers or shift transportation modes;**
- » **Global inventory at current lead times and service levels to identify**

optimization opportunities.

Various optimization projects were initiated and completed in 2014 for different modes or package types, while some findings from the modeling efforts resulted in the initiation of “deep dives” by business unit, which will be completed in a Phase II Network Optimization effort in 2015.

Eastman’s supply chain network optimization efforts have impacted three major financial categories:

- » **Distribution cost reductions, including transportation, warehouse, and administrative cost components;**
- » **Working capital or inventory reductions;**
- » **Revenue enhancements resulting in increased earnings.**

Supply chain network optimization results to date include \$9M savings in the various distribution cost components and \$5M in increased earnings. Supply chain network optimization is continuing in 2015 with focused efforts by business unit. Additional cost savings, inventory reductions and increased earnings are expected to result from Phase II. The ROI to date is more than 10 to 1 and is expected to increase after Phase II is completed.

Beyond cost savings, the environmental benefits of the optimization project are also noteworthy. The optimization project has helped Eastman to improve its supply chain efficiency, reduce emissions and conserve energy. For example, Eastman recognized an opportunity to transport products more efficiently and sustainably by transitioning a relatively small segment of a domestic transportation route from road (trucks) to rail. To make this transition, Eastman utilized an innovative new intermodal facility developed by the South Carolina Port Authority at Greer, SC for export shipments. The new facility allows Eastman to swap trucks for rail, providing quick, reliable service to customers with a significantly lower carbon footprint. This environmentally-friendly alternative reduces 212 miles of truck traffic from Kingsport, TN to Charleston, SC.

Since August 1, 2014, Eastman has moved more than 1,000 containers via this new route, resulting in a reduction in emissions from trucks.

Eastman’s supply chain strategies - including the Supply Chain Network Optimization Initiative - have been, and will continue to be, fundamental to the company’s sustainability strategy by reducing its costs, improving efficiency and limiting the company’s environmental footprint.

Sustainability Programs

Don't overlook the power of emotion in driving sustainability

While we like to think of companies as faceless entities and our programs some times are thought of strictly in management lingo (budgets, timelines, roadmaps, spreadsheets, engineering calculations, ROI, etc.) that doesn't have to be the case. At

the heart of many of our sustainability initiatives is a need to win over hearts and minds. Programs have to be approved and embraced by people, people have to implement the programs and many individuals (thousands in some cases) have to embrace and



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“ **Lesson learned: don't be afraid to appeal to emotion. Keep it positive whenever possible and don't overplay the “emotion” card, but it is a powerful tool in the toolbox.**

participate in those same programs. In the past year as I have worked on many sustainability issues, particularly ones involving social aspects and human rights, I have come to realize that appealing to emotion is a legitimate and powerful tool. The most recent example is one where I was reviewing audit findings with a group of our

Human Resources “Business Partners” (the individuals who are responsible for hiring, firing and other H.R. business systems at the regional and local levels). The findings in this instance revealed some deficiencies that could impact the working and living conditions for thousands of our employees in several regions. While we certainly spent time dissecting the findings and discussing root causes and remedial actions, I also took the time to appeal to their emotions. What I asked them to consider was that their response to the issues at hand could positively affect the lives of those same thousands of individuals. It is not every day that we have such opportunities and it was a powerful message that my colleagues appreciated.

Lesson learned: don't be afraid to appeal to emotion. Keep it positive whenever possible and don't overplay the “emotion” card, but it is a powerful tool in the toolbox.

Has cost cutting become the rule of the day, with people being walked out the door in layoff after layoff?



Maybe the C-suite is in fortress mode and can lose sight of Sustainability including basic utility overhead costs, employee engagement, and the right to operate in the community. How can a Sustainability professional continue to make progress, or even survive?

Ten tips from the trenches:

1. Consider getting back to basics. Drop the metrics and terminology except dollars.
2. Cut costs by cutting energy, water and waste. Realize that the money is being spent, it goes out the door every month to the power company, in the municipal water bill, or the gas company. We are talking about redirecting a small amount with good ROI.
3. Target lighting controls and HVAC settings for locations where these timers and building controls exist.
4. Unused areas or locations can be abandoned or reduced with work concentrated to the locations of your primary fixed costs. This saves large amounts of overhead typically including high priced rent, insurance, repair costs, and utilities.
5. Look for money being spent on the wrong things (i.e. less efficient replacement lighting) and shift that spending.
6. Consider "Use-based" replacements on consumables instead of calendar based changes (machinery filters, oiling, etc).
7. Fix the drips, controls and sensors. Are you watering the lawn during the rain? Are your parking lot lights on during the morning?
8. Go after air-leaks, compressed air is still one of the most wasteful energy hogs in the factory.
9. Look over past efforts and re-verify that they are active. If they stayed in saving mode look to see if there are areas you can replicate the project inexpensively.
10. Don't give up, even if this means finding a different venue to bring your knowledge and expertise.

Saving money never goes out of style. In factories that have had a Sustainability program in place for years, you may find between 4%-7% utilities savings with simple return in less than 3 months. In locations that haven't been reviewed or picked over for 5 years, you can find 50% utility savings or more with 2 year payback or less.

Even the name Sustainability can be a liability in this type of environment. As Magritte noted in his famous painting: "Ceci n'est pas une pipe" (translated: This is not a pipe., it's a picture of a pipe). Reporting on an initiative isn't the real work. Getting the projects done and saving the money is the real work.

The hardest part of implementing any sort of initiative is to get support and buy-in from management. The office politics involved with gaining management's support can be tricky and frustrating. It took months to gain the necessary support before launching our first set of sustainability initiatives. The trick that I have learned is to maintain your main goal, in this case saving the environment, while tailoring the results and outcome of the initiative to each manager's goals.



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For my direct manager, I showed him customer purchase orders that state how our customers often audit their suppliers on environmental initiatives. I leveraged this into our company losing orders, because we do not have an established set of sustainability initiatives and goals. This threatened his year end sales goals, which caught his attention and I gained his support.

To gain the support of the company president, I showed him how much money I anticipated the initiatives would save the company over the first year. Since he is focused on the company's bottom line, I was able to gain his support as well.

This has been a tricky process, but lesson learned is to focus the outcome of the proposed initiative inline with each individual manager's goals and/or interests.

We successfully completed our five-year environmental goals spanning 2009 to 2014. At non-manufacturing sites, absolute greenhouse gas



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emissions declined 24 percent (compared to a 5 percent goal), water use per employee declined 55 percent (compared to a 20 percent goal), and waste diverted from landfills reached 74 percent worldwide (compared to a 70 percent goal).

We achieved these results through a variety of methods including consolidating data centers, facility conservation projects, sourcing renewable energy, and employee green team projects. Our data center consolidation project (2012-2014) moved servers to AMD's LEED certified data center in Atlanta, Georgia. The project saved 14,000 megawatts of energy, equivalent to 6,650 metric tons of CO2 emissions, and over \$1 million in energy costs. Additionally, we implemented programs to optimize office space, like adjusting workstation layouts and establishing a formal telework program in North America.

Energy, water and waste conservation efforts were implemented at AMD locations around the globe, encompassing approximately 125 initiatives in 2014 alone. Taken together, these initiative saved the company \$6.5 million USD in 2014. Examples include collecting and reusing rainwater for irrigation; composting organic waste and reclaiming/recycling materials; and optimizing building equipment and lighting.

In addition to reducing global energy use by 31% since 2009, we further reduced our environmental footprint by sourcing renewable energy. Since 2009, we have sourced 358,000 MWh of renewable energy credits (wind), enough to power over 100,000 homes for a year.

Lastly, our network of employee Green Teams at nearly 20 locations around the world implemented projects which included eliminating disposable cups, training others on sorting organic waste from general waste, and promoting commute alternatives. Employees track actions in our "My Sustainability" web tool to view estimated savings, set goals, earn badges and compare their eco-ranking to others. We also held annual Employee Eco Awards from 2010 through 2015, with categories like Energizer, Water Warden, Trash Talker and Commute Champion.

It's often not about money. But it's always about the people. As a public finance and construction authority, we not only have worked very hard to green the buildings we design, construct and finance, but we have greened

our business practices. This makes the changes real and sustaining, and we are able to gain more traction in greening our product because of our own business experiences and through the illustration to our customers that we know what it takes.



Jodi Smits Anderson

Director Sustainability Programs
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One of our most successful strategies in saving money was to change how we clean our headquarters building in Albany. We have a 6-story, 180,000 sf building. We used to have the cleaners come in at 4:00 pm and work until midnight throughout the whole building. Each floor had one or two dedicated cleaners who spent their whole shift on that one floor.

We changed this to have the cleaners all work together to clean one floor at a time. The lights are on only for that floor, and then they turn off when the cleaners go to the next floor. This saves 5/6 of our lighting costs in the 8-hour shift all year long.

The lesson learned is that it did take time and management intervention to train the staff to work together. This was a big change for the people who were not used to working with a larger team. Once we invested in fixing small personality problems and adjusting the work plan, we started to see the efficiency not only in the lighting energy reduction, but in the better work results that have come from the crew working together as a team.

The I Hotel & Conference Center (I Hotel) is located in the Research Park at the University of Illinois. The I Hotel has implemented several energy-saving measures during construction and in its day-to-day operation.



Hope Hardin

Marketing Director
I Hotel and Conference Center
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As a further step to conserve natural resources and encourage sustainability throughout the south campus, a 2,860 square-foot green roof system was developed for the conference center roof, adjoining the I Hotel. This eco-friendly system created additional green space and complements the natural landscaping that has already been implemented in the Research Park. While limiting storm water discharge by over 50%, the green roof system also filters and detoxifies runoff, reducing energy usage by 25% through decreased roof temperatures and removing particulates traveling to the Embarras River. The I Hotel has developed marketing and educational materials, distributed in-house information to conference center attendees and provided green roof visibility to hotel guests and visitors. Due to these efforts, the public now has a greater understanding of the benefits of stormwater management.

Public awareness has been maximized by promoting the green roof through the I Hotel's partnership with the University of Illinois and its presence at the Research Park, where nearly 90 companies and 1,400 employees operate daily. Tours have also been incorporated into the I Hotel's operations to educate guests, clients and community members visiting the facility about the benefits of the green roof. In the future, Fox Development, managing partner of Fox/Atkins, will also take advantage of the relationships it has fostered with the Champaign and Urbana public school districts to develop educational outreach programs and organize annual field trips.

In 2010, the City of Virginia Beach, VA, had spent almost \$20 million in utility payments for electric, natural gas, fuel, and propane. In fact, outside of debt payments, retirement, and payroll costs, electricity was our top expense at over \$15.5 million. By 2012, overall utility costs had soared to over \$24 million annually for the City's approximately 3.3 million square feet of building space. The increases came in spite of energy-saving capital projects.



Lori Herrick, MBA, LEED AP

Energy Management Administrator
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For years, we operated under a decentralized bill review model with built-in redundancies that limited the City's measurement and control of energy costs. Cumbersome paper-based payment processes, coupled with utility vendor delays in remittance processing, led to duplicate charges, late payments, and fees. Departmental staff assigned to pay the bills did not have the tools to audit them.

While we knew the dollar amount we were paying each of our energy vendors, we did not have a comprehensive city-wide view of all of the energy being consumed.

Chaired by a Dave Hansen, Deputy City Manager, the Joint Energy Committee has a unique partnership comprised of representatives from City departments, the City public schools, and even the primary utility vendor—Dominion Virginia Power. As our utility cost crisis escalated, the committee was able to adjust and make changes that helped keep costs down – among other things.

Committee members agreed that certain long-term goals were vital as part of their mandate of energy savings:

- » **Monitor energy usage**
- » **Identify energy saving projects**
- » **Reduce building electric consumption by 10%**
- » **Reduce energy costs**

To achieve the second part of their mandate would require restructuring the utility billing process. They organized a project team that included the Energy Management Administrator and members of the Finance, Public Works, and Information Technology departments.

The project team analyzed the current system and developed a specific energy accounting and management system that would track the energy data and use it to guide budgeting and conservation efforts.

The project design included:

1. **Electronic Data Interchange (EDI) which allows the utility provider to send monthly utility bills electronically to the energy software;**
2. **An accounts payable system to transfer approved payments from the energy software to the City's accounts payable system; and,**
3. **An Environmental Protection Agency's ENERGY STAR's Portfolio Manager system which allows the software to automatically benchmark our buildings nationally.**

This process is providing us with detailed energy data to include on peak and off peak usage, rate schedules, and details on extra charges for fuel, taxes and other charges.

Total implementation costs were approximately 0.7% of our annual energy expense. A Department of Energy grant covered the cost of the EnergyCAP software.

The City's intranet site, Beachnet, provides our staff with a wealth of internal information, including that of energy usage. The Energy Office, working with Information Technology, created a new website to help accomplish our energy reduction goals.

Each quarter, the Energy Office uploads over 80 energy reports so that City staff may see each department's usage which includes electric, natural gas, fuel, water, and sewer. The reports provide a comprehensive view of the city's energy costs and consumption, which helps us identify specific areas where we can eliminate waste and conserve energy. Through the use of this software, we have improved energy reporting and tracking that helps reduce energy costs, improve energy efficiency of our City buildings, and increase reporting on greenhouse gases resulting from government operations. City departments are already showing an increased awareness of energy usage, thanks to the software's ability to generate charts, graphs, and reports with granular and/or summary data.

The key to the success of the project was our project team. They came together and worked through the strict City financial requirements and reorganized them in a new, highly efficient, electronic process. The efforts of the Joint Energy Committee and the project team, coupled with a successful implementation of EnergyCAP energy management software, have allowed us to make significant strides towards a much more energy-efficient and sustainable government.

We have achieved much higher efficiency in our financial process because of electronic invoicing. The City's energy management administration has developed greater accountability of

energy use through powerful, accurate energy reporting. The transition to electronic invoicing is helping us refocus resources away from the time-consuming task of payment processing to researching and resolving important issues such as skipped bills, missing

bills, and reduction of incorrect charges and past due penalties.

As a result, longstanding departmental billing issues have been resolved, inactive accounts and unused meters are being terminated, and energy data is being used to research the highest priority need for City building energy retrofits propelling the energy conservation program forward at a steady pace. The City of Virginia is projecting a minimum savings of \$50,000 annually as a result of this very successful project.

Internal awards programs acknowledge employees who lead the way in contributing to the environment on the job and in the communities where they live and work. Through surveys, we learned that our employees aren't seeking monetary awards or trophies for their efforts. Instead, they simply value the recognition they receive by having their efforts shared within the company via the intranet, internal social media and e-mail.



Sandi Alexander Tuttle
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At Xerox, the Global Environment, Health, Safety & Sustainability (EHS&S) Earth Awards program acknowledges employees for their achievements that help Xerox make improvements within and outside of our own walls through cost avoidance or savings, waste elimination and energy reduction.

