

# *3 R's of Sustainability*

**REDUCE**  
**REUSE**  
**RECYCLE**

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Instructor's Lecture Notes

## Session I

### LESSON 1: UNDERSTANDING SUSTAINABILITY

Sustainable management practices are becoming prevalent in companies today. In many situations “sustainability” is simply a buzzword, as many companies and organizations do not understand the benefits of implementing sustainable practices. In order to discuss sustainability, organizations must understand what sustainability is, why sustainability is important, how sustainability works, and how sustainability can be implemented.

Sustainability, as defined by the Environmental Protection Agency, is ones ability to “meet society’s present needs without compromising the ability of future generations to meet their own needs” (Environmental Protection Agency, 2010). Why is this important?

Studying sustainability is important because companies must be able to (1) meet new regulations and reporting requirements, (2) avoid litigation, and (3) use sustainability as a competitive advantage.

- *Meeting new regulations and reporting requirements* can be addressed by looking at different international and national standards, as well as various reporting initiatives. The international standards include: Kyoto Protocol, “Carbon Markets,” ISO 14001 and the Copenhagen Accord. National standards include new SEC Reporting Requirements and the Global Reporting Initiative (GRI).
- *Avoiding litigation* can be addressed by looking at past examples of companies whose environmental degradation has led to legislation and legal ramifications (i.e. lawsuits) and result in companies being held accountable for their actions.
- *Using sustainability as a competitive advantage* can be addressed by briefly examining Walmart and the use of market forces in its operations to create a competitive advantage.

Each of these topics will be examined after looking at a brief history of the 3R's of Sustainability (*Reduce, Reuse, Recycle*) and the Environmental Protection Agency (EPA). The creation of the 3R's and the EPA are stepping-stones towards sustainable management for organizations within the United States.

### **HISTORY OF 3R'S AND THE ENVIRONMENTAL PROTECTION AGENCY**

In recent years, focus on the environment has become a huge issue for businesses. Ideas on conservation and the introduction of the 3R's came in the aftermath of World War II. Shortages in materials led to the traceable beginnings of the "reduce, reuse, recycle" concept still utilized today. The initial implementation was intended to help companies stay afloat in hard times when resources were limited. After World War II, the concept of the 3R's grew in popularity as other countries began shifting towards policies related to the environment.

The United States later responded in 1970 with the creation of the Environmental Protection Agency (EPA), with the intent to monitor environmental activity. Several environmental Acts have been created and implemented by the EPA; the most notable being the Clean Air Act in 1970, the Clean Water Act in 1972, and the Pollution Prevention Act of 1990 which focused on "industry, government, and public attention on reducing the amount of pollution through cost-effective changes in production, operation, and raw materials use" (Environmental Protection Agency, 2007). Although this governmental agency has been responsible for monitoring environmental activity, setting standards, and reinforcing regulations, the level of enforcement has been limited. The development of new standards by international organizations, as well as increased national standards (*as discussed later in the lecture notes*) have led companies in the United States to revert back to the use of the 3R's.

## INTERNATIONAL STANDARDS

The biggest push as to date in sustainability standards has come as a result of several international standards. Europe, especially, has faced issues of limited space and resources, resulting in the creation of several international environmental standards. These standards include: *Kyoto Protocol*, “*Carbon Markets*,” *ISO 14001* and the *Copenhagen Accord*.

*Kyoto Protocol*: The Kyoto Protocol, held in 1997 in Kyoto, Japan, was an attempt to draft a framework for air quality cleanup to maintain the climate. Measurements of greenhouse gases in the air were assessed and discussed with intent of reducing emissions. This conference set out to reduce emissions world wide approximately 5% from the level in 1990; this is to be completed by 2012 (United Nations [UN], 1997). Reduction rates were based on how developed the country was and how much greenhouse gases it emitted. Different methods were implemented to offset the emissions of developing countries that might have more difficulty reaching reduction goals. The process of selling or trading emission permits became an accepted practice as part of the protocol. Additional programs include clean up projects both within respective countries or projects aiding in emissions reduction in other countries; these projects can be counted as credits for reducing emission (UN, 1997).

*\*See Kyoto PDF referenced on page 28 for more information*

“*Carbon Market*”: The creation of a trading market for carbon units as designated in the Kyoto Protocol. This specific mechanism allows countries with excess units to sell carbon credits to countries that have exceeded their allowed limits (UN, 1997). The underlying idea is countries will find ways to reduce emissions due to an incentive to sell the excess credits.

