

**DRAFT****Draft Report  
Industrial/Construction & Demolition Subcommittee****I. Current and Emerging Issues**

The Industrial and Construction and Demolition (C&D) subgroup was tasked with determining the current status of recycling programs and efforts in industry and construction and demolition generation in the state of Iowa. The group was made up of a diverse professional population but there was not a strong presence of expertise in the group focus. Therefore, information was collected from several facilities in order to develop this section. Those interviewed were John Deere Des Moines Works in Ankeny, Iowa, Cardinal IG in Greenfield, Iowa, and Climax Molybdenum in Fort Madison, Iowa. In addition, an interview was also held with several representatives of the Homebuilders Association in Ankeny, Iowa. This information, in addition to knowledge of the subgroup members, is summarized in the appropriate sections below. In general, the industrial sector will be looked at separately from the C&D sector for this evaluation. It was also important in this evaluation to look at not just the populated sectors such as Des Moines and Cedar Rapids for feasibility but also the smaller communities throughout the state. The first priority is to cover the majority of the easy to target areas, regardless of population base.

Product stewardship is an area on which the subgroup was asked to comment. For the initial look at increasing recycling in the industrial and C&D areas, product stewardship was not strongly examined. However, there are groups currently working in this arena. It was presented at the Iowa Society of Solid Waste Operations (ISOSWO) monthly meeting in December 2009 to encourage solid waste agencies in the state to participate in the Product Stewardship Institute (PSI). The PSI, according to its website, is a national non-profit membership-based organization located in Boston, Massachusetts. PSI works with state and local government agencies to partner with manufacturers, retailers, environmental groups, federal agencies, and other key stakeholders to reduce the health and environmental impacts of consumer products. PSI takes a unique product stewardship approach to solving waste management problems by encouraging product design changes and mediating stakeholder dialogues. Currently, Metro Waste Authority in Des Moines and the Waste Commission of Scott County are members, as is the State of Iowa as a governmental entity. These entities are looking to form a partnership in the State to encourage additional agencies to participate and thereby increase recycling in the key areas noted. Please see the website (<http://www.productstewardship.us/index.cfm>) for more information.

**A. Industrial**

The current and emerging issues facing industry in regards to recycling fell into five main categories. These categories include education and awareness of existing programs, markets, environmental management systems, economics, and greenhouse gas.

**i. Education and Awareness of Existing Programs**

There are multiple programs already offered throughout the state to aid in development and sustainability of recycling programs. These programs include various business assistance programs in the solid waste/recycling industry, such as the Iowa Waste Exchange, the Iowa Department of Natural Resources (IDNR) Pollution Prevention Services, the Iowa Waste Reduction Center through the IDNR, and the Solid Waste Alternatives Program (SWAP) through the IDNR. It is possible that other public and private programs exist, but are unknown. The

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under utilization of known programs and the need for awareness among stakeholders is a current issue.

### ii. Markets

Iowa has been able to secure extremely strong markets for traditional recyclables (paper, plastic, and metal containers, glass, and scrap metals). Iowa is also a leader in organic waste disposal, thanks to its agricultural background. However, good markets have not developed for commercial composting of food waste.

The primary reason for Iowa's overall success in securing sustainable and reliable markets for our traditional recyclables is the quality of the recovered materials we have had processed by our "Iowa Recyclers". Iowa has always understood that the recovered recyclables are generally the new raw material for a remanufacturing facility. Which is the case with the IP-Cedar River Paper Company's use of old corrugated boxes to make new liner board and medium paper rolls, which then are made into boxes. Another is the Mid-America Recycling facility in Des Moines taking container glass from Iowans and preparing it for reprocessing into new glass bottles at manufactures throughout the Midwest.

Our quality has been a great advantage for Iowa Recyclers as they have been sought out by end users from throughout the United States, Mexico, Canada and Far East, thus enabling Iowa to be one of the leaders in recycling in the United States. The newest concern for Iowa Markets is logistics. Iowa has always had a difficult time due to its central location to supply the end-user: mills that have begun to relocate out of the rust belt and into the sun belt. Its great distance from sea container yards has also added to difficulties in reaching the overseas markets.