“ **Projects to increase employee awareness and reinforce behaviors, report and fix all water leaks, and install a water softener on the incoming water supply to enable higher water cycling in the cooling towers resulted in a 48% reduction in water consumption and a \$25K reduction in operating costs per year.**

Here are how some of the winners of the awards achieved improvements within Xerox.

Reduce, Reuse, Recycle: Consumption of natural resources was significantly reduced, resources were reused, or the resource was recycled.

Our WEA Toner Plant, Webster, New York, aimed to reduce toner manufacturing waste by more than 15 percent from the prior year and to maintain zero waste to landfill status while increasing production by 2 percent. Projects to improve yields, improve cleaning efficiencies and optimize chemical use resulted in:

- » \$2M toner yield improvement.
- » \$70K waste disposal savings.
- » \$50K less waste water chemical purchases.
- » Saving up to 4.3 million gallons of water as a result of no net increased water use.
- » Continued zero waste to landfill for the 5th consecutive year.

Water Conservation - Water saving equipment, process changes or employee actions contributed to the overall saving of water at their site.

Our Dundalk Colour Toner Plant Water Conservation Team in Dublin, Ireland, had the goal of reducing the total amount of water used in the plant. Projects to increase employee awareness and reinforce behaviors, report and fix all water leaks, and install a water softener on the incoming water supply to enable higher water cycling in the cooling towers resulted in:

- » A 48% reduction in water consumption.
- » \$25K reduction in operating costs per year.

Energy (GHG) Reduction - Consumption of utilities like electricity, steam, heating and cooling of facilities is reduced through innovative methods

Our North American Facilities Management Team/Energy Management Program, United States and Canada formed a joint venture between Xerox and JLL, developed to improve operations and maintenance at facilities in the United States and Canada. The project resulted in:

- » Annual savings of \$114,000 and reduction of 877,000 lbs. (398,636 kgs.) of CO2 as a result of lighting replacement in Webster, NY, Wilsonville, OR, and Cerritos, CA.
- » Annual savings of \$200,800 and reduction of 2.698 million lbs. (1.226kgs.) of CO2 as a result of HVAC upgrades in Lexington and Louisville, KY, Utica, NY, and Webster, NY.

Savings of \$557,000 and reduction of 8.8 million lbs. (4 million kgs.) of CO2 as a result of optimization in operations all around North America.

At OTO Development we find it important to begin focusing on the environment and sustainability during the design and construction phase of each hotel, when company architects and development managers work with brand partners to incorporate resource conservation, waste minimization, and environmentally-friendly systems into every project. Commitment to environmental sustainability can be demonstrated, in part, by developing a wide range of hotels on contaminated sites or as re-use projects.



Chris Lewis

National Director of Facilities
OTO Development
<http://otodevelopment.com/>

In the case of Residence Inn Gainesville, FL, property, existing structures contained hazardous materials that were remediated, and past uses within those structures also created contaminated soils within the building footprint – these were remediated as well.

During the process, demolition and construction wastes were recycled, and this site – which was previously designated as an EPA “brownfield” – was ultimately restored to pristine condition.

But sustainability in our site planning goes beyond cleanup and remediation; we also consider existing features that should be preserved, enhanced or even protected. At this location, there were several grand trees the development team was able to save. The heritage and aesthetics of these trees became integral features in a new, cleaned up, “natural” area of the property that allowed native plant life to flourish and thrive on a water-saving irrigation system.

Socially responsible planning on this project also incorporated a framing structure made from 90% post-consumer recycled steel, and roofing materials certified by the Cool Roofing Council. The end result was a hotel recognized by Florida Green Lodging Program and benchmarked using the ENERGY STAR Portfolio Manager.

An Environmental
Employee
Engagement
Roadmap: How to
Quickly How to Build a
Streamlined Program
that Quickly Delivers
Business and
Environmental Results



Diana Glassman

CEO and Founder
Integration Strategy -- Energy, Environment
& Sustainability
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Before joining the bank I had a hardcore business background focused on generating revenue, cash flow and profit, and satisfying customers. Like many with similar responsibilities, I was skeptical that EEE truly matters to a business.

Nonetheless, as the first Head of Environmental Affairs, I needed to put an EEE program in place. I sought to create an enduring program that reached deeply throughout the bank, and was wholeheartedly embraced by all employees.

But, when setting out to design the program, we didn't know where to start. There were no roadmaps to show us what to do, and in particular how to reach 26,000 employees dispersed across 1300 branches along the U.S. east coast.

So we created our own roadmap. It reflects the philosophy that an EEE program must overcome skepticism (of people like me) with credible, measurable, and rapid business results before it can be fully embraced by a profit-making enterprise. To do so we blended best practices from corporate strategy, change management, program management, and social media with practitioner and academic knowledge: First we defined our goal as using engaged employees to attract and connect emotionally with environmentally-minded consumers, which helps to increase revenue. Then we worked backwards to identify key performance metrics to measure progress.

Concurrently we designed a streamlined program focused on the critical path to achieve that goal. We took some risks, for example by running a pilot with a control to determine whether or not the program would perform as hoped. It did: by banding together, employees delivered quantifiable and meaningful results. The pilot's success helped build the senior leadership support we needed to scale the EEE program and deliver company-wide results within a year.

I learned many things along the way. Once the environment spark is lit within a person at work, they see the world differently both inside the office and in their personal lives. For example, I watched as an indifferent mid-level employee transformed herself. Being asked to do simple workplace activities such as reducing paper consumption and unplugging chargers changed something in her, and she began taking on additional environmental activities at home. She movingly describes how her teen-aged children tell her how proud they are of her.

This story and many others helped me realize that engaging employees has a multiplier effect: employees carry their awareness wherever they go, both as they rise in their careers and in their communities.

As a result scaled up corporate engagement programs have the potential to send massive numbers of capable environmental leaders into society at large. But, to do so, EEE programs must first demonstrate business value before companies will grant them license to scale up. If environment is good to the business, business will be good to the environment.

When I joined the bank I did not know what “environmental employee engagement” meant. I now know it is the astonishing motivation and energy that employees who are proud of themselves and love what they do bring to their work and the environment. Companies increasingly understand this power and seek to harness it to produce business benefits such as increased employee productivity and retention.

Kee America Beautiful (KAB) is a nonprofit that inspires and educates people to take action every day in order to improve and beautify their community environment.

We believe that public /private partnership is the key to creating clean, green and beautiful communities that are environmentally healthy, socially connected and economically sound. To support action, we provide the expertise, programs and resources to help people prevent litter, reduce waste and recycle more. Increasing recycling in the workplace is one of those areas in which we partner to help make a difference.

We commissioned new research in 2014 which has shown that proper bin set-up in the workplace can boost recycling practices. In this study conducted by Action Research, a total of 34 offices across the country were assigned to various bin set-up scenarios. Over the course of 6 months, pre- and post-employee surveys were conducted along with outreach communications and over 200 waste audits to study the results.

The four bin configurations tested were:

1. **Two equal-sized recycling and trash bins at desk;**
2. **Recycling bin only at desk;**
3. **Little trash bin hanging on recycling bin at desk;**
4. **Information only (existing recycling and trash bins were not replaced).**

Findings from this research showed that the quality of recyclables can be increased by 20% with the proper bin set-up.

The method that proved most effective in this study was the choice to pair desk sized recycling bins with smaller trash bins. The results from this configuration increased recyclables from 65% to 85%, and correspondingly reduced the amount of recyclables in the trash from 29% to 13%. Along with these results, almost zero office paper was disposed of in the trash bins. However, during the baseline study, 79% of the offices had some paper in the trash bins. This “little trash” bin scenario proved to be the most successful.



Brenda Pulley

Senior Vice President, Recycling
Keep America Beautiful
www.kab.org

While the implementation of two equal-sized trash and recycling bins proved successful at reducing trash in the recycling bins (by 17%), we did not find that it helped to keep recyclables out of trash.

At the conclusion of this study, one relevant takeaway was that recycling education alone was not enough to invoke change in all of the scenarios, and therefore would not be sufficient to change recycling behavior in any other circumstance. For example, the offices that solely received recycling information, without their bins being replaced, did not change their behavior at all. As a result, we realized that providing clear, concise education along with keeping employees up to date with any changes to the program is vital to changing recycling behavior in the workplace.

This study has reinforced learnings about invoking change in the workplace. When it comes to changing recycling behavior, convenience is key. Along with that, keeping signage about proper recycling practices simple is important too. Finally, maintaining a consistent recycling program, equipped with proper guidelines, throughout the workplace will decrease confusion for employees and janitorial staff, essentially uniting the office through this common goal.

For a complete copy of the research report, findings and recommendations as well as templates for the signage used in this study, please go to: <http://recyclingatwork.org/research/>.

Creating the “New Normal” - Sustainability in Hotels through a Triple Bottom Line Approach

Over the last few years sustainability has risen up political, consumer, and business agendas faster than any other issue. Sustainability is now an accepted dynamic and we are currently in the midst of a paradigm shift.



Param Kannampilly

Chairman and Managing Director
The Fern Hotels and Resorts
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Sustainability in the hotel industry two decades ago was an emerging trend. Currently that trend, under the leadership of a passionate minority, is an emerging movement. Sustainable practices are not only here to stay but are also anticipated to further become a focus of the hospitality industry (Deloitte Hospitality Review 2015).

As the Leading environmentally sensitive hotels group, The Fern Hotels and Resorts is amongst the fastest-growing hotel brands in India and we expect to triple our inventory by 2016. Our brand differentiating factor has been our prowess to best combine upscale living

and environment responsibility.

Over the years, we have learned to holistically include every aspect of our business in our sustainability program which includes People, Planet and Profit.

People:

Our employees are proud to be associated with us on account of our social initiatives, engagement activities and recognition system. An enhanced customer loyalty is visible in our properties and our guests are genuinely pleased to know of our sustainable strategies and initiatives.

Through our programs we have striven to build stronger relationships with communities and deliver significant societal value through knowledge and resource sharing. A key initiative of The Fern Ahmedabad is its tree plantation program. On every birthday of a team member, they plant a tree in their honor.

Planet:

We spend a significant amount of time finding the most effective recycling programs to curb our waste to avoid sending anything to landfill. The Fern Jaipur relentlessly strives to be a "Zero Garbage" hotel every day through the adoption of a Vermiculture program, and recycling of dry waste.

As we share our water with the entire planet, we feel that it is a precious resource that needs to be conserved. All our hotels ensure a reduction in footprint consumption by an efficient water management strategy. Meluha The Fern is ranked No. 1 in the country (according to the HVS Environmental Resource Consumption benchmarking survey) in the total water reuse rate since recycled water is used for flushing, cooling towers, irrigation, etc.

Our energy management strategy in our hotels ensures a reduction in use of fossil fuels, air pollution, and greenhouse gases thereby encouraging renewable energy usage.

Profit

Due to natural resource conservation, we have noticed a reduction in operational expenses by implementing green initiatives. While the capital expenses have been relatively higher, the savings on a monthly basis on operational costs helps provide an impetus to the bottom line.

Further, we express a formalized commitment towards the preservation and enhancement of the natural environment in our properties. We also have stringent policies of greening the supply chain, encouraging fair trade practices, and protecting the culture and heritage of each individual place. The Uppals in Delhi has an extensive organic garden to grow their

very own vegetables which are utilized in the local cuisines at the restaurant. Beaumonde The Fern raises awareness among the community on biodiversity days such as wetland conservation day and world migratory bird day through documentary screenings, posters competition and expert trainings.

Through the triple bottom line approach, we have been able to catalyze change in our business as well as in our community.

The Creative Force of Museums in Environmental Innovation

The informal education sector is becoming a change agent for environmental sustainability. Museums in the US are a \$698 billion industry made of arts, science and history museums, plus zoos, gardens, aquariums, and historic sites. In 2012

there were \$1.353 billion in private sector building projects completed. Museums employ 400,000, and support ten times that number of artists, vendors, consulting firms, and individual professionals. That's a big economic engine, and a creative one.

To continue to improve its environmental sustainability the museum industry must work with outside talent and expertise. In return they offer opportunities for creativity and innovation. When partners appreciate and build upon the creative cultures of museums, and respect their professional expertise and mission, the team achieves more than either group expects. The best projects are integrated design teams of outside contractors and museum users from a wide variety of departments. It makes all the difference to have a facilitator who speaks both "museum" and "green."

Many museums are beginning to add efficiency programs, make significant waste management changes, design their exhibits to reduce waste and chemical impact, and expand programming around environment and climate. For example:

- » **The Minnesota Historical Society is creating sustainable message overlays to historic interpretation at its forts, farms, home, and lighthouses.**
- » **The Wagner Free Institute (PA) hit an 80% waste diversion rate in 2014 and is on track for zero waste next year.**
- » **Major art museums nationwide are completing the switch to LEDs in their galleries.**



Sarah Sutton

Principal
Sustainable Museums
www.sustainablemuseums.net

As for building renovations, additions, and new construction, the best include significant renewable and efficient energy approaches, greywater systems and water savings programs, expanded greenspaces designed with ecosystem benefits, and significant site and materials reuse/recycling programs built into the specs:

- » **Phipps Conservatory and Botanical Garden (PA) has a LEED Silver Welcome Center, Platinum LEED-EBOM production greenhouse, and the Certified Living Building that houses the Center for Sustainable Landscapes.**
- » **The Detroit Zoological Society is building the first anaerobic biodigester in a US zoo.**
- » **Thanks to flood modeling, the new Whitney Museum of American Art (NY) will have flood barriers for temporary deployment in case of a future Hurricane Sandy.**

According to the American Alliance of Museums “There are approximately 850 million visits each year to American museums, more than the attendance for all major league sporting events and theme parks combined.” With that many people through the gates and doorways, museums offer unprecedented opportunities to model the best of a green future. They are an overlooked opportunity for good green work.

In 2014, we grew three-fold in production space, moving from our 17,000-square-foot production facility to a fully retrofitted and remodeled, 49,000-square foot plant less than a mile away from our headquarters. To maximize our potential, we entirely renovated the interior to ensure better air quality, productivity, and energy efficiency. The end result was a 21% reduction in electricity usage by square foot compared to our old production facility (Baker). Started through a Loyola University Sustainability Program, we now compost about 60 pounds of compostable waste a week. We purposely purchase cups that are compostable while composting all bathroom hand towel paper. Through an elaborate air compressor plan for the new facility (Hilltop), we successfully reduced air usage average from 120cfm to 52cfm saving us a potential 50% off the cost of air even though we added equipment with air needs.

Additional equipment was part of the year with the big move which added 157% of natural gas capacity, although our actual usage numbers compared to Baker was only 15% increase. By adding a new oven and incorporating time, the 20x20x15” element emits 3.875 lbsCO₂ in the oven and 5.08lbsCO₂ by the old method on the hot plate to produce one or a



Travis Solberg

Chief Sustainability Steward
Solberg MFG
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24% reduction in pounds of CO2 emitted per element.