*International Organization for Standardization, ISO 14401*: is part of a set of standards that focuses on the implementation of environmental management systems (EMS) into a corporations’ operating scheme (International Organization for Standardization, 2004). The

overall concept is to begin by planning an EMS in the workplace through the setting of goals and aiming to meet specific requirements, then eventually implementing those processes.

*Copenhagen Accord:* The Copenhagen Climate Change Summit, like the Kyoto Protocol, aimed at reducing greenhouse gas emissions on a global scale. This conference, that took place in December of 2009, had a very similar concept to that of the Kyoto Protocol; however, a key difference was this time the United States acted as a leading authority in the formation of the agreement. Despite having political backing from major world powers, the conference's impact has been questioned (United Nations, 2010). The deadline to meet requirements is a few years away and questions of emissions measuring on a per capita and per country basis are still in question. Tracking of policies will be difficult until permanent governance and full commitment by participants is reached.

*\*See Copenhagen PDF referenced on page 28 for more information*

The onset of international standards and shifting spotlights towards the United States has slowly begun to push the issues of environmental management to the forefront of business operations. This has warranted the enforcement of national standards within the United States.

## **NATIONAL STANDARDS**

As environmental laws become more and more pressing at the international level, the United States and companies within its borders must begin to consider how those regulations will carry over into the United States model of business operations. As of the spring of 2010, movement toward environmental reporting practices has become a reality. The Securities and Exchange Commission (SEC) has issued a mandate on the strengthening of environmental reporting. Many companies have already begun to include environmental reporting in their annual reports; however, the strengthening of regulations will require companies to divulge

information of environmental impact. This coupled with consumer awareness could cause companies who do not implement sustainability measures to fall behind competitors who are operating in a “greener” manner. One way to regulate the reporting of environmental impact would be through the use of the Global Reporting Initiative.

The Global Reporting Initiative (GRI) is a set of reporting standards that provide corporations ways “to measure and report their economic, environmental, and social performance” (Global Reporting Initiative, 2010). This type of assessments is designed to help companies reduce environmental impact and create a larger awareness for different members in the companies’ operations.

*\*See SEC and GRI PDFs referenced on page 28 for more information*

## **LITIGATION**

Shifts toward a more sustainable operating environment call for organizations to be accountable for their actions. Increased regulations will in turn increase environmental litigation. Several companies who, in recent years, have caused environmental degradation have been served with lawsuits. Companies must realize that the inability to comply with those new regulations and requirements could result in large fines and monetary losses.

Two examples include the recent lawsuits against Exxon Mobil and BP. The Exxon Mobil case involved contamination of groundwater that was a viable drinking source for residents of the Queens, New York area (Navarro, 2009). The lawsuit resulted in Exxon Mobil paying the city of New York \$104.7 million. The BP Gulf Coast Oil disaster resulted in a large-scale contamination of the Gulf Coast from a leaking underwater well. The inability of the company to solve the problem in a timely matter concurrent to the amount of damages from the event, has led the company to set aside a fund of \$32.2 billion dollars for clean up and legal

claims (Feely & Fink, 2010). Litigation on these cases, and other cases in environmental nature set precedent as to how future violators of environmental policy will be handled.

## **MARKET FORCES**

Profitability is a major incentive in implementing sustainable practices into organizations. Companies are using sustainability to gain a position over competitors. One company will set the standards and other must respond in order to compete. To be on top, companies must find ways to implement these practices. Many companies these days are advertising either “going green” or “green practices” in operations. Consumers are becoming more conscious with buying efforts and the visibility of larger corporations is becoming eminent in our society. Those who do not conform to higher standards risk ridicule from the media and loss of customers.

One of the best examples of large corporations implementing sustainable practices into all aspects of their organization is Walmart. Beginning in 2005, the superstore has made great strides toward sustainability. The company set three long-term goals of being “supplied by 100 percent renewable energy; create zero waste; and sell products that sustain our resources and the environment” (Walmart, 2010). The company also implemented a process called “Sustainability 360” which deals with engaging all aspects of its supply chain in sustainability efforts (Walmart, 2010). Walmart has found several different ways to implement policies that save money and reduce waste, all while benefiting the environment. The company has become very transparent and continues to grow and move towards reaching its sustainability goals.

*\*See Walmart PDF referenced on page 28 for more information*

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## Session II

### LESSON 1: THE HIERARCHY

*Reduce, Reuse, Recycle*, also referred to as the 3R's of recycling, were created to establish a hierarchy of waste management practices for individuals and businesses.