As the United States continues to lose manufacturing to overseas locations, Iowa will be faced with ever increasing challenges to the sustainability of markets, as logistics and cost of transportation continue to rise. Iowa was successful in weathering the move of manufacturing to Mexico through the use of rail. However, with rail being abandoned in Iowa, relocation or start-up of recycling facilities is becoming increasingly difficult. Factor in that Mexico is losing manufacturing business to China, the new challenge will be to find sea containers and the logistics to supply raw material to the burgeoning Asia markets. The markets for traditional recyclables exist but the value may be the only issue as transportation continues to reduce the margins for recyclers and end-users. In reality, recycling anything and everything is possible if someone is willing to pay. If markets are not readily available and encouraged, recycling can be quite expensive, often more so than depositing waste in to the local landfill. Developing end-user markets needs to be encouraged throughout the state of Iowa as economic development activities are considered. Recycling creates jobs, is a net energy conserver (the recovered material reduces energy consumption by the manufacture from 50-90%, depending on the commodity and process) and protects the environment by using less virgin natural resources.

### iii. Solid Waste Environmental Management Systems

Iowa is divided into multiple planning areas for the handling of the waste

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hierarchy, which are 1) waste reduction, 2) recycling and reuse, including composting, and 3) other approved technologies, including landfilling. Each county and city within the state must either have its own comprehensive planning area or must be a part of another, even if waste is going out of state. These planning areas are mandated to have a minimum 25% reduction of waste from a base year of 1988. Those that are not meeting at least a 25% reduction are subject to several ramifications, including paying an additional \$1.10 per ton of waste they receive to the IDNR. Currently, there are 22 facilities in the State that fall under the 25% reduction goal. Another 11 facilities are above the 25% reduction goal but below the statewide average of 36%. There are 10 facilities that are above statewide average and one facility that is above 50%. However, the calculation is complicated and nebulous and does not take many factors into account. As a result of the complications with this calculation, legislation recently mandated an alternative evaluation of solid waste planning areas' success in waste reduction. A new pilot program will give opportunities to six solid waste planning areas to expand the scope of their programs. The pilot project is called the Environmental Management System Designation Program (EMS), established by the 2008 Legislature. The entities selected for this program are the Rathbun Area Solid Waste Commission, Cass County Environmental Control Agency, Metro Waste Authority, Cedar Rapids/Linn County Solid Waste Agency, Waste Commission of Scott County, and Dubuque Metropolitan Area Solid Waste Agency. With EMS, planning areas will be focused in order to improve the environment including: yard waste management, hazardous household waste collection, water quality improvement, greenhouse gas reduction, recycling services, and environmental education. Under the EMS Designation Program, a planning area will be evaluated by the progress of their services rather than exclusively by Iowa's other solid waste diversion goals. Initially, the areas of the six selected pilot projects will be challenged with increasing and improving programs offered in the six noted areas. However, it is anticipated that after the pilot project additional planning areas within the state will follow suit.

iv. Economics

The key to successful reduction of waste and recycling is finding sustainable end-use manufactures who use the recovered material as raw material to create a new product. This was discussed above in section ii. Markets.

It is critical that recycling collectors, processors (traditional processors like Mid America or City Carton), secondary processors (who take a recyclable and add value to it such as glass enhancement or plastic flaking), have a strong long-term business plan. Great ideas without business plans beyond a grant period or initial loan period have difficulty sustaining business. With strong business plans the economics of the dynamics of recyclable markets vs. virgin markets will be seen. As in any business COST is the critical component to success. Recyclables are competing against virgin products to be used as raw materials in the manufacturing process. An example is container glass; it competes with the cost of SAND. With the energy savings recovered glass provides the bottle manufacture with (secondary processed glass containers) have a value. The value is significant enough to currently cover the collection and processing cost for recycling. With energy becoming an increasing cost to manufacturing, we will see the economics of recycling improve as manufacturers gain 50-90% in

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energy savings using recovered material and releasing the recoverable energy recyclables have stored from their original manufacturing process. Recyclables are an untapped source of energy and will be valued (paper, glass, and aluminum have already begun to show this value in pricing) for their energy savings vs. their greenness in disposal reduction.