In 2014, we made 21,876 of similar size elements equaling 25,704 pounds of CO2 reduced. Furthermore, at each end of our elements is a soft, plastic seal that seals the element media to the filter canister. The plastic material is called “plastisol” and Solberg uses adhesive and non-adhesive type plastisols for its elements. We ensure environmentally safe ingredients are being used to help us not only achieve compliance throughout the world but to also be a leader in reducing our environmental impact.

For this reason, VOC concentrations and presence of phthalates (thought to be cancerous) are two areas closely watched. In 2014 our supplier worked hard through 6 month tests to produce our adhesive plastisol as non-phthalate and uses 19% bio-derived chemicals resulting in 0.34% VOC by weight which is a 92% reduction in VOC from our past plastisol at 4.14% VOC by weight. These results made it an easy switch from our past supplier to this one which now handles our three most used plastisols. Furthermore, we are saving 15 cents a pound which comes to \$1500 saved every order of 10,000 pounds. Since this change happened in August, we saved \$6900 from 46,000lbs of material and best of all we only emitted 156lbs of VOC compared to 1904 lbs in the past.

Scaling Sustainability Savings and Results at USPS

How do organizations with thousands of employees initiate and drive behavior change to address the many sustainability and energy efficiency issues they face? The US Postal Service (USPS) has orchestrated such engagement,

tracking over \$100 million in annual economic savings tied to these employee-led initiatives, even while facing tightening fiscal pressures. The USPS change model focuses on goal-directed behaviors by aligning actions and initiatives with specific sustainability goals, promoting and motivating employee participation, and then tracking activities to specific results using a customized business intelligence application that links to their financial accounting and data warehouse systems.

The general size and complexity of organizations makes it difficult to implement sustainability programs in a widespread manner. Ultimately, it takes a lot of people to do the work and not just the “true believers” who would normally volunteer for recycling programs and Earth Day events. Embedding sustainability successfully into the organization means tying it to business functions, job roles and work processes, so it becomes relevant to everyday work.



Grant Ricketts

CEO and Co-founder
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The USPS uses a mix of tools and program methods to engage employees, including interactive surveys and suggestion forums, online learning programs, green team interaction, rewards and incentives. But the key to its success is how it has aligned employee actions and commitments with specific goals and actions across its 32,000 facilities and then to trace these actions and commitments to financial results; collectively as well as by area, districts and facilities.

Not unlike many companies, the USPS has 5 core goals – to reduce energy use, solid waste, consumables, water usage, fossil fuels, etc. To support these 5 core goals, sustainability leadership has identified a series of employee knowledge requirements and behaviors (e.g., actions and commitments) that tie directly to these goals and embarked on a series of programs to engage more employees.

To build organizational capability and execute locally, regionally and nationally around these initiatives, the USPS adopted a series of online “role-based” training programs to address how sustainability principles affect different job roles across the organization. It identified 7 key roles and targeted specifically tailored “role-based” learning modules to each. The focus was not to talk about climate change, per se, but rather to make sustainability issues relevant to a person’s day job and therefore easier to understand and incorporate in everyday work. For example, procurement managers received training on Environmental Preferable Purchasing considerations and how to adopt responsible procurement policies. Postmasters received learning that addressed Lean and Green Operations, Facility Energy Efficiency, etc.

The USPS team also organized and deployed over 1,000 Lean Green Teams to help support the project plans that were circulated throughout the organization. A second series of learning interventions were designed to help build more cross-functional skills among “green team” participants so they are able to spread their influence and support.

The entire effort is supported by a business intelligence system called GITT, for Green Initiatives Tracking Tool. This tool taps into data warehouse and accounting systems to track and correlate facility savings on local, regional and national levels with employee engagement activities in those areas. To date they have tracked over \$100M largely due to these employee-led efforts.

The USPS engagement model illustrates fundamental organizational strategies to align activities with goals; cascade goals across specific job functions; build employee knowledge and capability to ramp up participation and results; and partner with business functions to build infrastructure capability to help scale the effort. The added benefit is that the sustainability organization can also point to financial results and use it as justification for investment in further programs.

On April 15, The Dow Chemical Company announced a strategic set of commitments designed to redefine the role of business in society. Our 2025 Sustainability Goals use a global lens to magnify the company's impact around the world, driving unprecedented collaborations to develop a societal blueprint that will facilitate the transition to a sustainable planet and society.



Mark Weick

Director, Sustainability
The Dow Chemical Company
www.dow.com

Through harnessing Dow's innovation strengths, global reach, and dedicated employee population, the company has set bold and aggressive sustainability targets designed to develop breakthrough product innovations, positively impact the lives of 1 billion people, and deliver \$1 billion in cost savings or new cash flow for the Company by valuing nature in business decisions.

Our seven 2025 Sustainability Goals are as follows:

Goal 1: Leading the Blueprint – Dow leads in developing a societal blueprint that integrates public policy solutions, science and technology and value chain innovation to facilitate the transition to a sustainable planet and society. To develop the blueprint, we will engage in 100 significant dialogues across the public and private sector and establish 10 new collaborations. The initial blueprint will be published year-end 2017 and will be updated throughout the goal time frame, considering world progress towards sustainability and emerging challenges.

Goal 2: Delivering Breakthrough Innovations – We strive to deliver breakthrough sustainable chemistry innovations that advance the well-being of humanity. By 2025, Dow's product portfolio will have a six-fold net positive impact on sustainable development. Our products will offset three times more carbon dioxide than they emit throughout their life cycle and save three times more energy than they use throughout their life cycle.

Goal 3: Advancing a Circular Economy – By 2025, we will work with other industry leaders, non-profit organizations and governments to deliver six major projects that facilitate the world's transition to a circular economy, where waste is designed into new products and services.

Goal 4: Valuing Nature – Dow applies a business decision process that values nature, which will deliver business value and natural capital value through projects that are good for the Company and good for ecosystems. We will generate \$1 billion by 2025 in the form of cost savings or new cash flow as measured by net present value, a measure of future cash flows discounted to the present day.

Goal 5: Increasing Confidence in Chemical Technology – We increase confidence in the safe use of chemical technology through transparency, dialogue, unprecedented collaboration, research and the company’s actions. By 2025, we will work with non-profit, businesses and government partners to develop new, cutting-edge predictive modeling capabilities and integrate them into 100 percent of their new product assessments. We will also improve on the understanding of chemistry’s potential and will develop and implement new predictive modeling capabilities.

Goal 6: Engaging Employees for Impact – Dow people worldwide directly apply their passion and expertise to advance the well-being of people and the planet. By 2025, Dow employees worldwide will apply their talents to positively impact the lives of 1 billion people. Dow employees will give 600,000 hours to support students and teachers in science, technology, engineering and math (STEM) education. Dow volunteers will complete 700 sustainability projects around the world.

Goal 7: World-Leading Operations Performance – Dow maintains world-leading operations performance in natural resource efficiency, environment, health and safety. By 2025, Dow will reduce its freshwater intake intensity at key water stressed sites and its waste intensity footprint by 20 percent. It will also obtain 400 megawatts of its power demand from renewable sources and strive to eliminate unplanned safety events.

Our 2025 Goals, the company’s third set of sustainability-related goals since 1995, build upon its previous decade-long commitments. Dow’s 2005 Environment, Health & Safety Goals resulted in \$5 billion in safety, waste, water and energy savings after a \$1 billion investment.

Dow’s 2015 Sustainability Goals provided more sustainable products and solutions addressing global challenges in food, energy, sustainable water supplies and improved personal health.

For more information, visit www.dow.com/sustainability/goals.

Win-Win-Win Scenarios in Sustainability

Sometimes a company’s sustainability strategy can feel like that one stray fry you find in your onion rings. How does environmental leadership fit in with an overall business strategy



Amanda Wang

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<http://awguarantee.ca/>

typically centered on delighting guests and growing same-store sales?

At A&W Canada, we knew environmental responsibility was important to our guests, staff, and franchisees, but we had to figure out how it made sense in the context of a national quick-service burger chain. We wanted to identify the major factors contributing to our company's carbon footprint and target an area where we could make meaningful impact. Our research showed that we needed to review our packaging choices. Foil bags have long been a part of A&W history, dating back to our drive-in days. We made the tough decision that this was something we were willing to let go. And so, we created an Environmental Leadership Strategy with a focus on waste diversion.

We came up with a compostable paper bag that would be served open – proudly showcasing the burger inside.

The business case was compelling: waxed paper was substantially less expensive than foil. But what about the guest experience? The open bag offers a nice presentation but a burger is not very tasty if it's cold. How could we possibly expect burgers to stay hot if we took away the foil? We decided to get to the root of the concern, and invested in an overhaul of our kitchen equipment. We wanted our burgers to

come out hotter in the first place. Through months and months of development, we were able to find success. Our testing confirmed that we could achieve the same temperature retention as the foil bags with the new paper bags and our new kitchen practices. For our guests, we were able to deliver a hotter burger that stayed hot. For our restaurants, we offset the costs of new equipment with savings realized by switching from foil to paper. And for the environment, we were able to drastically shift our waste profile by replacing a landfill item with something that can be composted.

We've made several other packaging changes since then and found that reducing our environmental impact consistently led to a better experience for guests and cost savings for franchisees. A&W has always used frosted glass mugs for our famous root beer. When you dine in our restaurants today, you can now also expect your fries and onion rings to be served in mini metal fry baskets. If you join us for breakfast, your bacon and eggs will come on a ceramic plate with stainless steel cutlery. We've elevated the guest experience, while saving franchisees money by implementing reusable packaging. Our front line staff are engaged and excited to be making a difference through their work. Our sustainability efforts so far allow us to divert over 1 million pounds of waste from landfills each year. We



Our testing confirmed that we could achieve the same temperature retention as the foil bags with the new paper bags and our new kitchen practices. For our guests, we were able to deliver a hotter burger that stayed hot.

still have a long journey ahead, but it's a small step in the right direction.

Mars, Incorporated's Coral Reef Rehabilitation

This year, Mars Symbioscience, a business segment of Mars, Incorporated, has further expanded one of the largest single coral reef rehabilitation projects anywhere in the world. The latest installation of new coral area was carried out over four days in early June, 2015 by 10

Associates taking part in the Mars Ambassador Program – a volunteer initiative, which allows our Associates from across the globe to come together with local associates to get involved with some of our sustainability projects. Through the program, Associates have the opportunity to make a difference in the communities where we have operations in the form of “paid time off” to volunteer. Associates are encouraged to get involved in an effort to improve lives and build lasting and meaningful relationships that will ultimately, encourage responsible growth.

Since 2007, Mars has has been working to restore the coral reef infrastructure on Pulau Badi, a small island in Indonesia, at the heart of the Coral Triangle, 20 kilometers from Makassar, where we have a cocoa processing factory. Between June 9th and June 12th 2015, 1666 square meters of new coral reef was installed by the Mars Ambassadors, working together with a team of Indonesian based associates and the local community to expand the already blossoming, rejuvenated reef, which stretches almost 1km along the island reef crest. Following this work, the total area of new coral installed is now more than 8000 square meters - effectively rehabilitating 2 hectares of coral reef habitat.

The rebuilding of the reef and creation of a marine protected area as a “no take” zone, and long term source of fish, is driving significant increases in fish stocks, providing food and commercial opportunities for islanders for generations to come. Prior to the rehabilitation, the original coral reef had been largely destroyed by years of destructive fishing practices, causing a severe shortage of fish as well as erosion of the island itself. In addition to repairing the marine eco-system and providing job opportunities within the community, the project aims to provide a blueprint for best practice coral rejuvenation, which could help transform sustainable fishing practices elsewhere.

The project supports the wider Mars, Incorporated, initiative related to marine ecosystems: the company's wider commitment to source all its fish from sustainable sources.



Noel Janetski

Director of Marine Sustainability
Mars, Incorporated
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The RobecoSAM Assessment – Not Just a Check the Box Exercise

The dreaded survey season. Organizations of all sizes, are increasingly asked to respond to any number of surveys, questionnaires, supplier inquiries and ranking requests.

The challenge is in determining which matter most, how best to allocate resources and how to benefit from the work of completing them. At IHS, we have been participating in the RobecoSAM Assessment for five years now. From the onset, we recognized the breadth and depth of what the assessment was asking – and it helped us begin to evaluate and think about ourselves in new and different ways. And, instead of simply “filling out another survey,” we decided to seize the opportunity to approach this with a different mindset. Instead of simply a survey, it became a framework.

The questions are industry specific, providing relevance and the opportunity to mindfully look at how we can or should be operating. The breadth of the content covered requires cross company participation at all levels thereby engaging colleagues well beyond the Sustainability office. Our response is reviewed by an independent third party (we aren’t paying them to tell us how we are doing), providing an external and expert perspective on our progress and furthermore, a year-on-year benchmark against our own performance, and against our peer group. Using the assessment as a tool enables us to identify key areas of progress – and opportunity. And, the results are important to all stakeholders, from colleagues to investors, where we have been listed on the North American Dow Jones Sustainability Index for the past 2 years.

Maintaining our listing requires continuous improvement and best in class performance – meaning we can’t rest on last year’s progress. By embracing this assessment, and using it as a framework for our sustainability efforts – and not just a check the box exercise – we have been able to accelerate in all areas sustainability in a meaningful and measured way, across the Economic, Social and Environmental Dimensions. Now - we wait for the results that will be announced in September, as we continue on our path of continuous progress and improvement in sustainability.



Marilyn Johnson

Senior Director, Sustainability
IHS

<https://www.ihs.com/about/corporate-sustainability.html>

A Grassroots Approach

At Verizon, we have seen the success of grassroots efforts to expand sustainability initiatives within the company and into the community of stakeholders. In 2009, we created the Verizon Green Team, a group of employee volunteers interested in learning and doing more to support Verizon's green and sustainability initiatives.



Anonymous

Sustainability analyst
Verizon

<http://www.verizon.com/about/responsibility/sustainability/>

Green Team members champion ideas and projects at the local level, volunteer to support internal and external community green events, stay informed about upcoming sustainability initiatives, and make environmentally friendly choices at work and at home. The team's motto is Work Green, Live Green.

In June 2015, the Green Team reached 20,000 members and surpassed its goal two years early. Green Team members come from 28 countries all over the world and have helped Verizon achieve many company-wide goals. Green Team members have participated in more than 540 community volunteer events like habitat cleanups and tree plantings and have held 67 large scale Recycling Rallies and Office Supply Swaps to reduce Verizon's



It is through Green Team-led Recycling Rallies that Verizon was able to achieve its 5-year goal of collecting and recycling 2 million pounds of e-waste from employees and their local communities. All of the material collected is reused and recycled so it doesn't end up in a landfill.

environmental footprint. It is through Green Team-led Recycling Rallies that Verizon was able to achieve its 5-year goal of collecting and recycling 2 million pounds of e-waste from employees and their local communities. All of the material collected is reused and recycled so it doesn't end up in a landfill.