- *Reduction* is the first and most important step in the hierarchy. This step includes taking a proactive stance in purchasing and using only what is necessary. The idea is to be conscientious of one's supply stream and waste management practices in order to minimize raw materials.
- *Reuse*, the step following reduction, focuses on finding an alternative use for materials that would otherwise be considered waste and ultimately disposed of. Ideally the goal is to eliminate waste completely.
- *Recycling*, the final step in the traditional hierarchy emphasizes on properly separating and distributing those materials that cannot be reduced or reused, to the appropriate facilities so the items can be applied to the creation or production of new products and goods.

The ultimate goal of the 3R's is to minimize the amount of waste sent to landfills, in order to create a safer and healthier environment. While historically the waste hierarchy has been centrally focused on the 3 R's, the following additional steps have been added:

- *Avoidance* is most preferable and challenges an individual and organization to precisely calculate and purchase only what is absolutely necessary and *avoid* obtaining any materials that are not essential and could ultimately be wasted or passed along to the next steps in the hierarchy.
- *Recovery* entails extracting materials or energy from waste to be used or processed. An example would be reducing waste materials to compost.

- **Treatment** is subjecting waste to any physical, chemical or biological processes intended to change its volume or character, so that it can be disposed of with minimal or no adverse affect on the environment (Whangarei District Council, 2007).
- **Disposal** is the final step and least preferred in the hierarchy is to apply waste to the natural environment.

### **THEORETICAL PERSPECTIVE ON THE 3R'S**

Conservation has become a necessary and critical component of lifestyle and business decisions. One of the most daunting challenges governments and organizations face is solid waste management. The control, storage, and disposal of waste until the 20<sup>th</sup> century were problems without solutions. Today, advances in science have produced a hopeful outlook for managing solid waste. The implementation of the 3R's by companies has created several societal, environmental, and economic benefits. Although these methods have helped meet the needs of society and the environment, the greater issue companies may want to consider is how sustainability practices help them meet the bottom line. Until recently, the economic benefits of the 3R's implementation have gone unnoticed. Creating a leaner, well-defined operational method utilizing the concepts of *Reduce, Reuse, Recycle* can lead to increased profitability.

*Reduce:* The first step in managing solid waste is to reduce and strictly limit the amount of materials used. The less companies bring in, the less the company will need to haul away in the form of waste. Consumers have become more educated in ways of saving money and conserving energy thereby reducing waste. Turning off lights, installing low-flow toilets and programmable thermostats are all ways to reduce the amount of waste produced. Waste reduction can often be accomplished by minimization of consumption and purchasing fewer materials.

*Reuse:* Reusing items takes place when a product that has been used for its original purpose is later used in to accomplish the same task or to an entirely new one based on its ability to be reused. This eliminates the need to consistently reorder products, and can give companies a way to be creative and find new use for existing materials. The best goods to reuse are those with no diminishing value; instead of one-use plastics or disposable items, products that can be used more than once have recurring value and ultimately minimize waste.

*Recycle:* Recycling acts as a last resort for companies, allowing them to send away materials, they cannot use to be made into something else. Recycling has played a major role in the creation of new and proactive environmental policies, while at the same time, creating a market for materials that can be made into new products. Markets are created when materials such as scrap metal and higher-grade plastics are separated and sold to companies that might recycle and re-figure the materials for future use. Various national and international standards (*as mentioned in Session I*) have reinforced the idea that recycling is essential to environmental protection.

Only in recent years have the economic benefits of the 3R's been addressed by organizations. The largest obstacle to increased use of recycling has been the recent recession; government costs, and consumer motivation. Complications are immense to recycling programs because attention is focused elsewhere in the current economic downturn. There are many economic benefits to recycling that can raise motivation including "pay-as-you-throw" programs, discounts on waste disposal bills, as well as money saved on lowered energy consumption and resource conservation (Gerlat, 2009).

Reducing and reusing can save money on consumption, which creates economic incentives, as well as competitive advantages for companies. By reducing, reusing, and

recycling, businesses can pass on savings to the customer, improving prices and business.

Furthermore, green economies promote lower production costs, long-term product savings, and increased potential for cost savings. The 3R's promote economic stewardship and entrepreneurial innovation (*as demonstrated later in Lesson II*).

The 3R's have provided a means by which to influence social, political, economic and environmental change. The effects on society and culture have been altered by efforts to adjust our ways of thinking about the environment. Hopefully these new perspectives will slow the spread of environmental damage and also show companies the bottom line can benefit from these concepts.