The true value of recycling for any generating manufacturer is the cost savings they will gain from recycling/reducing their waste. If there is no value, be it hard dollars or intrinsic value/soft dollars, there is no incentive for the generating manufacturer to recycle. The business exists to make widgets so the cost of manufacturing vs. the sales price is what drives manufacturers' decisions. Recycling laws cannot give competitive advantages to out of state manufacturers by encumbering Iowa firms with special costs. An example of a law that did not interfere with competitiveness is the Iowa Deposit Law where all Distributors of carbonated beverages in Iowa and grocery stores were treated equally. (Both parties above feel they were placed at a competitive disadvantage but the reality is if you distribute or sell in Iowa you follow the same rules). Whereas a regulation relating to handling process water from manufacturing that is much stronger or costly than the national laws may discourage a manufacturer from locating in Iowa or remaining here so economic impacts need to be considered as rules and regulations are developed.

The true competitor of recycling is the landfill, as it is generally less expensive to throw away recyclables than to handle and prepare them for recycling. Going forward, higher costs of transportation, logistical loss of rail, and availability of sea containers will potentially make this a greater issue than it is today. Businesses like to say they are in business to make products not recycle; which is true in our country's economic model. Recycling must add value, be it lower disposal cost or a soft dollar return in consumer acceptance of a greener company/product vs. the lowest cost product.

v. Greenhouse Gas

How solid waste is managed has direct and indirect impacts on the production or mitigation of greenhouse gases. The disposal of solid waste produces greenhouse gas emissions in a number of ways. The anaerobic decomposition of waste in landfills produces methane, a greenhouse gas 21 times more potent than carbon dioxide. In addition, the transportation of waste to disposal sites produces greenhouse gas emissions from the combustion of the fuel used in the equipment. Finally, the disposal of materials indicates that they are being replaced by new products. This production often requires the use of fossil fuels to obtain raw materials and manufacture the items. Recycling materials reduces greenhouse gas emissions. The US Environmental Protection Agency estimates that current national recycling efforts, 32 percent recycling in 2005, yield annual greenhouse gas emission reductions of 49.9 million metric tons of carbon equivalent (MTCE), compared to landfilling/combusting the same material. This is equivalent to removing over 39.6 million cars from the road. By recycling all of its office paper waste for one year, an office building of 7,000 workers could reduce greenhouse gas emissions by 546 MTCE, when compared to landfilling. This is the equivalent to taking nearly 400 cars off the road that year. If an average family of four were to recycle all of its mixed plastic waste, nearly 340

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pounds of carbon equivalent emissions could be reduced each year. As the state develops greenhouse gas mitigation strategies the implications from solid waste management activities need to be considered and appropriately incorporated into the overall plan.

### **B. Construction & Demolition**

The current and emerging issues facing construction and demolition in regards to recycling falls into three main categories. These categories include the division of new construction, renovation, and demolition, the generation of C&D waste, and the processing of C&D waste.

#### **i. Division of New Construction, Renovation, Deconstruction, and Demolition**

According to the United States Environmental Protection Agency (USEPA), C&D is a large and varied waste stream that includes concrete, asphalt, wood, gypsum, and asphalt shingles generated from the construction, renovation, and demolition of buildings, roads, bridges, and dams. (EPA-530-K-04-005). The reduction of C&D waste has several benefits, most of which involve saving resources, whether the resource is landfill capacity or natural resources in creating new materials.

It is important to recognize the differences of waste or potential recycling material from new construction, renovation, deconstruction, and demolition projects, as they hold different characteristics and require different handling procedures. Many of the items in these categories will overlap; however, they appear in the waste stream at different parts of the process. Understanding the differences allows for a successful management plan for jobsites where these materials can be collected.

Construction waste consists mainly of lumber and manufactured wood products, 35 percent; drywall, 15 percent; masonry materials, 12 percent; and cardboard 10 percent with the remainder being composed of a mix of roofing materials, metals, plaster, plastics, foam, insulation, textiles, glass and packaging according to the Nebraska Energy Office's Construction Waste Minimizations Methods factsheet.

Renovation projects will tend to generate appliances, masonry, doors, windows, shelving, cabinets, drywall, and porcelain. These materials are also typically found in deconstruction projects. Perhaps the most important distinction to make is that between deconstruction and demolition. According to Wikipedia, in the context of physical construction, deconstruction is the "selective dismantlement of building components, specifically for re-use, recycling, and waste management. It differs from demolition where a site is cleared of its building by the most expedient means and has also been defined as 'construction in reverse'". (Deconstruction (building)). Wikipedia goes on to state that buildings, like everything, have a life-cycle.