The Green Team and Verizon have committed to collecting an additional 2 million pounds of e-waste by 2020 and reaching 30,000 Green Team members by 2018.

Sustainable IT

I recently did a research survey where I wanted to see where companies were in regards to green IT initiatives. I asked almost 600 companies in the US and Europe what they were doing in regards to virtualization, server energy

reduction, ambient cooling, SAAS and five other potential environmental strategies for their data centers, and the results were very interesting. I asked: Are you planning each of the strategies, are you currently implementing them, or have you completed the initiatives? The results were varied except when cross-tabbed with a second simple question: do you currently have a dedicated person that is tasked to focus on green IT initiatives?

Within the survey, 35% of the companies responded that they had designated a specific person to identify and implement green IT strategies. What was interesting was that for all of those companies that had a dedicated green IT person, those companies were 2.3 years ahead on all 10 of the identified energy saving initiatives.



Brad Allen

Associate Professor of Business
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When companies get serious about improving energy and emission metrics around their IT centers, you must create expectations with the staff that are measurable. Corporate sustainability is a commitment that must be tied to both environmental and financial metrics and they cannot simply be passing comments aimed at external stakeholders.

The point to this short research study is simple. When companies get serious about improving energy and emission metrics around their IT centers, you must create expectations with the staff that are measurable. Corporate sustainability is a commitment that must be tied to both environmental and financial metrics and they cannot simply be passing comments aimed at external stakeholders.

Arrow Value Recovery (AVR), in collaboration with the international nonprofit

Close the Gap and Greenlink Solar, has created a solar powered mobile IT classroom or clinic to address humanitarian needs in rural Africa. We call it the Digitruck.



Carol Baroudi

Global Sustainability and Compliance
Arrow Value Recovery
www.arrowvaluerecovery.com

For a decade, AVR and Close the Gap have distributed high-quality, pre-owned computers in developing and emerging countries to address the digital divide. These computers are donated by large and medium-sized corporations and public organizations that want to make a difference. Over the last 10 years, we have processed 440,000 donated computers and reached a million and a half users.

In the course of that decade of work, Close the Gap recognized that providing IT equipment is not sufficient for many whom they aim to serve. The digital divide isn't simply a lack of available technology. For many, it starts with a lack of electricity. Devices are of little value without electricity to power them. For many of the 75 percent of Africans who live in rural communities, a lack of infrastructure - including access to electricity - makes the digital divide a veritable chasm. From these rural communities only 46 percent of students qualify for secondary school because their access to elementary education is so limited.

The Digitruck is built with triple insulation to withstand the sub-Saharan African heat, so it can go where others can't. It also generates its own electricity and can be used as a classroom or clinic as it travels from village to village. Beyond bringing education and direct medical aid, the Digitruck is a bridge to access a wider world of opportunity. By providing the opportunity to learn skills that can be parlayed into employment or used to access the vast array of educational materials accessible online, the Digitruck truly opens new vistas of hope and opportunity. Basic health care can now reach otherwise inaccessible villages.

The Digitruck is an upcycled used cargo container outfitted with refurbished computer technology. It is large enough to accommodate 18 students at a time or act as a self-contained clinic. Because it is mobile and solar powered, it can reach deep into areas that are otherwise difficult to serve. The Digitruck represents the best of innovation—upcycling with purpose.

When electronics meet the circular economy, we have very serious challenges. First and foremost, most electronics are not designed with reuse in mind. Electronics are perhaps the most complex products produced today, with a long list of materials, many used in such miniscule quantities that reclaiming them is unfeasible.

Manufacturing electronics is extremely energy intensive—even when raw materials come from recycling streams. For these reasons, AVR focuses on extending the life of existing

electronics, repairing and refurbishing to extend life, reusing usable parts before relegating anything to recycling. But our belief is that, true to the circular economy, the upcycle trumps even reuse as goods that are designated as trash find utility in a new instantiation of higher value or purpose. We believe the Digitruck is an excellent example of the upcycle.

Recycling is an energy-intensive process that fundamentally breaks things down to reclaim materials for new manufacture. Reuse extends the useful life of a product, getting more use from the original energy and materials used to create the product in the first place. Upcycling is a process where waste materials or products, without breaking them down, are used to create something of greater value or environmental benefit. To create a Digitruck, a used cargo container and used IT equipment become the ingredients re-introduced in a configuration that can deliver a very positive upside.

True Value of Sustainability

Key Global Beverage Companies Share Commitment to Addressing Climate Change in Operations and Supply Chains

Given the global beverage sector's share of Global Greenhouse Gases (GHG) is estimated at 0.4%, climate change reduction and adaptation are



Nick Martin

Associate Director and Sustainability Practice Lead
Beverage Industry Environmental Roundtable (BIER) and Antea Group
www.bierroundtable.com

crucial components for environmental sustainability strategies in the beverage industry. Climate change has significant ramifications for water and energy -- vital resources both within our direct operations, as well as within the broader production supply chain. Thus, a compelling business case can be made from the beverage sector to recognize and adapt to these environmental challenges.

A number of us, members of the Beverage Industry Environmental Roundtable (BIER), recognize the need for more focus on the issue of climate change, and have joined together to make a commitment addressing this important challenge. Through our collective action, we:

- » Recognize climate change as one of the greatest challenges facing the continued prosperity of society, particularly to those in emerging markets;
- » Commit to continuing to do our part to reduce GHG emissions not only across our own operations, but also by driving action through their supply chains; and
- » Support an international framework of national GHG reduction targets and commitments to invest in adaptation.

Climate change is not only a carbon issue, but also a water issue, says Jamie MacKinnon, Molson Coors representative and BIER Climate Change and Energy group lead. The group is committed to reducing carbon emissions, along with focusing on responsible water use in their own operations and in supply chains.”

BIER’s Joint Commitment on Climate Change is available for download at:
<http://www.bieroundtable.com/>

BIER members engaging on the commitment include: Anheuser-Busch InBev, Bacardi, Brown-Forman, Carlsberg, The Coca-Cola Company, Constellation Brands, Inc., Danone Waters, Diageo, Fetzner Vineyards, Heineken, Keurig Green, Mountain, Inc., MillerCoors, Molson Coors, New Belgium Brewing Company, Ocean Spray Cranberries, PepsiCo, Pernod Ricard, SABMiller, and Sun Orchard.

The Economics of Nature: Looking at Natural Capital

We are working to build understanding of the links between the environment and the economy, because we believe that understanding these links is key to getting us, as a society, to the point where we see the environment as an economic opportunity rather than a cost – and to meeting our environmental challenges.



Karen Clarke-Whistler
Chief Environment Officer
TD Bank Group
www.td.com

Last year, we focused on natural capital, looking particularly at the economic value of the environmental benefits provided by the natural environment. In a paper titled Valuing the World Around Us: An Introduction to Natural Capital TD Economics showed very clearly that our natural resources and ecosystems provide enormous, measurable benefits each year, and that including natural capital valuation in decisions can give us a better understanding of the true costs, benefits and return on investment of planned activities – and that not taking natural capital into account can lead to “sub-optimal outcomes and

unrecognized costs.”

For example, New York City has about six million trees. Each year those trees provide nearly \$150 million in annual benefits to New Yorkers from the services they provide, including:

- » filtering pollutants from the air
- » absorbing groundwater and thereby reducing the strain on infrastructure
- » cooling the air, which leads to energy saving
- » and absorbing carbon dioxide.

“ Natural capital is central to our economy. It provides huge benefits – economic, environmental and social – and considering natural capital in our planning process means better decisions all around.

So considering the natural capital value of trees is a must when it comes to urban development not just from a quality of life perspective but for very real economic reasons.

Our paper also looked at TD’s net zero energy “store” in Cypress Creek, Florida, which highlights that making the environment and natural capital a driver of facility design is a win for all. The Cypress Creek facility generates solar energy and has automated systems to make sure the store works at peak efficiency and that electricity isn’t wasted. Generating renewable energy and reducing energy use means reduced carbon emissions and at the same time energy costs. The property is landscaped with native trees and plants, which help to maintain local biodiversity – and reduce maintenance costs (e.g., less watering is required).

Overall, the Cypress Creek store provides more than \$100,000 of savings – through reduced operating costs and natural capital impacts – to TD and those living or working in the area.

The Cypress Creek net zero energy store was developed as part of TD’s green building initiative, which is playing an instrumental role in helping TD to reduce its carbon footprint and meet its carbon neutral commitment.

We take a three-step approach to carbon neutrality: reduce our carbon footprint; green our energy supply by generating renewable energy and purchasing Renewable Energy Credits (RECs); and develop innovative carbon offsets to neutralize the remaining emissions. Since becoming carbon neutral in 2010, TD has invested \$11.7 million in RECs and carbon offsets. The reduction in atmospheric emissions achieved through our 2014 purchases of RECs and offsets has a natural capital value of over \$118 million for the year.

So what's the bottom line? Natural capital is central to our economy. It provides huge benefits – economic, environmental and social – and considering natural capital in our planning process means better decisions all around. As the TD Economics paper says, “Beyond the business case, putting a value on natural capital is in many ways like putting a value on the future: incorporating natural capital into decision-making helps ensure that our children and grandchildren continue to benefit from today's natural resources.”

The Carlyle Group, a global alternative asset manager, focuses on value creation for our investors. Increasingly, we're learning what that means in terms of sustainability. New initiatives in our portfolio demonstrate how sustainability is a means to enhancing customer relationships. Just two examples include:



Jackie Roberts

Chief Sustainability Officer
The Carlyle Group
<http://www.carlyle.com>

Greener Products Attract More Customers – Carlyle Europe Technology Partners II, L.P.

In 2011, Carlyle invested in ADA Cosmetics, a European supplier of premium hotel cosmetics and accessories. Increasingly, ADA's hotel customers wanted to provide their guests with sustainable products. During Carlyle's ownership, ADA responded with eco-certifications, greener product lines and packaging, and operational efficiency improvements. In 2013, the company added a fourth new product line, named Fair Trade, to its Green Collection. These changes contributed to a 19% sales increase in 2013 for the four lines in the Green Collection, making it the top-performing category. The Green Collection also generated a 21% increase in sales in 2014. ADA's approach to sustainability met customer needs, and it was an important value component when we exited our investment in the company in August 2014.

Engaging Customers in Sustainability – Carlyle Infrastructure Partners, L.P.

When your product is a resource that is limited in supply, it's important to make sure customers use it wisely, so Park Water Company conducts ongoing customer education programs on the efficient use of water. In 2014, Western Water Holdings, which does business as Park Water, took this a step further with an innovative program called “Cash for Grass” that offers customers a rebate for replacing turf with desert adaptive plantings. At one of Park Water's companies, customers have removed more than 2.5 million square feet of turf -- an area equivalent to 50 football fields -- producing annual water savings in excess of 138 million gallons.

Treat Everything as a Business Case

When planning a new sustainability initiative, do what you can to give that initiative a realistic dollar value to the business. In some cases, this will be relatively easy. Energy or water conservation projects, for example, involve comparing your bills before and after. When investing in new technology such as video conferencing facilities you would measure its impact on business travel - flights, taxis, hotel stays and so on - remembering to take into account the cost of the technology.

Some projects have a less tangible value, like an educational program or community clean-up program. But they have a value nonetheless. Do your research and find out how to establish that value. Others have done it before you and the information is out there. Sell your initiatives to the business. Ideally, present each initiative as a one-page business plan showing the cost, its expected return on investment, time lines and a project team or sponsor so there is accountability.

Use this one-pager to socialize your initiative with decision makers. Be sure to highlight all the various value propositions of the project that appeal to the different business functions.

Then set up a dashboard or summary page to give you a total value of all sustainability initiatives companywide. This is great way to demonstrate the value that the sustainability team brings to the business.



Chris Lindley

CEO

FoundationFootprint

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Accounting for Change

Accounting can be a powerful tool for encouraging sustainability. It's already working reasonably well for energy efficiency and materials reduction related projects, where the ROI of initiatives can be precisely calculated

and tracked. But the impact is blunted where the financial benefits are less tangible, which is why most firms don't offset to zero emissions, and why branding initiatives often



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have a positive/mitigating impact far less than the firm's waste, water, or other footprint. Executives need to carefully consider how well their accounting approach to sustainability aligns with the firm's strategy and intent, if they want managers to make the "right" decisions.

This last year, I spent a week in Belize with a partner NGO, working on how to create the economic case to protect and manage some of the country's remaining forest cover. Belize has 3.5 million acres of forest, but is losing almost 1% of that per year -- some in protected areas, and some outside of them. The abstract arguments for protecting old growth forests and valuing their ecosystem services are easy to articulate -- forests provide a variety of useful services including carbon storage, biodiversity, flood control, and maintaining fresh water cycles. But on the ground, the economic decisions are much more pragmatic.

In Belize, an acre of cleared land can produce US\$1000 in sugar cane revenue for a local farmer, and farmland can be sold for US\$1500/acre to an expanding Amish family. Forests need to compete against these revenue streams through potential managed harvesting of hardwood and ecotourism revenue (and in some cases, investing in park rangers). This is often a losing battle without somehow including the "soft" benefits of the forest's ecosystem services.

Better accounting for these forest benefits would change a lot of the decision-making around forests vs. farming.

And what's true in Belize is also true for companies struggling to justify their continued push towards sustainability. For example, using FSC certified wood or pulp is largely a reputational decision now: Will a 10% increase in materials cost be worth it to create higher employee engagement? Benefit the brand? Enhance the CSR footprint? With a better accounting for the full ecological footprint cost, however, it may be that the FSC product actually costs less, relative to achieving the firm's sustainability/impact targets.

Some firms (such as Disney) already set internal carbon prices, and charge back emissions-related costs to the individual business units. This creates a clear cost to the businesses, which is then used in both energy efficiency ROI calculations, and for factoring emissions-impact into the profitability projections of new business initiatives. Applying similar accounting methods to all key sustainability metrics will create simpler and more economically powerful business cases for sustainable initiatives.

For companies pursuing corporate water stewardship strategies, a common barrier to action is the perceived low cost of water "at the tap." Water reduction, reuse, and recycling projects often do not



Nick Martin

Sustainability Practice Leader
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meet investment hurdle rates or compare positively to other investments. This also acts to limit community and watershed engagement actions outside of the fence line as well.