Preview Only

## Session II

### **Lesson II: CASE STUDY: AUTOMOBILE INDUSTRY AND SUBARU**

#### **AUTOMOBILE INDUSTRY**

The environmental impacts of the automotive industry are spread throughout the entire life cycle (i.e. production, use and the end of life of vehicles). Car production and usage leads to significant energy consumption and emissions. The automobile sector is considered to be a major contributor of environmental pollution such as air pollution, greenhouse gas emissions, road congestion, noise, etc. Nevertheless, through green management, the industry is finding ways to reduce waste throughout production, use and end-of-life vehicles.

A 2009 Wall Street Journal study discussed a success story at the Subaru auto plant in Indiana, which not only decreased solid waste 99%, but also saved millions of dollars. The article revealed that Subaru spent years studying, reviewing and redesigning processes to make their plant green. Auto plants have various indirect materials such as steel, cardboard, wood, plastic, paper, and packing material, which can be reduced, reused or recycled. The key is to determine a method that will be most profitable for the company (Robinson & Schroeder, 2009).

There is potential in saving more quickly if companies combine automated activity-based costing and analytics with in-depth analysis to measure the costs of recycling, retooling, conserving and maintaining equipment in the most green and cost-effective way possible (Newkirk, 2009).

Subaru of Indiana has taken measures to eliminate waste, and serves as the ideal case study for the automotive and all other industries. Subaru has managed to save money as a result of their conscious efforts to be environmentally conscientious. This same effort has led to remarkable innovation, unmatched by others in the industry. Let's take a closer look at Subaru.

## **SUBARU OF INDIANA AUTOMOTIVE, INC.**

Subaru of America, Inc., the automotive unit of Japan's Fuji Heavy Industries Ltd., recognizes its responsibility to the global environment, the society, customers, its distribution network and its employees. The company is dedicated to establishing and sustaining an efficient environmental management system that goes beyond just meeting the standard environmental laws and regulations. Subaru's environmental policy for the company includes the following:

- Complying with all environmental laws and regulations and other requirements related to their business activities;
- Implementing effective pollution prevention systems that protect air, land and water;
- Conserving natural resources by reducing, reusing and recycling materials;
- Continuous improvement of their Environmental Management System (EMS);
- Creating employee awareness and commitment to Subaru of America's (SOA) Environmental Philosophy and Policy;
- Working with SOA's business partners to improve the operational impact on the environment.

Subaru of America is fully committed to compliance with environmental laws and regulations relevant to their business activities (Subaru of Indiana, 2005). In the past, many companies have mistakenly believed that adopting environmentally friendly processes adds cost negatively impacting the bottom line. Recently, businesses have realized green practices can cut down cost through encouraging innovation in the way the company uses materials leading to efficiency. In other words, the approach should be more proactive than reactive in the sense that focus should be more on creating less mess to begin with instead of finding ways to clean up the mess after (Robinson & Schroeder, 2009).

Subaru of Indiana Automotive, Inc. (SIA), a factory of more than 3,000 workers who build approximately 800 automobiles a day, pursued green initiatives for years and took upon the challenge of setting new standards for manufacturing excellence. Their efforts involved employees at every level of the plant finding ways to save energy, reduce waste, and create more efficient processes. In 1998, Subaru of Indiana Automobile, Inc. went on to become the first automotive plant in the United States to be ISO 14001 certified, which is the international standard for excellence in the environment management systems. The factory was able to achieve a 14% reduction in electricity consumption on a per-car basis since 2000. Then in 2004, it was recognized as the first automotive assembly plant to be ‘Zero-Landfill’ (Robinson & Schroeder, 2009). It was able to achieve this by discovering ways to reduce, reuse, and recycle waste through the kaizen process of continuous improvement. Subaru emphasized eliminating waste, improving productivity, and attaining continual sustained improvement in targeted areas.

SIA is the industry leader in environmental stewardship and has earned recognition for their green efforts. Some of its environmental milestones include the following:

• 1994: 1 <sup>st</sup> auto assembly plant in the U.S. to become smoke free
• 1998: 1 <sup>st</sup> auto assembly plant in the U.S. to be ISO 1401 Certified
• 2002: 1 <sup>st</sup> auto assembly plant in the U.S. with an on-site solvent recovery and reuse system.
• 2003: 1 <sup>st</sup> auto assembly plant in the U.S. to be designated a Backyard Wildlife Habitat by the National Wildlife Federation
• 2004: 1 <sup>st</sup> auto assembly plant in the U.S. to achieve Zero Landfill
• 2006: 1 <sup>st</sup> among overseas facilities of Japan-based auto makers in Nikkei environmental management survey (Subaru of Indiana Automotive Inc., 2009)