"Deconstruction focuses on giving the materials within a building a new life once the building as a whole can no longer continue. When buildings reach the end of their useful life, they are typically demolished and hauled to landfills. Building implosions or 'wrecking-ball' style demolitions are relatively inexpensive and offer a quick method of clearing sites for new structures. On the other hand, these methods create substantial amounts of waste. Components within old buildings may still

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be valuable, sometimes more valuable than at the time the building was constructed. Deconstruction is a method of harvesting what is commonly considered “waste” and reclaiming it into useful building material (Deconstruction (building)).”

### ii. Generation

#### a. Education

Construction and demolition recycling and reuse in Iowa does not appear to be a well developed market with readily available programs and contractors. However, programs do exist. Trade associations such as Master Builders of Iowa are continually offering training and information on Green Building and certifications. Associated General Contractors of America provides information both on how to recycle materials generated at jobsites and how to use recycled materials for new construction. The IDNR has a portion of their website dedicated to C&D recycling information and a list of Iowa Construction and Demolition Management Resources. Included in the resources are a number of ReStores, where material from renovation and demolition projects can be taken and resold – or purchased for other projects at lower costs. The programs available and advantages to recycling should be promoted to the builders and contractors throughout the State to further educate the stakeholders on the benefits of recycling and reuse.

#### b. Single Stream vs. Sorting

Curbside recycling is a common practice, both in metropolitan areas like Des Moines and rural areas throughout the State. News was recently made in Des Moines when they changed from a curbside sorting system to single stream where household recycling is now collected in a single cart, which is collected in to a single haul vehicle, and then sorted at a facility. A similar debate exists for recycling at construction sites. Is it more economical to collect all the recyclable/reusable material in one container and then to sort it at a processing facility or is it better to provide multiple containers at a site to have materials separated as they are generated? Interviews with the Homebuilders Association have pointed out several reasons they emphasize the need for single stream recycling. Among them are the cost of multiple containers and hauls, the limited space often found on jobsites, and the challenge in educating the workers at the job site to use and comply with the source separated bins.

#### c. Builder/Contractor Buy-In

The success of any program heavily relies on the buy-in of the stakeholders. In the realm of C&D recycling and reuse, builders and contractors are large stakeholders. From the interviews with the Homebuilders Association, these stakeholders have already experienced governmental mandates that have made their jobs difficult, if not impossible to perform. An example was given in terms of the National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Plans (SWPPPs). The Homebuilders Association stated that the IDNR mandated they follow these regulations and then left it to the cities to enforce them. The developer is required to provide the concrete washout. At one site, the developer did not comply, so each builder had to do a SWPPP, best management practices, etc. to meet the regulations. Due to space constraints at the site, room was not available for

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the areas required to meet the regulations. The contractors were not sure what to do when city rules, in that case, made it impossible to pour concrete – with no place to put the waste. Increasing the recycling and reuse numbers within the State is a positive step but it must be done in a way that encourages and promotes builder/contractor buy-in and does not make it more difficult for them to do their jobs and earn a living.

d. Green Building/LEED Certifications

According to their website

(<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988>), LEED is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies aimed at improving performance across all the metrics that matter most: energy savings, water efficiency, CO<sub>2</sub> emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts. In this day and age, being “green” is a new way of life for many people who want to do their part in preserving and protecting the environment and natural resources. Review of the United States Green Building Council’s certified project list and registered project list shows a number of sites in the Des Moines area. Searches for other populated cities in Iowa also returned projects in Cedar Rapids, Dubuque, Ames, Council Bluffs, and Davenport. Smaller populations (Burlington, Greenfield, Carroll, and Ottumwa) did not have any returns under the registered project list. However, as the momentum gathers for the LEED certification, the presence of this program will increase throughout the State. The availability of valid programs to assist owners and contractors in the Materials and Resources division will be essential.

iii. Processing

a. Capital Costs

The start up costs and operation of a C&D processing facility are not insignificant. Typical facilities require plenty of space for sorting, processing, and storage of the materials as they are sorted, processed, and held for transport. Processing lines are mechanical or hand picked, and often a combination of both. Facilities also need to have some flexibility to handle new or changing markets. Investors and operators may be difficult to find with the troubled history of these facilities in Des Moines over the last ten years and the status of the markets, as discussed below.

b. Markets

As with any recycling program, a material can not be designated as recycled unless there is another viable end-use for the product. Markets were discussed above under the industrial sector. Materials generated in construction, renovation, and demolition are different from those generated in the industrial, commercial, and residential areas. These materials include lumber, manufactured wood products, drywall, masonry, cardboard, packaging, plastic, foam, insulation, concrete, shingles, and porcelain, just to name a few. Several of these materials have known markets within Iowa. However, a number of the markets are yet to be developed. The shingle recycling market will be discussed further in this paper. It is gradually becoming a success story in taking a material that was recently disposed of in

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the landfills and is now finding a beneficial recycling market. There is still much work to be done on markets for shingles and other materials to create viable sustainable markets within the State.