Our water and monetization experts worked with a leading beverage manufacturer to more thoroughly understand all of the cost drivers for water throughout their operations. In analyzing the true cost of water for representative production facilities, we expanded the assessment to include not only direct water costs but also considered:

- » **Treatment costs (pre-treatment, chemicals, filters)**
- » **Energy costs (heating, steam generation, cooling, and transportation of water)**
- » **Losses of water with embedded cost or value**
- » **Waste costs (sewer fees/surcharges, water to drain, wastewater)**
- » **Regulatory costs (water-related permitting, fines, and compliance management)**
- » **Operations and maintenance costs**

Using a “true” or “actual” cost of water as the baseline, we then worked to analyze future case scenarios with consideration of aspects such as:

- » **Increasing direct costs of water (e.g., inflation, municipal cost increases)**
- » **Water allocation limits and production impacts**
- » **Seasonal scarcity from both frequency and severity of droughts**

This more in-depth cost of water analysis yielded significantly more savings once very tangible water throughput costs were added to the company’s investment models. Water actions that previously could not satisfy the company’s internal investment hurdle rates can now be justified and defended on a more equal playing field with other investments. The future case modeling provided an ideal planning tool to project the business implications of increasing water costs and potential production losses due to insufficient water to meet growth projections.

Water and Waste Management

We recycle approx 100 (55 gal) drums of used oil filters a month. We estimate that each drum contains roughly 300 individual used filters,

which equals (roughly) 360k individual used oil filters diverted from landfills a year. We've been in business for 20 years, but lets conservatively say for the last 10 years we've averaged this, that's 3.6 MILLION diverted. Why does this matter? Our recycling process like most others consists of collection, drainage and most importantly crushing, more draining, and then off to incinerator & scrap metal. As a result of our recycling service, we have found that without fail, (+ or - a few gallons) every full 55 gallon drum of used oil filters recycled nets 20 GALLONS of liquid used oil. Same calculation as above the last 10 years results in 240,000 gallons of used motor oil diverted from landfills. This is the same oil that when it finds a water source, 1 ounce of used oil can contaminate 1 million ounces of water h2o. Realistically we can probably document the last 15 years of our recycling service but 10 is a conservative calculation. Now I think that's a damn good green feather in our cap when current NYS law does NOT require anyone, service shops, fleets, homeowners, etc to recycle their used oil filters.

How that's even possible is besides me, however I have come across a NYS bill that has been stagnant for a few years that proposes exactly that. Bill A573-2013 "Requires that used oil filters be source-separated and recycled". This needs to be addressed, especially when you consider that we estimate our 100 drums per month is only something like 2% of New York State's used oil filters. That leaves a lot of opportunity across the board for incentive.

We started our company well before "green" was the "new black" back in 1991, after getting everything we deserved when we hired the low-priced mover. They held our freight hostage, and billed us for several thousands of dollars above the estimate.

As I'm incinerating the corrugated boxes the very next day feeling deeply offended by the



Keith Adler

VP

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Nadine Cino

CEO

Tyga-Box Systems, Inc

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colossal waste of natural resources, not to mention the landfill afterlife, I launch into a Latina rant, saying, "Somebody ought to rent reusable plastic boxes as an ecological alternative to corrugated!"

That evening, my husband and partner, Marty Spindel decided that that "somebody" would be us.

WTS was asked by a confidential client to develop and implement a cost-effective and sustainable means of cleaning out and removing material from refinery tanks on an isolated area in the U.S. Virgin Islands. The over 250 storage tanks, which were up to 284 feet in diameter, required a unique and innovative solution.



Ryan McQueeney

Marketing Analyst

WTS, Inc.

<http://www.wtsonline.com>

WTS mobilized a cross-functional team and safely lead the turnkey management of the Largest Hydrocarbon Removal and Recovery Project in world history for a refinery that, in 2010, was one of the top 10 largest refineries in the world. In all, the solution required greater than \$10 million in capital catalyst to utilize the most advanced technology available to perform this task.

The solution delivered was for WTS to design, build and operate a Hydrocarbon Recovery Unit with rated annual capacity of 40,000 tons. In addition, the processing and removal of material from the tanks in a timely fashion required 10 on-site centrifuge operations running concurrently.

Throughout the two year project, WTS processed over one million barrels of sludge for hydrocarbon recovery, while disposing of the resultant ash and unusable materials in a secure landfill. During this process, there were over 100 process parameters monitored and controlled by PLC, which helped assure the project concluded without a single injury or incident, thus maintaining WTS' Goal Zero.

During the span of the hydrocarbon removal and recovery project, WTS was able to reduce the byproduct disposal volumes by more than 60%, while recovering 99.9% of all hydrocarbons from the site, which then became marketable product. The alternative solution would have been incineration of the oil-bearing secondary material, which would have destroyed a valuable energy resource, while creating more emissions than the Hydrocarbon Recovery Unit. The WTS solution to invest in the sustainable recovery of the hydrocarbons preserved natural resources, minimized total waste-to-landfill and resulted in the reclamation and reuse/recycle of 12 million gallons of oil. WTS understands the need for such natural resource

preservation solutions as the global population rapidly expands and the need for energy sources grows as well.

The economic value ultimately equated to a monetary savings of \$0.20 per pound versus the alternative disposal and incineration solution. The economic value delivered to the customer was approximately \$16 Million.

Food Waste - Less is More

Isn't it ironic that the developed countries around the world tend to waste substantial amounts of food? Rough estimate in America range from 20 to 35% of the food that's grown ends up in landfill. The environmental damage this creates along with the economic losses must be higher up the list of priorities for the food & beverage sector to address. In fact we all have a responsibility to address this issue, since part of this waste is domestic.



Malcolm Knight

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Some waste in tends to be accepted as inevitable, especially in the fresh chilled food sector, but even in this space there are many ways of reducing waste. One European retailer for example makes dips, soups, juices & sauces from second and third grade fruits & vegetables. First grade produce looks great, but down-graded produce has the same eating, food safety and nutritional qualities - it simply doesn't meet the size or appearance standards set by retailers and ultimately set by us the consumer.

There is a strong case for companies to tackle this issue and benefit economically by doing so. Why are more companies, from manufactures to restaurants to consumers not doing their bit? In short it's complacency. One could argue that because companies are making profit, they focus on continuing along the same old path. This makes sense since it got them to where they are - a healthy business model. However, overlaying a sustainability and environmental approach would only further benefit their business, if tackled in a way that does not disrupt their core business.

A separate business unit can often be a solid approach, where the new part of the business is made accountable for turning waste into a value stream, thus reducing or eliminating landfill.

There are two approaches I like to adopt to address this important environmental issue:

- 1. Reduce waste to its lowest possible level by going back into the whole supply**

chain.

2. Quantify the waste that's left and target conversion of this waste stream, call it something else that reflects its food safe, nutritionally valuable attributes, like Value Grade, and set a team the goal of converting this into a value stream.

Food considered to be waste can sometimes be converted great tasting products. Ask any good chef. It can also be used in other sectors such as a raw material for packaging and to replace plastics used in industries as diverse as cars to home ware.

The target for companies in developed countries should be to attain <1% waste going to landfill. This is not going to happen anytime soon, but initiatives must start now to address this issue. The next time you see food headed for landfill, think about how it could be avoided and let me know.

We've had ESOS but what about WSOS ?

Everyone has heard of the drought problems in California and there are times when the UK's water supplies are regionally severely stretched.



MERVYN J BOWDEN

Managing Director
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I was chairing a (Edie.net) conference in Birmingham earlier this week and ESOS (the Energy Saving

Opportunities Scheme for those who've exploring Antarctica these last several months) was being debated when the inspirational ideas started to spring up and flow.....(Sorry, couldn't resist the puns - lots more to come).

I thought I'd float (!) the idea of there being a Water Savings Opportunities Scheme as a very necessary addition to the regulatory portfolio, both at a domestic level and across the rest of the economy as well. There is a screeching need to reduce the amount of water wasted by the human population and to capture and use what's left far more efficiently than we've done up to press.

It should be mandatory for all to evaluate how they use water, understand how they can reduce wastage and improve efficiency on precisely the fundamentally sensible which ESOS advocates.

But the regulation must have teeth - severe penalties for not implementing identified measures.

OK, so if you weren't very taken by ESOS you're unlikely to fall off your chair at the prospect

of WSOS (careful how you say it....) but, as in California, there is a sense of urgency, particularly given the cost and relative difficulty of shunting large volumes of water around the UK.

The causes of this, and why it's so important, forgetting the obvious and debatable issues around climate change, are fairly simple. Increasing population is the greatest, e.g. California's population has grown from around 2m to 38m in the course of the last century. If anything is unsustainable surely it is that. Compare it with the mass migrations over a similar period into the South East corner of England. Population hasn't relocated to areas with very high rainfall.

Should they all have gone to Manchester or Scotland or Ireland where they've got loads of spare water supply capacity? Perhaps water supply should be a factor when politically looking at building new human settlements, as with the "garden cities" and the currently mooted new "sustainable" towns. With a water supply and effluent system which has the bulk of its roots, despite ongoing attempts to upgrade and replace it, in Victorian times.

Agriculture and industry clearly have a major role in ensuring they consider water when introducing, or economically considering, new crops and processes. Introducing seriously water-intensive functions to areas with massive infrastructure, and indeed weather, issues is highly irresponsible but it's too late to cry wolf when established cultures have developed.

Who polices any new regulation is important – the issues are sufficiently important to warrant necessary resource to ensure mandatory compliance. Initially, as with ESOS, this may be around installation of meaningful metering which will instantly identify most major leaks, the principal cause of wastage.

Periods of drought always highlight inadequacies in infrastructure and management so it's important to consider all the corrective issues on a planned basis, and to mitigate them before they occur and create even greater problems.

A long-term, master plan is needed to map out all these changes can be effected rapidly. At the end of the day does anyone really care if lawns turn brown? Of far more concern is for humans and animals to die of thirst.....

In my view, we need WSOS now so that much faster progress on supply and demand efficiency can be made, waiting for the new deregulation of the water industry in 2017 is way behind the pace and inviting further problems.

Zero waste to landfill.

I spearheaded a “zero waste to landfill” purchasing standard for the organization. As part of our corporate supply chain optimization strategy and in conjunction with company-wide CIMS-GB and GreenSeal 42 third party certifications, all materials purchased from our nationally selected vendors may be diverted from the landfill at the end of their useful life.



Jason Lee, LEED AP O+M

Director of Sustainability and Process Optimization
Harvard Maintenance, Inc
<http://www.harvardmaint.com/sustainability/>

As a vested Building Service Contractor, Harvard is committed to partnering with our clients to help them toward zero waste to landfill objectives resulting in lower waste hauling costs and carbon footprint reduction.

In 1990, Fetzer Vineyards set an ambitious aim for “Zero waste” sent to the landfill, and was an early pioneer in developing waste recycling, composting, reuse, and reduction practices. Since then, the company has achieved a remarkable level of reduction. In 2014, Fetzer Vineyards became the first Zero Waste certified wine company in the world, achieving Platinum level certification from the U.S. Zero Waste Business Council.



Josh Prigge

Sustainability Manager
Fetzer Vineyards
www.fetzer.green

Fetzer has diverted 98.5% of all waste from landfills in 2014 through recycling, reusing, and composting used materials. This led to over \$700,000 in savings and revenue from avoided landfill fees and recycling income in 2014. Fetzer has reduced the total amount of waste sent to the landfill by over 97% since 1990, while doubling production.

All grape skins, stems, and seeds remaining from winemaking process are composted on-site and reintroduced into the vineyards as fertilizer.

Mixed stream recycle bins are placed throughout all buildings for paper, cardboard, plastic, metal, glass, and aluminum can collection.

Production building has allocated areas and bins to collect glass, plastic, cardboard, metal, and PET for recycling.

Food waste, paper towels, and biodegradable plates, cups, and utensils are collected

throughout all employee break areas to be composted.

Coordinated efforts with vendors to allow for the return and reuse of packaging and distribution materials such as pallets, boxes, trays, and air bags.

Damaged or otherwise unused corks and capsules are returned to vendors to be repurposed or composted.

Wine barrels and barrel racks are sold at the end of their useful life.

Lees (yeast residue from winemaking process) is diverted from waste water after fermentation and sold to third-party vendors.

In California, water is precious, competition for water is fierce and conservation is critical. In the midst of the state's worst drought to date, Governor Jerry Brown declared a State of Emergency in January 2014, urging Californians to voluntarily cut water use

20 percent by 2020. Seeing the need for even more urgent measures, on April 1, 2015, new statewide mandatory water restrictions went into effect, calling for a 25 percent reduction in water usage through February 2016.

The University of California Merced (UC Merced) is located in one of the driest climates in California – the Central Valley. Known for being an extremely green campus, staff and students have joined together to dramatically cut water, energy and gas usage per student every year, showing water savings well ahead of goals set by the UC president. As part of its water saving initiatives, UC Merced has relied on Badger Meters automated data collection and online software in order to be more aware of our water consumption.

In 2010, well before the new compliance standards were set, a group of staff and students developed an energy team to take a look at water conservation. With the help of the energy team, a dorm water challenge was set into motion.

In the first year of the water conservation competition, the campus dorms reduced their water consumption by 14 percent, saving 79,000 gallons of water. They also saved 1.4 million gallons of water from 16 water leaks detected by the data.

In the following years, the campus saw another nine percent reduction, involving over 2,000 students and found more leaks.

For example, a 100 gallon a day leak was responsible for hot water, energy and chemical loss. Stopping the leak saved the university \$6,105 annually. In addition, the dorm



Kristie Anderson

Product Marketing Manager
Badger Meter, Inc.
www.badgermeter.com

competition revealed five toilets were leaking a total of 150 gallons an hour. The leaks were quickly identified and fixed in seven days, saving the university an estimated one million gallons of water per year and \$6,576. Other leaks in cooling towers, boilers and irrigation systems have also been quickly detected and solved.

The pulp and paper industry's impacts on the environment are notable—ranging from damage to forests, pollution of air and water, creation of solid waste and emissions of greenhouse gases. These impacts occur at all phases of the paper lifecycle, from fiber acquisition to manufacturing to disposal.



Susanne Antonucci

Sustainable Production Manager
The Segal Company
www.segalco.com

In the United States, the paper industry is the largest user per ton of product of industrial process water (US EPA 2002) and the third largest industrial consumer of energy (US DOE). By putting sustainable practices into place, paper mills can achieve economic success.

By recycling paper, it is reincarnated and not wasted---a cradle-to-cradle design. Increasing recycled content in paper has benefits throughout paper's lifecycle. It reduces demand for wood, reducing environmental impacts of commercial forestry and the pressure to convert natural forests and ecologically sensitive areas into tree plantations. Making paper from used paper is a cleaner and more efficient manufacturing process than making paper from trees. This is because much of the work of extracting and bleaching the fibers has already been done. These efficiencies save the paper mills money in their manufacturing processes, and more importantly, save our natural resources.

For example, making copy paper from 100 percent recycled content results versus copy paper made from 100 percent virgin forest fibers results in the following reductions:

- » **Total energy consumption by 44 percent**
- » **Net greenhouse gas emissions by 38 percent**
- » **Particulate emissions by 41 percent**
- » **Wastewater by 50 percent**
- » **Solid waste by 49 percent**
- » **Wood use by 100 percent**

Listed below are costs for various grades of paper, based on a 24-page, self-cover booklet, producing a quantity of 50M. It should be noted that there is only a \$375 difference between a post-consumer fiber and a virgin fiber paper.