Since May 2004, Subaru Indiana Automotive Inc. has not sent any waste to a landfill. Additionally, 99.9% of all waste that leaves the plant is recycled meanwhile the remaining 0.1% of their waste is sent for incineration in accordance with EPA guidelines (Subaru of Indiana Automotive Inc., 2009). The multifaceted recycling program involving the cooperation of

employees and the supplier base (81% of whom are ISO 14001 certified) allowed Subaru of Indiana Automotive to recycle 13,142 tons of scrap metal and conserve 670,000 gallons of oil in 2007 (Newkirk, 2009). Moreover, the Subaru plant recycled so much waste that it saved enough electricity to power more than 6,000 homes for a year.

The impressive outcome of the recycling program in 2007 is listed in the table below (Kenney, 2008):

<b>Subaru's Reverse Supply Chain</b>	
<b>In 2007 alone, one Subaru plant recycled:</b>	<b>Thereby conserving:</b>
13,142 tons of steel	29,200 mature trees
1,448 tons of cardboard and paper	670,000 gallons of oil
194 tons of various plastics and foams	34,700 gallons of gasoline
20 tons of pop cans and bottles	10,136,000 gallons of water
10 tons of solvent-soaked rags	53,116,000 Kwh of electricity
4 tons of light bulbs	34,500 cubic yards of landfill airspace

Since 2000, SIA has reduced the amount of waste per vehicle produced by 46%. In 2008, the results were extraordinary with 17,907 tons of scrap steel, 1,363 tons of cardboard and paper, and 864 tons of wood recycled. This is equivalent to saving 27,500 mature trees, 69,873,000 kilowatt-hours of electricity conserved, 43,600 cubic yards of landfill airspace not used, 631,000 gallons of oil saved, 32,700 gallons of gasoline not consumed, and 9,541,000 gallons of water conserved. Furthermore, SIA's Engine Shop singlehandedly returned 2,122 tons of reusable packaging to vendors and suppliers (Subaru of Indiana Automotive Inc., 2009).

## HOW TO REDUCE

The 3R's are becoming a staple in the operations of many industries. When implementing environmental practices, companies must first learn where to start. Which of the 3R's is the starting point? The answer: Reduce. Reduction is the most cost efficient method companies can implement. Denise Coogan, Manager of Safety & Environmental Compliance at Subaru of Indiana (2010) suggests that if you can reduce "you'll save the most money. If you're not paying to have it delivered, you're not paying to have it handled while it's here, and you're not paying to have it taken away. Therefore, reduction is the best way to go."

### Discussion Topics

- **After watching Subaru's video on Reduction, what are some of the ways you noticed the company Reduces?**
- **What types of materials were reduced? Give specific examples?**
- **Why is Reduce the best starting point for organizations?**

Some ideas for reducing in the office area may include reducing mailing lists and going to electronic sources, making employee data accessible online, or even using recyclable/ recycled materials (The Eco-Efficiency Centre, 2009). In terms of production the company can look to use durable materials that can be shipped numerous times rather than buying new each time, which means more reduction in landfill wastes (*Reuse*, 2010). The company can also look to use less packing materials, in the case of Subaru, the company reduced the amount of cardboard used for vehicle part storage by 1/6<sup>th</sup> (*Reduce*, 2010). Finally one last area companies may want to pay close attention to in terms of reduction is energy consumption. By replacing old lights and implementing sensors companies can reduce their energy impact (The Eco-Efficiency Centre, 2009). Once reduction is maximized the company will then be able to see where reusing items

and recycling fit into the overall scheme of 3R implementation.

## **HOW TO REUSE**

Reuse is the second solid waste priority after reduction. Subaru took up the challenge to reuse all indirect materials, turning to recycling only as a last resort. Using the dumpster diving technique, they formulated a list based on weight. Steel, carrying the most weight, topped the list followed by cardboard, pallets, styrofoam, plastics, and plastic caps.