- c. **Leadership in Energy and Environmental Design (LEED) Points**  
Many owners, architects, and builders are looking to obtain LEED ratings for projects they are involved in. One of the areas that points are available in is Materials and Resources. Items such as building reuse, construction waste management, recycled content, and the use of regional materials add to the points available. When projects are obtaining points for these items, it is essential for the integrity of the LEED system that programs are actually meeting the intent of the certification. For example, multiple C&D processing facilities have been in place in the Des Moines area. Local builders have brought their waste to these facilities in order to achieve LEED points. However, due to several factors, the material has not been recycled or reused in a correct manner which has led projects to obtain LEED points when they should not have. It is essential when facilities are stating recycling and reuse for materials that this is happening and the materials are not ending up in a stock pile or buried for citizens to have to take care of once these unsuccessful businesses fold. It is vital that the correct processing methods are in place and that there is a valid end-use for their recycled material.
- d. **Fines**  
Fines are a byproduct that is generated when C&D waste is processed. There is generally not a strong end market for this material. Within the State, several facilities have attempted to use the fines as alternative daily cover (ADC) for landfills, which are required to place a six inch layer or another approved material on a daily basis over the exposed waste placed that day. Metro Waste Authority, in Des Moines, had set forth testing criteria for the fines to meet in order for them to be accepted as ADC. Otherwise, the material would be accepted as waste. The two C&D processing facilities in operation at that time were not able to meet the criteria to use the fines for ADC. Therefore, the material had to be disposed of, rather than used as ADC. This had a significant impact on the C&D processing facility's bottom line as disposal was a higher cost. In addition, an odor problem developed at the Metro Park East Landfill as a result of the ground gypsum board in the fines. When ground gypsum board is exposed to liquid, the chemical reaction releases hydrogen sulfide gas. Material being utilized as ADC is going to be stored outside and exposed to elements under most conditions. Therefore, the gypsum content in fines needs to be taken into account when finding end uses. Facilities need to take in to account finding viable end markets for fines or plan for the disposal cost when deciding to operate.

## **II. Existing programs (Enhancements and continuous improvement)**

As previously noted, several industries were interviewed to determine the existing programs within the state. These industries include John Deere Des Moines Works in Ankeny, Iowa, Cardinal IG in Greenfield, Iowa, and Climax Molybdenum in Fort Madison, Iowa. In addition, an interview was also held with several representatives of the Homebuilders Association in Ankeny, Iowa. The results of those interviews in addition to several other programs are discussed below.

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### A. Industrial

Based on the interviews conducted, industry in the state is already active in the recycling arena. Several of the existing program case studies are noted below.

#### i. John Deere Des Moines Works

A tour was conducted of several of John Deere Des Moines Works buildings showing the manufacturing process. A John Deere representative provided the narrative during the tour explaining the activities as the tour progressed, what was being produced, and what the next step was. The main items generated at this plant are cotton pickers, when in demand, and high clearance sprayers.

Following the tour, discussion was led by a John Deere representative in regards to John Deere Des Moines Works recycling initiatives. The Des Moines Works formed a recycling team to look at operations and determine the high impact items that could be recycled or items that could be eliminated so less waste was generated. The initial effort impacted six waste streams and implementation of this program was very successful. Key points noted by the John Deere representative included:

- Segregating waste
- Ease of use on workers
- Provide audits and feedback to team leaders
- Results published
- Identifying champions of the recycling programs

The John Deere representative also indicated that John Deere Des Moines Works is in the process of looking for ways to reduce greenhouse gases. The task force committee asked if it was driven by economics or a desire for John Deere to be good citizens. The John Deere representative stated that John Deere does not want to just operate in compliance; they want to go to the right of green. The John Deere name has a lot of meaning in public and they want to promote a positive image, green, and in compliance. As such, John Deere conducts Category 4 audits of the vendors that deal with their waste and have asked suppliers to be partners in John Deere's initiatives. They have seen good results so far.