- » Rolland Enviro 100 100% post consumer fiber \$10,625
- » Rolland Opaque 50 50% certified post consumer and 50% virgin fiber \$10,125
- » Finch Casa 30% post-consumer fiber \$11,125
- » Finch Opaque 100% virgin fiber \$10,250

With a combination of new energy sources and technologies in order, the paper mills can reduce costs and ensure that today's energy needs will be met without compromising those of future generations.

To achieve economic success, they will need to utilize new technologies to reduce air emissions, purchase energy credits, and look at innovations for producing paper. By compensating (buying energy credits, air permits) for the negative externalities that their production adds to the environment, they should maintain market equilibrium. There are theories that by imposing taxes, Pigouvian, the producers and consumers of polluting goods will be forced to incorporate the full cost into their output and consumption decisions. Coasean bargain has produced some public good and helped to overcome some of the negative externalities in the paper industry. Are full costs being realized without taxes?

I do not believe that paper will ever go away, but there will be a time when we will look at alternative sources to produce it, and potentially only recycled paper will be marketed. Costs will increase at an increasing rate, and benefits will increase at a decreasing rate. However, with regulations in place by the government, actions by the paper mills themselves, and with consumer pressure, paper production can be both an environmentally sustainable and economically efficient industry.

As much of North America has seen warmer summers, growth of algae in many surface water supplies has increased. Additionally, the 2009 National Lakes Assessment from the USEPA has estimated that 20 percent of the nation's lakes are highly impacted by algae and one-third contain some level of harmful algal toxins.



Orren Schneider

Manager, Water Technology
American Water

<http://www.amwater.com/>

This presents a challenge for water treatment plants trying to control algae blooms, which can create problems for performance and increasing operating expenditure for cleaning and maintenance activities.

American Water's New Jersey subsidiary operates the Canoe Brook Water Treatment Plant in Short Hills, N.J. The reservoirs that serve as the plant's water supply are shallow, and due to nutrient loading, also eutrophic.

This combination of factors leads to seasonally severe algae blooms, which in turn can lead to customer complaints of disagreeable tastes and odors. While these are aesthetic, and not a cause for health concerns, they nevertheless can negatively impact customer satisfaction with our service.

Typically, the algae present in the lake were treated with copper sulfate, a compound toxic to algae and other aquatic life. However, this compound is expensive and can lead to the development of copper-resistant algal strains. Furthermore, the use of chemical algaecides can cause cell lysis leading to the release of taste and odor compounds and/or harmful algal toxins.

As an alternative to copper-based algaecides, the use of ultrasonic treatment is sometimes used to control algae. Ultrasonic treatment uses high-frequency sound waves to attack the algal cells. The treatment is widely used in commercial and residential applications but is relatively new for municipal drinking water reservoirs

In an effort to reduce costs, improve operations, and reduce customer complaints, four solar-powered ultrasonic algae control buoys manufactured by LG Sonic (Netherlands) were installed in the Canoe Brook Reservoir No. 1. These buoys transmit ultrasonic waves continuously to disrupt algal cells, causing them to sink and prevent proliferation.

These emitters have been incorporated into a buoy system that uses on-board analytical capability and algorithms to determine the type of algae present and alters the emitted frequency to control the different species present. Rather than cause cell lysis, the LG Sonic devices are targeted at the gas vesicles present in the algae causing them to collapse, thereby reducing the buoyancy of the cells causing them to sink to the bottom of the reservoir. At the bottom, less sunlight is available for photosynthesis and the cells stop growing. If other species of algae begin to predominate, the frequency can be changed to deal with the new population.

Because of these advances, much lower sonic intensities can be used and thus, the ultrasonic buoys are capable of being powered by on-board solar cells.

Because of the tunable emitter, a single device is capable of treating the range of algae that may be present in a water body, including cyanobacteria (blue-green algae), green algae and diatoms. The effective diameter of treatment using these buoys is approximately 500 m (the effective area is approximately 50 acres). Because the algal cells are not lysed, metabolites (including taste and odor compounds, pigments, and toxins) are contained within the cells and are not released into the water.

This was the first installation of this relatively new technology for drinking water reservoirs in North America. This new system combines online water quality monitoring, telemetering and ultrasound technology to better prevent taste and odor events from occurring. Additionally, this system operates 100 percent on solar power and the technology will not harm fish or other wildlife.

Extensive testing conducted during 2014 showed the buoys had a significant impact on the algae, reducing algal counts, raw water turbidity and total organic carbon in the water. This improved water quality, allowed the plant operations staff to reduce coagulant consumption by more than 20 percent, and reduce the concentration of undesirable taste and odor-causing compounds in the raw water entering the plant. This reduced chemical use resulted in lower filter effluent turbidity and significantly increased filter run lengths over the same period in

2013, all while pumping approximately 20 percent more water than the previous year. Based on the cost of the equipment and savings realized, it is estimated the payback period for the buoys is less than two years.

Based on the positive results of this study, Kentucky American Water recently installed seven solar-powered, sonic buoys in the reservoir at the Lake Ellerslie Fishing Club, which will help address a periodic problem associated with using reservoirs for drinking water supply. In addition, Hawaii American is installing basin mounted units to control algae in a wastewater plant, and several other installations are planned across the American Water system.

From Net Zero Energy to Net Zero Water – A Next Frontier in Sustainability

Companies, governments, and organizations are increasingly realizing and responding to the risks posed by climate change and its specific impacts on water. Yet, unlike topics such as energy and carbon emissions, tools to help strategically plan for using water more efficiently and reducing water consumption still lag behind.

We have partnered with the Colorado Clean Energy Cluster (a nonprofit economic development organization), and the Colorado Water Innovation Cluster (an organization addressing current and future water challenges) to develop an action plan for reducing



David Wortman

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water use and impacts. The goal is Net Zero Water (NZW) – a water management concept that builds off the principles of net zero energy and climate neutrality. NZW, or being water neutral, means using only as much water as falls on your site and eliminating all water quality impacts from the site. In essence, NZW focuses on understanding your water footprint and taking action to reduce consumption and improve water quality - whether you are a building owner, company, school campus, or community.

To launch the NZW initiative, we developed a user-friendly Microsoft Excel-based analysis tool and companion guidebook (NZW Planning Toolkit) with the help of a project team and series of sponsors, as well as a consortium of national organizations such as the Living Building Challenge, The Nature Conservancy, U.S. Environmental Protection Agency, and American Water Works Association. The NZW Planning Toolkit is designed to help users quantify their water footprint, evaluate reduction strategies, and recognize financial and environmental benefits from reducing their water use and water quality impacts. It is anticipated to be used widely across the public and private sectors and is intended to standardize and simplify water analysis and planning, while maximizing economic returns and environmental benefits.

This spring (2015), we launched a pilot program to test the NZW Planning Toolkit at the building scale with project partners and sponsors. With rollout of a building-scale Toolkit anticipated later in 2015, subsequent phases will focus on modules for the building portfolio, campus, district/neighborhood, and community scales.

In 1990, we set a goal of “Zero waste” sent to the landfill, and were an early pioneer in developing recycling, reuse, and reduction practices. Since then, we recently became the first Zero Waste certified wine company in the world (U.S. Zero Waste Business Council).



Josh Prigge
Sustainability Manager
Fetzer Vineyards
www.fetzer.green

Waste statistics:

- » **We diverted 98.5% of all waste from landfills in 2014 through recycling, reusing, and composting our used materials.**
- » **In 2014, our savings and revenue from avoided landfill fees and recycling income was over \$700,000.**
- » **We have reduced the total amount of waste sent to the landfill by over 97% since 1990.**

Waste practices at Fetzer Vineyards:

- » All grape skins, stems, and seeds are composted on-site.
- » Food waste, paper towels, and biodegradable plates, cups, and utensils are collected throughout all employee break areas to be composted.
- » Coordinated efforts with vendors to allow for the return and reuse of packaging and distribution materials such as pallets, boxes, trays, and rubber bands.
- » Damaged or otherwise unused corks and capsules are returned to vendors to be repurposed.
- » Wine barrels and barrel racks are sold at the end of their useful life.
- » Lees are diverted from waste water after fermentation and sold to third-party vendors.
- » Single stream recycle bins are placed throughout all buildings for paper, cardboard, plastic, and aluminum can collection.
- » Production building has allocated areas and bins to collect glass, plastic, cardboard, metal, and PET for recycling.

About 5 years ago we were made aware of a growing problem within the Specialty Coffee industry with the disposal of used burlap bags. These bags carry the green coffee beans from the country of origin to the coffee roasters where they are cut open to remove the beans for roasting; then, too often, the bags are disposed of in landfills. We took this problem and came up with a sustainable solution to landfilling by using the fiber from the burlap bags to produce paper.



Thomas Danz

CEO

Whiting Paper Company
www.whitingpaper.com

We blend the burlap fiber (predominantly jute fiber) with office waste to create a 100% Post Consumer Fiber paper that performs like any other commercial printing paper. We have patented this process and we now produce paper made from coffee bean bag fiber under the Kona Paper name for printing papers, label stock, art papers, scrapbooking papers, and retail coffee bags.

Once we got into this process, we realized that a number of industries have this same issue with burlap bags. Most notably, cocoa beans come into this country in burlap bags, so we are collecting burlap bags from that industry and making paper out of those bags, recycled rather than landfilled.

Industry Driven Collaboration to Improve and Increase Recycling

Cartons are one of the most sustainable food and beverage packaging options available. They are made mainly from paper, a renewable resource, have a low carbon footprint across their lifecycle and are highly recyclable.



Jason Pelz
Vice President of Recycling Projects/Vice President
Environment Carton Council of North America/
Tetra Pak North America
www.CartonOpportunities.org

Although cartons are highly recyclable, environmentally friendly packages, they were not always able to be recycled in most areas of the country. In 2009, four leading carton manufacturers (Elopak, SIG Combibloc, Evergreen Packaging and Tetra Pak, as well as associate member Weyerhaeuser) joined forces to form the Carton Council of North America with the goal of delivering long term, collaborative solutions to divert valuable cartons from the landfill. To do this, we set out to support a lasting infrastructure for carton recycling so it is sustainable for recycling processors, environmentally beneficial, easy for communities and convenient for consumers.

Six years after we first started, cartons can now be recycled by more than half of all American households -- a 200 percent increase since the coalition's efforts began, and the number is growing every day. This progress is the result of a robust strategy, which involves every aspect of the recycling value chain to:

- » **Ensure sustainable end markets;**
- » **Support collection and sorting infrastructure;**
- » **Grow access to carton recycling in communities across the country;**
- » **Increase consumer awareness to drive more cartons into the recycling stream.**

The key word to describe our efforts is collaboration. Cartons are a valuable recyclable package that is recycled into paper products or green building materials. The Carton Council is a proponent of sorting cartons into their own grade to achieve their highest value. In 2011, a new Paper Stock Industry (PSI) commodity grade specification, Grade #52, was created for cartons (aseptic and gable-top). This only occurs when industry demand and commodity value justifies it. When baled as Grade 52, cartons can be shipped to paper mills or to other recycling companies. Because cartons are a recyclable commodity with

value, demand for carton recycling is increasing around the country.

The Carton Council provides technical support for individual materials recovery facilities (MRFs) to help them identify the best solution to sort cartons. In addition, the Carton Council can help to connect MRFs with carton end markets, as well as assist in the necessary outreach to let community residents know that cartons can be accepted in the local recycling program.

We also work with local governments who operate or oversee local residential and/or drop-off recycling programs to ensure they recognize the benefits of accepting cartons. Many communities have Zero Waste goals, and cartons are crucial to meeting these ambitions. When communities start accepting cartons, the Carton Council can equip them with educational materials and tools, offer education grants, or launch a new education campaign to promote carton recycling to their residents.

Food and beverage brands have an authentic and compelling sustainable story to tell about the cartons they use to package their products. We work with brands that market products in cartons to raise awareness about the recyclability of cartons to their consumers. Last year, we formed the Carton Recycling Champions network. Eleven companies and eighteen brands have signed on. (There is a full list at CartonOpportunities.org/youcould-be-carton-champion.) These companies share our commitment to carton recycling and have access to up-to-date information and materials to help promote recycling to the consumers who purchase their food and beverage products.

eCycling Leadership Initiative Produces Unprecedented Amount of Electronics Recycling

According to our research, the average US household now owns roughly 21 different consumer electronics (CE). Most of those 21 gadgets are not new and at some point will be disposed. When that time comes, the consumer electronics (CE) industry wants to make recycling your older electronics as easy as buying new ones.



Elliot Grimm

Sr. Coordinator, Policy Communications
Consumer Electronics Association
www.ce.org

In 2011, the CE industry launched the first-ever, industry-wide eCycling Leadership Initiative (ELI). The goal was to increase collaboration from all levels of the industry and government to get more consumer electronics recycled responsibly. The results have been exceptionally successful.

Each year since its inception, the Initiative has increased the amount of annually recycled electronics: from 300 million pounds of recyclable electronics in 2010 to over 660 million pounds last year, a 120 percent increase. That growth is even more impressive considering that for more than a decade the rapid pace of innovation has produced electronics devices that are lighter than ever. So, even as the total weight of CE recycled increases, consumers are recycling an even greater percentage of CE than the annual weight may indicate. ELI has also increased the number of responsible recycling locations available to consumers to over 8,500. Additionally, nearly all (99.9 percent) of the recycling arranged for by the eCycling Leadership Initiative's participants was conducted in third-party certified recycling facilities, a testament to the freedoms CE manufacturers and retailers now have in selecting the recycler of their choice.

From the start, ELI prioritized collaboration with outside interest groups. In order to reach a younger audience and their parents, the CE industry worked with Young Minds Inspired to create a school curriculum for 4th through 6th graders, helping them understand the benefits recycling brings to them and their communities.

Also, since 2013 CEA has partnered with Recyclebank to increase awareness of the industry's education efforts and promote GreenerGadgets.org, a website where consumers can locate the nearest responsible recycling facilities to their homes and find tips to live green, buy green and recycle responsibly. Working with these outside groups allowed ELI to engage a much wider audience about the importance of recycling.

This raising of public awareness has been critical to the initiative's success. Since 2012, CEA's public service announcements about recycling have been heard or seen by more than 100 million consumers. Additionally, CEA and the CE industry heavily promoted and supported local recycling events across the country in partnership with manufacturers and state government officials to educate consumers about the importance of recycling electronics. Last year's CEA Recycling and Reuse Study, 2014 Edition helps measure consumer awareness from ELI and similar campaigns by other public and private sources. The report says three in five (59 percent) US adults know where they can recycle electronics, and one-third of consumers surveyed (30 percent) recycled electronics products in the last year – a four percent increase from 2012.