### **Discussion Topics**

- **After watching Subaru's video on Reuse, what are some of the ways you noticed the company reuses materials?**
- **Which materials are reused?**

Approximately, 85% of the pallets generated are reused, so vendors do not have to buy costly pallets as frequently as before. At Subaru, styrofoam and plastic carriers that suspend and protect camshafts during shipment are reused. Their goal is to reuse their camshaft carriers a minimum of five times before recycling them. After the camshaft is fitted on to one of their horizontally opposed 4 – cylinder engines, they place the camshaft carrier, along with other forms of packaging on trailers that are returned to suppliers. Metal crates, plastic tubs, engine valve, styrofoam and plastics from throughout the manufacturing facility are all returned to suppliers. In 2008, SIA's Engine Shop alone returned 2,122 tons of reusable packaging to vendors and suppliers. Careful inspections are done in Japan to make sure that there are no risks of contamination from reusing the package materials.

Furthermore, Subaru reused oil and was the first plant to have a system in place to replace excess solvents. They had a 79% reduction in waste discharged from the solvent recovery system and 6,000-gallon annual reduction in waste discharged from oil purification.

## HOW TO RECYCLE

After the organization has taken measures to reduce and reuse as much material as possible, the next step is to recycle those remaining materials.

### Discussion Topics

- **After watching Subaru's video on Recycling, what are some of the materials you noticed the company recycles?**
- **Are there any additional materials you think they might be able to recycle that are currently being disposed of as waste?**
- **What difficulties are associated with beginning a recycling program?**

The following steps will aid in implementing a recycling program:

- Determine what items will be recycled
- Locate markets for the recyclable materials
- Design a collection and storage system for the materials
- Introduce the new system to employees and develop incentives to encourage their participation.
- Develop recycling goals for the organization that are tangible and measure these goals.

Examples of recyclable materials include: cardboard, paper, cans, periodicals, glass, steel, debris, food waste, kitchen fats and oils and plastic. The key to a successful recycling program is to make it as easy to recycle, as it is to throw items away.

## LESSONS FROM SUBARU'S GREEN INITIATIVES

*1. Profits come from increasing efficiency and reducing waste- but they don't necessarily come right way.* Several of SIA's early green initiatives delivered quick paybacks and did not require much effort (i.e. dimming assembly-line lights automatically once the workers went on

break, plugging leaks in compressed-air lines, or recycling various materials). However, redesigning entire processes took more effort. For example, recycling was expanded to incorporate returning packaging materials to supplier for reuse. This saved Subaru and its suppliers money, however it required both parties to make considerable changes in operations (Robinson & Schroeder, 2009).

Sometimes, there is an increase in the costs when first initiating the green projects. The factory's current practice of having the trash incinerated as fuel at an energy plant close by is more expensive than having the trash taken away to a dump. Despite this, Subaru officials make an effort to reassess each process in order to meet the green goals in the most cost effective manner. Due to constant re-evaluation, many of the changes with higher up front costs gradually led to savings or break-even point. To achieve zero-landfill, Subaru determined how it disposed of a toxic solvent that was used to flush painting systems between color changes. Initially, the used solvent was shipped off to a site for specialized and expensive disposal. Today, an in-house distilling process is used to eradicate impurities from the used solvent, which makes it reusable. Therefore, solvent consumption was reduced from four to six tankers per week to one tanker-truckload every three months. The impurities that are formed are sent away to a company that utilizes the residue to form coating material for ladles in the steel industry. Although Subaru pays additional costs to the company to take care of the impurities, it expects the solvent operation to break even in close to five years when weighed against its savings in solvent costs (Robinson & Schroeder, 2009).

Another case involved a sequence of process redesigns initially increased costs, but eventually produced lower costs, less waste and higher quality work. The factory used to weld its steel auto frames in such a way that produced sparks, resulting in scrap known as slag. Subaru

discovered a company in Spain that wanted to utilize slag for the base metals it contained, therefore, it started shipping the substance and paying the company. Consequently, Subaru increased costs to reduce its environmental impact. This gave plant incentive to create a new welding process producing fewer sparks, less sag, lower electricity and materials cost. Its consumption of copper welding tips decreased 75% and Subaru shipped only a small amount of slag to Spain (Robinson & Schroeder, 2009).

*2. Management's leadership is crucial in setting goals and getting departments to cooperate.* Management needs to define goals for reducing environmental impact, and convince everyone involved that green initiatives are just as important as metrics on productivity, quality and safety. In the 1990s, managers at Subaru of Indiana decided to adopt internationally recognized standards for measuring and managing global impact. These Geneva-based International Organization for Standardization standards helped companies figure out from top to bottom how much waste is being produced and the improvements that can be made. Collaboration among departments is crucial. A worker in engine assembly at the Subaru plant gave the idea to return packaging material to a supplier for reuse. This required the collaboration of engineers, suppliers, transportation, logistics and accounting in order to progress to the next stage (Robinson & Schroeder, 2009).