The current recycling programs seen throughout the facility were hitting the streams with a ready market that would make the biggest impact. There are, however, additional streams that could be targeted but they did not have known markets. The task force committee raised the question of what was hindering John Deere from doing more. The primary factor was economics. Besides economics, three other points were noted that affect recycling:

- Lack of information regarding available programs
- Status of Iowa's RCRA C approval.
- Lack of a vehicle to provide list of certified vendors.

Further information on each of these items is discussed below.

Lack of information has lead to one recycle stream in particular to not be processed. The knowledge of the task force committee determined that there was indeed potential for that stream. It was then discussed on how to best get that information

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out to industry in Iowa. The John Deere representative noted that his area of operations experienced frequent turnover, so all knowledge was not always passed on. The John Deere representative suggested an effort of letting industry know what is available for recycling programs on a three to four year cycle and not assuming that facilities know what programs are currently in operation.

The task force committee asked the John Deere representative if John Deere could quantify their waste reduction. The John Deere representative gave the example of the amount of hazardous waste that was reduced. However, he noted that due to regulations they were required to haul off hazardous waste that they could easily handle at their facility. He asked the task force committee if the state would consider becoming RCRA C approved. It was noted that Iowa is one of two states that are not approved to enforce hazardous waste rules. When stakeholders were asked, they stated they did not want Iowa to enforce those regulations. It was noted that Metro Waste Authority (the local planning authority) could send a representative to help John Deere with hazardous waste issues.

The task force committee asked the John Deere representative with the years of knowledge that he has what would he like to see the governor do to help. The John Deere representative noted that vendors with proven track records of reputable markets for less common items were a challenge. The task force committee suggested a vehicle to provide industry with a list of certified vendors. A certification by the IDNR was suggested with vendors being able to volunteer to participate. The task force committee noted that the Iowa Recycling Association (IRA) had discussed a program where companies could receive a green label. This could be done as a joint venture between IRA and the Iowa Society of Solid Waste Operations (ISOSWO) and be posted on the IDNR website.

The John Deere representative requested that the task force committee stay focused on economics to create sustainability. The task force committee asked that the John Deere representative discuss the recycling concept with the John Deere corporate and follow up with the task force committee on further ideas of how the committee can help to create sustainable recycling programs within industry.

### ii. Cardinal IG

Cardinal Glass Industries is a management-owned S-Corporation leading the industry in the development of residential glass for windows and doors. They have grown to more than 5,500 employees located at 27 manufacturing locations around the United States.

Cardinal tries to maintain a clear vision: design and fabricate the most advanced residential glass products in the industry. The Greenfield, Iowa facility manufactures insulating glass.

Cardinal IG has done a great job of getting a superior waste reduction percentage but has currently hit the economic threshold. The cost of landfilling is cheaper than going to the next level of recovery. The capital involved to make improvements for the next step is significant enough to keep them looking to the landfill. Cardinal IG does recycle glass (windows go to their own company glass furnaces in Oklahoma or Wisconsin to re-melt). Metal scrap is recovered by a local business.

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Waste generated at the Cardinal IG facility is approximately 200 tons per year, with the recycled material accounting for approximately 9,100 tons per year. Cardinal IG noted that of the 200 tons currently landfilled, 100 tons is a glass that is too large to safely handle in their glass recycling system as the system handles the standard window sizes. The oversize windows do not safely fit into the system. Cardinal IG would like to recover and recycle this glass and cut their current trash by another 50% , which would take additional capital and with current landfilling rates they do not feel it would be a good return on investment. Cardinal IG would also like to improve their efficiencies, potentially by adding one or two additional staff, in handling the recyclables better, as a significant percentage of the material is placed into the wrong collection container and thus goes to the landfill.

Cardinal IG felt a tax credit for hitting certain recycling goals would give them the incentive to spend capital on the next step of recycling versus using the landfill. The tax incentive would also help them update their truck fleet as they currently have to deliver the glass themselves to the Oklahoma and Wisconsin plants. If the market price stays low, freight prices climb and they would almost be forced to look at landfilling of glass as an economic alternative in the future if there is no incentive to invest in recycling.