The progress of ELI has not come without obstacles. The recycling of certain "legacy" consumer electronics has proved challenging; specifically, cathode ray tubes (CRTs) that were once the primary technology for televisions and computer monitors. As newer, more efficient technologies such as liquid crystal displays, light emitting diodes and plasma overtook television displays, demand for old CRT glass to make new CRT glass has plunged. But even as the CRT recycling market has become stressed and expensive to maintain, the CE industry worked hard to get these legacy devices recycled. In fact, a 2014 study shows a majority of US households (56 percent) are now CRT-free. Efforts to find a comprehensive

and responsible CRT recycling solution are ongoing.

To learn more about eCycling Leadership Initiative or be an active participant of its objective, please visit CE.org/eCycle.

No Such Thing As Non-Recyclable

From utilizing recyclable materials to finding productive uses for waste, sustainability efforts have come a long way in the manufacturing industry in recent years. However, some materials still prove to be very difficult to recycle. When a major Packaging Manufacturer found themselves with an abundance of waste material and no clear solution, they called on us for help.



Noah Goodman

President

Northstar Recycling

www.NorthstarRecycling.com

The packaging manufacturer was sending 98% of their waste to a landfill and racking up more than \$1 million a year in disposal costs. The major factor was a multi-layered packaging film for coffee bags that had been deemed unrecyclable by many of the recycling experts they'd presented their problem to in the past.

As my colleague John Trovato, a recycling and landfill diversion specialist at Northstar, pointed out, "We had to turn over a lot of rocks. With no potential end-user in the picture, they were sending 150 tons a month of clean, usable material to a landfill."

We were able to find a company that was using something similar to the stubborn coffee film to make their own product. From there, we developed a customized program that diverted the packaging manufacturer's waste, previously going to a landfill, to a new end user who could use the material in their own manufacturing process.

We toured the plants, mapped out all details with decision makers, arranged distribution and delivery schedules and created the financial framework and payment arrangements.

We worked closely with the packaging manufacturer's staff, across multiple locations, to develop internal sustainability programs and get them on board with the new procedures and processes.

We also helped consolidate and streamline the recycling program from two facilities through one system with a single point of contact. This method maximizes efficiency and profitability while making it more convenient and manageable.

Using the customized program the manufacturer was recycling 90% of their production

waste within the first year -- \$1 million a year in cost savings. They also now generate over \$100,000 a year in recycling rebates.

Sustainability-focused Service Innovation: Key to Growth at Alpine Waste & Recycling

Sustainability-focused product or service innovation as a source of market opportunity and new revenues is as much a part of the business case for sustainability as internally focused initiatives designed to reduce costs and

improve resource utilization efficiency. Few companies illustrate this approach as clearly and successfully as Alpine Waste & Recycling, Colorado's largest independent waste collection and recycling company, founded in 1999.



Graham Russell

Principal

TrupointAdvisors

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Around 2006, founder John Griffith realized many of his customers were seeking changes in the services provided by their waste handling vendors as part of their own evolving sustainability programs. Notably, he saw that providing services that would divert increasing proportions of their waste from landfills would add value in customers' eyes and create additional revenue opportunities.

Subsidiary Altogether Recycling was formed in 2007 as only the second single-stream recycling facility in Colorado and was quickly followed in 2008 by an organic waste processing facility that now converts 7,100 tons of organic waste annually into high quality compost which the company sells to the landscaping industry.

The success of these endeavors showed Griffith that Alpine could create "an identity in our marketplace as the leader in sustainability initiatives." The company's executive team began to think more broadly about other measures that could further enhance the Alpine sustainability brand. In 2010 the company began to convert its truck fleet from diesel to compressed natural gas (CNG), which emits 21% fewer GHG emissions, is about \$1.25 cheaper and is domestically produced.

The financial return on the fleet conversion project looked acceptable but the leadership team justified the move primarily on the grounds that it fit with who they wanted to be in the industry, namely, the sustainability leader, leveraging the company's sustainable brand image in the eyes of its target market customers. Over 50% of the company's trucks now run on CNG.

Alpine's experience, like that of many companies that have pursued a sustainability-based strategy, is that sustainability builds upon itself with new ideas emerging from existing successful initiatives. As the market began to understand that sustainability was a key element in Alpine's customer service message and a key differentiator from its competitors, the company's leadership realized that it needed to continuously and consciously broaden its range of sustainability-focused services to sustain momentum in its marketing strategy.

In 2012 this led to a new service offering called Automated Sustainability Reporting (ASR). Responsible waste handling is a major source of LEED points in office buildings. Large property managers like CBRE and Jones Lang La Salle were seeking ways to quantify the proportion of their waste being diverted from landfills. In response to their requests, and to eliminate the laborious task of calculating the figures manually, Alpine developed its ASR system in which all of its vehicles are equipped with on-board scales and computers that weigh and record every trash, recycling and compost container picked up. The data is uploaded wirelessly together with the account information (identified by the truck's GPS) into Alpine's CRM system, which develops a comprehensive record of each customer's ongoing recycling and landfill diversion track record.

Competitors can only provide broad (and not very accurate) estimates of these figures.

Using EPA conservation ratios ASR provides an indication of the environmental impact of customers' waste diversion efforts in terms of GHG emissions avoided, trees or gallons of fuel saved etc., information which they feed into their own GRI or other sustainability reports. ASR also delivers comparative data for all of its customers so a company can benchmark its recycling and waste diversion performance against industry peers. Even individual stores within a large retailer like Whole Foods can compare their performance with other stores in the group.

ASR is unique in the waste management industry and is now used by nearly 1,000

Alpine customers. ASR has delivered an unanticipated benefit by providing management with more accurate data on the types, weights and volumes of waste handled for each customer. This showed that some customers' contracts were incorrectly priced. The resulting negotiations sometimes led to the abandonment of customers who could not be persuaded to pay more for their waste handling services but, more often, to improved contract terms that enhanced Alpine's profitability.

Branding itself as the "industry sustainability leader" and supporting this claim with innovative services that are demonstrably valuable to customers wishing to enhance their own sustainability programs is fundamental to Alpine's corporate strategy and has unquestionably enhanced its market reputation and expanded its customer base. New

customers that have specifically mentioned ASR as a major reason for switching to Alpine from other waste handlers include Regis University, Kroger and Charles Schwab.

A major challenge with this type of strategy is that it is much more difficult to calculate the contribution to increased revenues made by these types of market-focused sustainability initiatives than it is to determine the energy savings and ROI on simple internal measures such as replacing incandescent light bulbs with LEDs.

Griffith acknowledges this but is convinced that his sustainability-driven innovations have been largely responsible for the impressive growth in Alpine's revenues to the current level of \$35 million in 2014.

Across the nation, more states and local governments are addressing solid waste issues through policy and recommendations. Waste diversion has recently gained more support through municipalities incorporating waste

reduction goals and objectives. Waste diversion is the action to divert discarded materials from disposal, including reuse, recycling, and composting. The waste diversion goal of zero waste has been adopted in several large cities in the US, including Austin. The Zero Waste Alliance defines this goal as "designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them."

In support of waste reduction, the Travis County County Commissioner signed the Zero Waste Inter-local with City of Austin (COA) on Jan. 8, 2014. The Inter-local aligns the County with City of Austin's Zero Waste Strategic Plan. The main goal of the inter-local is to combine efforts of both regulatory programs by the City and non-regulatory programs by both parties. The inter-local has several sections with the following focuses: single-stream recycling provided at all facilities, waste audits of facilities, recycling at county events, food service composting, recycling education, and partnership of community drop-off and reuse facilities. Travis County will phase in the requirements of the inter-local over time. The performance measures of the implementation will be reported to the Travis County Commissioners' Court and City Council.

Our county has been implementing the Waste Management Policy for the past eighteen years. The single-stream recycling program has been highly successful with strong participation. We recycled 116.7 tons of single-stream material in FY2013 . It will take time to fully implement the program through infrastructure and education. All facilities and departments participate at varying levels.



Shaun Auckland

Conservation Coordinator Sr.
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Corporations finding success with sustainability management solutions

To protect consumers, the environment and overall brand health, businesses in all industries need to commit to management of all procedures and operations that conserve energy and resources while achieving measurable, net-positive results at a reasonable cost.



Mike Rozembajgier

Vice President

Stericycle Environmental Solutions

www.stericycle.com

We work with corporations on a wide range of sustainability services including waste compliance, product recalls and recycling programs. A holistic approach drives efficiencies through any type of facility, thereby enabling efficiencies in business operations while avoiding costly fines.

Among our successes, we are proud to share several 2014 accomplishments:

- » 1 billion pounds of medical waste disposed of properly;
- » 1 billion pounds of hazardous waste disposed of properly;
- » 30+ million pounds of unused pharmaceuticals disposed of properly;
- » 100 million pounds of plastics, corrugated cardboard and other materials recycled or reused;
- » 2 million fewer trucking miles traveled due to smarter logistics.

Corporations working with Stericycle on focused sustainability efforts have achieved remarkable success in increasing compliance, saving costs and reducing the environmental impact of their operations. For example, a major medical center that integrated its waste stream management with Stericycle increased recycled waste from just 15 percent to 24 percent, while decreasing solid waste by 11 percent. In addition, a global appliance manufacturer partnered with Stericycle on a recall of 2 million units. While communicating recall efforts to distribution partners, retailers and consumers, Stericycle also recycled 6.5 million pounds of material in this case, diverting it from landfills.

Other sustainability success stories from Stericycle include:

Maximizing reusable containers: Through Stericycle's Sharps Management Service, reusable containers are used for sharps medical waste instead of traditional single-use disposable ones. In 2014 alone this kept 18 million sharps containers out of landfills. For other hazardous waste services, our use of reconditioned steel and plastic drums saved

more than 1.4 million pounds of CO2 equivalent. Between those two initiatives, landfills were spared 94.3 million pounds of plastic. That means that nearly 3,000 barrels of oil were saved that would have been needed to produce new, single-use plastic containers.

Double duty: fighting food-borne illnesses while reducing waste

Food safety is a complex effort. Food is grown, processed, packaged and transported across numerous locations before it reaches us in the grocery store. As consumers, we trust all of these steps have been completed with the highest levels of quality and safety, and that our environment is protected along the way.



Ann Peddle Meitz

VP Sustainability
3M Health Care Business
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To help ensure product quality and fight food-borne illnesses, 3M developed fast, accurate indicator tests that help food and beverage manufacturers detect microorganisms in food and beverage products before they become potential quality and safety issues.

But we didn't stop there. 3M Petrifilm Plates also offer users a 66% reduction in waste. Compared to traditional agar methods of testing, our tests use 75% less energy, 80% less water and produce 75% less greenhouse gases as a result.

This makes it easier to test across the many facets of global food production so quality, safe food can be provided more sustainably for consumers everywhere.

Innovation in Sustainability

Foodstuffs New Zealand is coordinating the roll out of a radical new, holistic approach to waste management to over 200 sites nationally working with up to 180 independently run stores who are part of either the Foodstuffs North Island or Foodstuffs South Island Cooperatives.

Following in-depth research into existing practices and store satisfaction levels of current arrangements, consultation was undertaken with the waste industry to establish what



Mike Sammons

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may be feasible given the current technology, emerging markets and logistical resources available in NZ.

Following this understanding, current best practice was identified in Foodstuffs 180 large supermarkets and a new generic waste management plan was developed that could be applied to all stores.

Research revealed a lack of continuity in approach to waste and recycling at back of the supermarkets resulting in a range of practices, risks and ever increasing costs for the stores. Materials such as plastic pallet wrap, waste cooking oil, waste chicken fat, bone and fat and seafood waste, produce and bakery waste, were being placed in garbage bins back of store.

The existing model was counterintuitive as it financially incentivized the waste services provider to encourage the store to make more waste, not less, as they charged on pick-up of bin.

The logistical challenges presented by the geography, population density, market economics and administrative needs resulted in a single national supplier being sought. Envirowaste Services Ltd won the preferred supplier status and following 8 national workshops to engage stores, started the process of site auditing, plan drafting, contract signing and then implementation in March last year.

For the stores in the program, there has been a dramatic reduction in waste sent to landfill and an accompanying dramatic increase in the recycling rate. Stores on the program reduce waste by an average by 35% in 3 months of being on the program and push recycling rates over 80%. We currently have 3 stores with over a 90% recycling rate.

Envirowaste (Foodstuff's preferred suppliers) is expanding their workforce to accommodate the greater number of stores they are servicing, they are also applying the same innovative solutions to their other customers, expanding the benefits well beyond our sector.

The third party contractors are also benefitting from business growth as a result of the new commodities passing through their hands. Stock feed providers are now able to replace previously imported winter feed from overseas with a high quality NZ product, due in part to the new arrangement, offering NZ farmers a better priced domestically produced option. The multiplier effect of diverting previously considered waste is difficult to quantify in both economic and environmental terms but must be very significant. Maximum landfill diversion is estimated at 10,000 tonnes pa. as a result of the project equating to a reduction in GHG of approx. 10,000 tonnes.

This is the first time that a programme of this size demonstrating so many new approaches to waste minimization has been applied to the NZ retail/waste sector. Materials that were previously put in rubbish bins and sent to landfill now have buyers as a result of new

markets being developed as a result of bringing together a range of independent operated businesses to supply quantities that are economically viable to process; i.e., there was no market for 50 liters of used cooking oil a week from a single store but there is for 1000 liters a week.

Stores on the program have a fundamental change in mind-set, whereas they used to see waste, they now see commodities. Out of ten materials streams coming out back of store, only one goes to landfill. The store staff are feeling greater self-worth in actively contributing to a scheme and the waste bill has been cut by a third.

Water Management Best Practices

Given the recent restrictions on water in California, as well as the drought conditions in Texas and parts of Washington state, we've learned that now more than in any other recent year, companies need to understand the best practices to manage their water consumption.



Ken Holiday

Senior Director, Energy & Sustainability
Ecova

www.ecova.com

Ecova manages over 2.5 billion data points in our Big Data Warehouse that we use to analyze trends and determine key findings for our clients. Since 2008, we've managed expenses for over 1 trillion gallons of water—that's a lot of water flowing through sinks, toilets and irrigation systems at facilities around the country!

Over the last five years we've seen, on average across the US, more than a 30 percent increase in water rates for our clients. Water costs are rising across all industries and building types from offices and retail to industrial facilities. Several states have seen 40 percent or more per unit cost increases since 2008, and the regional variation adds further complexity to the challenge. Add these increases to the fact that utility expenses are typically the third highest controllable expense (and water/sewer costs can be up to a third of total utilities), and there is reason to be concerned.

Aging infrastructure, droughts, and rising energy prices are putting upward pressure on water rates. Energy as a water cost driver may seem counter-intuitive; however, extracting, conveying, and pumping water into storage facilities requires power—not to mention wastewater treatment energy demand. Lastly, there are no alternate providers. Unlike being able to shop around for energy in deregulated markets, there is no such opportunity when it comes to water. Unit prices are, for the most part, uncontrollable.

In order to begin managing water consumption, these three common best practices should be followed:

Get expense data in order.