*3. The front lines have to be engaged.* Front-line workers are well positioned to generate ways to reduce, reuse and recycle. Subaru incorporated the 3 R's into the worker training, as well as developing a system of think referred to as "waste hierarchy." This is a ranking of potential environment actions in increasing order to environmental benefits:

1. To burn material for energy is better than sending the material to a landfill.
2. To recycle is better than burning the material.

3. To reuse material is better than recycling the material.
4. To reduce the amount needed is better than reusing the material.
5. To eliminate the need for material is better than reducing (Robinson & Schroeder, 2009).

One of the methods teams used to notice opportunities was dumpster diving, which involves spilling the contents of the dumpsters onto the floor, then sorting and categorizing the material by source and type. If the goal was zero-landfill, then everything that was being put into the dumpsters had to be reduced, reused or recycled (Robinson & Schroeder, 2009).

*4. Green initiatives achieve lots more when companies involve their suppliers.* In order to fulfill its green goals, Subaru of Indiana created major criterion for choosing suppliers. Its steel suppliers cooperated with the factory and provided rolls of steel that precisely fit the needed widths and lengths. Since 2000, this strategy has helped the plant reduce steel scrap by more than 100 pounds per vehicle. A Japanese supplier delivers the plant engine parts in Styrofoam blocks contoured containers. Initially, the Styrofoam blocks remained in Indiana and were recycled. Now, the Styrofoam is sent back with packing containers to be reused. In total, 80 kinds of plastic cups, metal clips, cardboard spacers, and other packing materials are sent back to Japan. The suppliers then determine whether the materials are reusable (Robinson & Schroeder, 2009).

*5. All wastes are potential products.* In a manufacturing process, everything has a potential raw material for another process. Subaru discovered companies that would utilize its solvent residue and slag. Moreover, its cafeteria waste is sent to a waste-to-energy plant in Indianapolis that burns the material. Subaru does pay these companies to take the materials away, but once again Subaru is determining a way to turn its food waste into a cost effective product (i.e. industrial-scale composting). Also, the plant is planning on installing a small

hydroelectric generator to tap the huge amounts of energy in the 10,000 gallons per minute of falling water in the factory's spray painting operation (Robinson & Schroeder, 2009).

6. *Green leadership creates competitive advantages.* Green initiatives give companies the opportunity to study operations and material flows from a new perspective. As a result, the innovations give companies competitive advantages. The savings realized by simple steps extend beyond elimination of scrap. Subaru claims to have saved millions of dollars by merging the green perspective with in-dept studies of its processes, suppliers, and equipment. Their largest savings have been achieved in reducing waste by revising processes, conserving energy, and working with suppliers (in that order). If the government and the market put pressure on companies to improve their environmental performance, then Subaru of Indiana would have a competitive edge (Robinson Schroeder, 2009).

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## Session II

### LESSON III: IMPLEMENTING A WASTE REDUCTION AND RECYCLING PROGRAM

Once an organization has made the decision to create, adopt and implement a company environmental policy aimed at reducing their negative environmental impact, it must develop and implement a comprehensive waste reduction and recycling program. There are nine basic steps to follow when planning and implementing the program:

1. Engage the support of Upper Level Management
2. Organize a *Green Team*
3. Conduct a Waste Assessment
4. Establish Waste Reduction goals
5. Secure Recycling Markets
6. Set up a Collection and Storage System
7. Purchase Recycled Goods
8. Train Staff and Promote the Program
9. Measure and Evaluate Procedures and Progress

Each of these steps is discussed in further detail below.

**1. Engage the support of Upper level Management.** In order for a waste reduction and recycling program to be successful and widely accepted throughout the company, it must have the support of and commitment from upper management. When a program is fully supported by the top, employees will follow. These programs will also require financial investments in order to obtain the necessary energy efficient machinery and equipment among other things. Once management and investors understand the long-term benefits and profits impacting the bottom line, their support will follow