Manage and analyze bills to gain insight into consumption at the site level. Use this analysis to identify and respond to billing errors and gain transparency and insights on spikes or high consumption locations, which could mean incorrect meter reads or water leaks. By proactively managing and analyzing water bills, you can measure consumption trends and better control water consumption.

Engage employees and understand how water is used internally

Encourage employees to keep an eye out for leaks and to adapt behaviors to conserve water. Repairing water leaks in faucets and sinks can add up to real savings, along with water conservation practices.

Change internal infrastructure and look outside the building

Controlling or modifying equipment can be a challenge given degradation due to age or improper use or installations, so look for opportunities to upgrade equipment to higher efficiency options. Investigate water efficiency low-cost and capital investments, as well as equipment specifications for new construction/remodel sites. The EPA's WaterSense program can help identify products (think ENERGY STAR for water). Don't forget to look outside the building at water consumption associated with irrigation. Are sprinklers watering parking lots instead of landscaping, or are they on when it's raining? There are opportunities to revise settings and/or install advanced and smart irrigation controls to avoid pouring money down the drain.

The business case is clear for investing in a water management program given the upward trending rates of water over the last five years and the likelihood high rates will continue.

Lack of access to collection systems for polystyrene foam is a major obstacle to recycling on the consumer side. At the same time, many communities are trying to meet landfill diversion goals and ensure that as many materials as possible are recovered. Material recovery facilities (MRFs) interested in recovering foam face challenges including material handling issues, economics of recovery, and transportation of high-volume lightweight material.



Catherine Goodall

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RRS assisted the Foam Recycling Coalition (FRC), a part of the Foodservice Packaging Institute, launch a new grant program that is aimed at helping fund infrastructure for the processing and marketing of polystyrene foam products. (The FRC members include: Americas Styrenics; Cascades Canada ULC; CKF Inc.; Chick-fil-A; Commodore; Convermex; D&W Fine Pack; Dart Container Corp.; Dolco Packaging, A Tekni-Plex Company; Dyne-A-Pak; Genpak; Hawaii Foam Products; NOVA Chemicals Corp.; Pactiv Foodservice/Food Packaging; Shell

Chemical LP; Styrolution America; and TOTAL Petrochemicals & Refining USA.) Additional support of the coalition comes from the EPS Industry Alliance.

RRS worked in two phases on the project. First we developed the structures and processes that make up the grant program, facilitated discussions to define the roles of funding members, developed grant program materials, as well as provided administration of the grant program itself.

Second, RRS created and implemented the program's outreach and communications plan that drew in dozens of applications from the US and Canada. Outreach included press releases, website development, webinar participation, ad placement and much more.

The grant program targets those involved in managing residential curbside recycling programs, drop-off recycling centers, and commercial recycling programs. In addition, material recovery facilities (MRFs) were targeted, especially those looking to add or strengthen a polystyrene foam recovery program.

Alpine Waste & Recycling of Commerce City, Colo., was the first recipient of a \$45,000 grant from the FRC program. The grant will enable Alpine to purchase equipment that densifies (compacts) polystyrene foam into bricks, allowing the residents and commercial customers in the Denver metro area to add polystyrene foam foodservice packaging, egg cartons, meat trays and protective packaging to their recycling carts.

The ConAgra Foods facility in Waterloo, Iowa, is home to the company's pudding production, including Snack Pack and private brand pudding. The standard flavor changeover process yields blended pudding, which meets the same quality standards as other pudding made in

the facility. In the past, this pudding and packaging was disposed due to lack of consumer and customer interest and the required changes to the packaging and nutritional labels.



Justin Grau

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A cross-functional team identified this as an opportunity to reduce waste and the overall cost to make the product while generating additional revenue. The team developed a business case based on the top and bottom line benefits of the project and implemented a creative solution by identifying an institutional buyer for the new product. In addition, new packaging was developed and the nutritional labels were adjusted to reflect the potential variances of blended pudding.

This project has allowed the facility to divert over 1,000 tons of pudding and cups from waste, reduce yield loss by 15 percent, eliminate over \$30,000 in annually for hauling costs and generates over \$500,000 of additional revenue.

Teams at other facilities have taken notice. After seeing the results, teams from other ConAgra Foods' facilities began pursuing similar solutions to reduce waste streams and improve the top and bottom line.

Williams Creek Consulting applied over 13 years of experience in the planning, design, and construction of low-energy, ecological treatment systems (ETS) for the treatment of wastewater at a midwest brewery facing

significant surcharges for high BOD (Biological Oxygen Demand). ETS designs require little or no external energy for operation, and rely instead on attached biological growth processes and renewable physical filtration to lower BOD, retain suspended solids, buffer pH, and reduce nutrient concentrations. Systems can be designed to meet surface water, subsurface discharge, or sanitary or industrial pretreatment requirements.

Based on several years of data, the brewery's average water use was approximately 20,000 gallons/day with a daily wastewater stream of approximately 12,000 gallons. Based on expected BOD concentrations between 4,000 mg/L and 10,000 mg/L, the brewery may incur monthly surcharges in excess of \$10,000 per month in the near future. We designed an ETS pilot project to determine the effectiveness of an ETS filter system in pretreating wastewater prior to release to the local combined sewer system. ETS systems make use of an anaerobic treatment process that recirculates wastewater to increase the contact time between the waste and bacteria. The gravel bed utilized in ETS systems simulates an attached growth reactor. We conducted a total of 10 sampling events over the course of 10 months and revised the pilot methodology to eventually achieve a 95% BOD reduction within the waste stream within two days by adding waste activate sludge to the anaerobic digestion bioreactor. Additionally, contact time needs to be maximized by optimizing



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recirculation rates and techniques and systems need to be maintained and off gassing addressed.

ETS systems can be utilized by growing breweries in dense urban settings and can serve as landscape features or even be located underneath parking lots. Based on our experience with large food and beverage manufacturers and microbreweries, ETS systems provide a unique “green” alternative to more traditional wastewater treatment systems.

‘Green Guilt’ on the Rise with More Planning to Recycle Batteries and Electronics

According to a new national survey, approximately one-third (34 percent) of US respondents suffer from “green guilt,” or the feeling that they could and should be doing more to help preserve the environment. This finding shows an increase over a similar 2012 survey where 29 percent of respondents admitted to experiencing green guilt.



Carl Smith

CEO & President

Call2Recycle

www.call2recycle.org

Call2Recycle, Inc. battery collection program periodically conducts research to understand consumer attitudes and behaviors around proper product disposal and environmental responsibility. To continue building an effective recycling program, it’s helpful to better understand what barrier consumers experience in participating in these activities.

The good news is that respondents are putting green guilt to good use with four out of five (81 percent) saying they are likely to recycle batteries, cellphones, and other small electronics rather than throwing these items in the trash. The top reason reported for recycling these items is that it is the environmentally-responsible choice (70 percent).

“ Respondents are putting ‘green guilt’ to good use, with four out of five (81 percent) saying they are likely to recycle batteries, cellphones, and other small electronics rather than throwing these items in the trash.

However, seven in 10 (69 percent) of respondents identified barriers to recycling batteries and electronics, especially:

»Not knowing how or where to recycle their old technology (33 percent);

»Not being able to find a collection event (22 percent); or

» Local electronics or retailers not offering programs (20 percent).

Three in five (or 60 percent) of survey respondents reported needing a way to dispose of single-use batteries, cellphones, computers, TVs, rechargeable batteries, cordless phones, DVD players, audio equipment and digital cameras. About a third (34 percent) of respondents need to discard single-use batteries and nearly a quarter (23 percent) said cellphones.

While green guilt is on the rise overall, women (39 percent) and younger respondents ages 18-44 (45 percent) were even more likely to experience it. This resonates with other research that indicates Millennials are particularly concerned about the environment.

We have found that consumers increasingly want to make a difference in sustaining the environment and view recycling batteries as a way to take action. Making recycling more available and accessible via strong retail partnerships and municipal programs is key to increasing recycling rates nationwide.

ORC International conducted an Online CARAVAN Omnibus survey from March 26-29, 2015, among 1,024 US adults ages 18 and older.

American Family has had a robust recycling program in place since 1989 and a strategic sustainability plan in place since 2007. We have made significant strides in increasing energy efficiency and reducing our water footprint. But in 2012, we took it to whole new level, taking a deep dive into the waste stream to find out just how much waste was being produced.



Margaret Becker

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The first thing the group did was visit the waste hauling vendor's local material recovery facility. There they had the opportunity to observe their landfill-bound waste spread out over the floor. It was horrifying to see how poorly waste was being sorted, as most of the waste was recyclable material. We knew if we removed food waste and the recyclables from the pile, we would be close to zero waste. That day the dream of a zero waste future was born.

American Family became a founding member of the United States Zero Waste Business Council (USZWBC) in 2013. The USZWBC's mission is to educate, inform and document the performance of zero waste businesses using scientific methods to help businesses and communities become more healthy and sustainable. This mission was a perfect fit with American Family's objectives.

In addressing the waste system, it was discovered the heart of a zero waste program is in

two very different components. First, there is a required infrastructure for recycling. There needs to be bins for employees to sort waste, a process to move the materials throughout a building and a way to measure it all. To address the latter part, a metrics project team was created to design a way to capture a diversion rate that accounted for all their waste streams.

The other half is change management. Behavioral changes do not always come easily. This was apparent when so many recyclables were landfill-bound – the infrastructure had been provided, but there was not a strong emphasis on the education of staff. Thus, a team was created to handle zero waste communications and education.

Finally, waste streams were addressed. A crucial waste stream in food waste was added at the company's national headquarters in Madison, Wisconsin. American Family partnered with the City of Madison and the University of Wisconsin – Oshkosh to manage our organics with the help of an anaerobic digester. This bio digester accepts all organic material in an oxygen-free environment and mixes in microorganisms to aid in breaking it all down. The waste is turned into thick, nutrient-rich black dirt. As those organics are broken down, they produce methane gas, which is collected, turned into electricity and sent out to the grid where it is used to power campus buildings and even the composter itself. We also have extensive recycling practices that prevent plastic, glass, paper, metal, wood, Styrofoam and used equipment from ending up in landfills.

In addition to working closely with the City of Madison and the USZWBC, we have collaborated with other area businesses and non-profits with similar goals. We've worked especially closely with food service, housekeeping and waste hauling vendors, without whom the goals would be out of reach.

Contamination is a word in the solid waste industry commonly used to describe unwanted material included in a customer's waste stream. WM's Total Recycle Program (TRP) assists high volume customers nation-wide with training and education of acceptable items for single stream recycling (SSR) in efforts to drive landfill waste diversion rates. In managing TRP for WM of New England (WMNE), we were able to apply TRP internally, re-discovering the elementary lessons to begin with the "man in the mirror" and the power of influence of 43,000 employees' network.

TRP is comprised of core elements of successful landfill waste diversion programs including waste stream analysis, on-site assessments, customized recommendations, implementation assistance, and, environmental reporting. In conducting an impromptu



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office receptacle waste assessment in the WMNE hub, it was apparent employees would benefit from TRP. Thus, in 2013, the first WM employee recycling training program was established, which comprised of:

1. **Photos from the employee waste assessment illustrating common contaminants**
2. **Recycling carts containing actual material to clarify confusion between acceptable versus unacceptable every-day material**
3. **Feedback cards – notification of correct usage or misuse of bins and material identified**
4. **Educational information about and recycling facts employees can relate to and comprehend**
5. **SSR collateral including desk reference cards**
6. **Recycling plant/Material Recovery Facility (MRF) capabilities and common contaminants**
7. **State waste bans and new regulations**
8. **Newly created WMNE environmental report**
9. **WMNE mission statement including diversion goals**
10. **WM Corporate Code of Conduct [Environment section]**
11. **WM environmental stewardship - recipient of global and national sustainability awards and accolades, i.e. Dow Jones Sustainability Index, FTSE4Good, Ethisphere's Most Ethical Co., Carbon Disclosure Project, etc.**
12. **WM sustainability goals**
13. **Display of PET, HDPE, etc. flake and pellets; fiber book with examples of all grades of fiber; cullet; and, sample products made from recyclables, i.e. carpet, decking, apparel**

Identical to our customers, WM employees had questions about acceptable SSR items, i.e. plastic film, shredded paper, cellophane or foil based wrappers, 'to go' packaging, polystyrene, aseptic containers, paper towels, plastic utensils, etc. Post-training waste assessments resulted in 100% improvement and, to date, every time I am in the office and conduct an informal waste assessment, at least a couple of staff are excited to share stories of empowerment how they are using their [correct] knowledge of recycling with customers and in their personal network. Furthermore, post-training survey results provided extremely useful insight:

- » 90% found the training beneficial;
- » 72% had not received any recycling training;
- » 88% said the training would help them recycle more;
- » 88% said the training will better assist them with customers;
- » only 55% were familiar with the resources reviewed in the training;
- » only 14% were aware of WMNE recycling diversion rate and goals;
- » Anecdotal: opened lines of communication, developed staff camaraderie was developed around recycling right, and established point person for recycling questions.

Additionally, last fall, WM's Recycling Council successfully rolled out a public back-to-the-basics recycling campaign, Recycle Often. Recycle Right. (RORR), addressing the common confusion about SSR via simplified messaging and marketing collateral. RORR components such as MythBusters and the Promise Pledge Leaf, were incorporated into the WM employee follow up training and education material. These, along with various sustainability related resources and references, are posted on the ThinkGreen ActGreen bulletin board.

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[Laerdal Medical Corporation](#)
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[Minto Communities](#)
[Cascades Tissue Group](#)
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[Axalta](#)
[Environmental Services, Inc.](#)
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[Dell](#)
[Eastman Chemical Company](#)
[Flextronics](#)
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[DASNY](#)
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[City of Virginia Beach](#)
[Xerox Corporation](#)
[OTO Development](#)
[Integration Strategy -- Energy, Environment & Sustainability](#)
[Keep America Beautiful](#)
[The Fern Hotels and Resorts](#)
[Sustainable Museums](#)
[Solberg MFG](#)
[Tripos Software, Inc.](#)
[The Dow Chemical Company](#)
[A&W Food Services of Canada Inc.](#)
[Mars, Incorporated](#)
[IHS](#)
[Verizon](#)
[Plymouth State University](#)
[Arrow Value Recovery](#)
[Beverage Industry Environmental Roundtable \(BIER\) and Antea Group](#)
[TD Bank Group](#)

[The Carlyle Group](#)
[FoundationFootprint](#)
[ClimatePath](#)
[Antea Group](#)
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[Badger Meter, Inc.](#)
[The Segal Company](#)
[American Water](#)
[Brendle Group](#)
[Whiting Paper Company](#)
[Tetra Pak North America](#)
[Consumer Electronics Association](#)
[Northstar Recycling](#)
[TrupointAdvisors](#)
[Travis County](#)
[LEWIS PR](#)
[3M Health Care Business](#)
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