2. **Organize a Green Team.** A green team should be comprised of representatives from each work area within the organization and should have designated coordinator. The team will be responsible for the planning and execution of the program from inception through implementation. The team will also be responsible for the efforts of continuous improvement throughout the life of the company. The duty of the recycle coordinator is to oversee the program. Too often recycling responsibilities divided among several individuals cause a disjointed program with low recycling rates. A recycling coordinator is responsible for the entire program, including overseeing implementation and monitoring operations.
3. **Conduct a Waste Assessment.** A waste assessment provides a baseline to measure the programs in the future. Next you should identify types and sources of waste. This can do this by performing a waste assessment prior to developing a recycling plan. The most comprehensive and resource intensive waste audit is conducted through a “Dumpster Dive”. A dumpster dive serves to determine what is being thrown away. After a successful dumpster dive the organization should be able to answer the following questions: Exactly what is being thrown away? How can this material be categorized? What materials are reusable or recyclable? What type of waste is generated from each department of the organization? How much waste does each area generate? What are the waste-related costs for trash and recycling containers, hauling, disposal, recycling and labor?
4. **Establish Waste Reduction Goals.** After the contents of the waste audit have been identified, organized and classified, the next step is to determine what waste can be reused or recycled. Then tangible goals need to be set over a specified period of time which will aid the organization at reaching these goals.

5. **Secure Recycling Markets.** Next the organization must assess current waste collection contracts and find agencies for those recyclable items for which no current contract exists. Before accepting a waste collection contract be sure to ask many questions including:
- a) Who provides the transportation?
  - b) What is the schedule of collection?
  - c) What are the maximum allowable contaminant levels and what is the procedure for dealing with rejected loads?
  - d) Where will the waste be weighed?
  - e) Who will provide containers for the recyclables?
6. **Set up a Collection and Storage System.** Determine how to integrate the separation and collection of recyclables and waste into normal work procedures. For instance, replace garbage cans throughout the organization with recycle bins to aid with sorting of these items as well as to reduce overall waste.
7. **Purchase Recycled Goods.** Buying goods made from recycled products enhances a company's eco-friendly initiatives. By teaming with vendors who offer products made from recycled products, the organization will save time and money throughout the program as fewer hazardous or non-recyclable products will be entering the facility at all. This helps avoid the need to reduce anything to waste and apply it to the natural environment.
8. **Train Staff and Promote the Program.** Develop a plan to educate your employees and customers. When educating employees and customers on the new plan, the education must begin as soon as the plan is developed for employees. For a successful, long-term recycling program continual education is necessary. Educating employees and customers about the benefits of recycling reinforces the practice. Education can begin by simply placing

informational signs on or near bins explaining why recycling is important. (United States Environmental Agency, 2010) As part of this process it is also important to recognize those employees who contribute to the program's success through useful recommendations and ideas that have a significant impact and generate large savings.

**9. *Measure and Evaluate Procedures and Progress.*** In order to accurately measure the success and effectiveness of a program, proper monitoring and evaluation procedures must be in place; however these procedures must be accompanied by some degree of flexibility to respond to the ever changing needs of the facility, changes in state and local regulations, recycling costs and the incorporation of new technology.

#### **Break Out Session**

Now that you have familiarized yourself with the 3 R's of Recycling and have some background information, Brainstorm the following issues in your small group:

1. What is your organization's current environmental policy and plan?
2. How can the plan mentioned in question 1 be improved?
3. What can your team or department do to further Reduce? Reuse? Recycle?

## SESSION II: REFERENCES

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## Resources Information/links to PDF/Websites

**Copenhagen Accord**, 11a01.pdf from:

[http://unfccc.int/documentation/documents/advanced\\_search/items/3594.php?rec=j&prire=600005735#beg](http://unfccc.int/documentation/documents/advanced_search/items/3594.php?rec=j&prire=600005735#beg)

**GRI**, G3\_GuidelinesENU.zip from:

<http://www.globalreporting.org/ReportingFramework/ReportingFrameworkDownloads/>

**Kyoto Protocol**, kpeng.pdf from: [http://unfccc.int/kyoto\\_protocol/items/2830.php](http://unfccc.int/kyoto_protocol/items/2830.php)

**SEC Commission Guidance Regarding Disclosure Related to Climate Change**, 33-9106fr.pdf from: <http://www.sec.gov/rules/interp/2010/33-9106fr.pdf>

**Walmart**, WMT2010GlobalSustainabilityReport.pdf from:

<http://walmartstores.com/sustainability/7951.aspx>

**ISO 14000** (no pdf) website only: [http://www.iso.org/iso/iso\\_14000\\_essentials](http://www.iso.org/iso/iso_14000_essentials)

**BP** (no pdf) from Bloomberg.com: <http://www.bloomberg.com/news/2010-08-10/bp-gulf-oil-spill-lawsuits-to-be-consolidated-in-new-orleans-federal-court.html>

**Exxon Mobil** (no pdf) from The New York Times:

<http://www.nytimes.com/2009/10/20/science/earth/20exxon.html>

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