Cardinal IG likes the idea of a state standard such as zero waste or something that can be measured easily and audited by the state. They also supported the green licensing of recycling vendors so they could easily see who is a viable vendor.

iii. Business Assistance Programs

a. **Iowa Waste Exchange**

The Iowa Waste Exchange (IWE), a program administered by IDNR, is one of the nation's premier materials exchange programs. There is a booming market for byproducts and wastes produced by Iowa institutions and businesses. Since 1990 the Iowa Waste Exchange has matched over 2.6 million tons, keeping waste out of landfills and into the economy, saving Iowans \$59.6 million by diverting this waste into production and use. The IWE is designed to keep waste out of the landfills and in production. Many industry, business, and even local governments dispose of items others can use. The IWE representatives are available to help anyone who is looking for a specific item or has items they are willing to give away. The program is easily accessible through contacting the local IWE representative, utilizing the IWE database, and/or utilizing the "hot" list. The IWE maintains a database of available and wanted materials that is free to access. With over 13,000 materials listed in the IWE database, there is a chance they have what others need. The IWE also maintains a hot list where entities can look to find materials that are difficult to match, or are time sensitive. The list changes every month and currently has items such as labels, folding solid panel dividers, and porcelain sinks.

b. **IDNR Pollution Prevention Services**

The IDNR Pollution Prevention Services work with organizations to provide access to an assortment of waste reduction assistance, technology transfer opportunities, case studies, vendor lists, technical conferences and workshops, and waste exchange services. Clients include business and industry, institutions,

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government agencies with more than 100 employees, Resource Conservation & Recovery Act (RCRA) Large Quantity Generators, and Toxics Release Inventory (TRI) reporting facilities. Services provided include the following items:

- Initial consultation
- Plant-wide or focused assessments
- Project and program evaluation
- Pollution prevention program
- Environmental Management Systems development assistance
- Source reduction alternatives
- Educational workshops and training
- Pollution Prevention Intern Program

The Pollution Prevention (P2) Intern Program is an available program deserving particular note. Interns with the Iowa Pollution Prevention Program experience a unique partnership of academia, industry, and government all working together toward environmental and economic goals. The IDNR implemented the P2 Intern Program as a collaborative effort between government, business, and academia to develop cost-effective options for preventing or minimizing waste from industrial processes. Top Iowa students share their talent, hard work, and fresh perspectives with companies and institutions dedicated to environmental excellence. In return, the students gain valuable training from experts in their fields and hands-on professional experience. All Iowans benefit from the lasting environmental impacts this partnership creates.

Since 2001, the implementation of P2 Intern recommendations has saved over 1 billion gallons of water, 117,475 tons of solid waste, 1.17 million gallons of hazardous waste, 83,640 tons of special waste, and over 258.6 million kilowatt hours and 16.5 million therms of electricity. Companies have cumulatively saved over \$58.6 million dollars by implementing these environmental improvements.

In 2009, 24 interns with the Pollution Prevention Intern Program implemented projects that improve the way Iowa businesses manufacture, consume, reuse, and recycle materials. Intern recommendations helped participating companies and facilities dramatically reduce solid and hazardous waste, conserve water, improve water quality, improve air quality, reduce energy usage, and reduce greenhouse gas emissions to the atmosphere. Projects implemented this year will save participating companies and institutions over \$1.2 million dollars annually.

For 2009, the program offered two circuit rider projects; thermal imaging in industrial facilities and source reduction in hospitals. These projects offer the opportunity to assess energy conservation measures and targeted waste streams that are common to specific processes and industries.

Typically, after one week of training, interns spend 11 weeks at the host facility. In 2008, two interns with the program undertook 24-week projects, finishing in November. Twenty-four week projects allow an intern to collect data over time, and evaluate a system through varying conditions. These extended internships allow more opportunity for the intern to begin implementation of the projects they have recommended. The host company benefits by having continuous

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oversight of initial stages of the implementation, while the intern gains additional hands-on experience and is able to see the project through to fruition.

### c. **Iowa Waste Reduction Center**

For over 20 years, the Iowa Waste Reduction Center (IWRC) has been providing expert environmental assistance to thousands of Iowa small businesses from all 99 counties. Services range from conducting an on-site review, assisting with environmental paperwork, or just answering questions. Specific services offered by the IWRC include on site review, Iowa Air Emissions Assistance Program, Spray Technique Analysis and Research for Defense, and IWRC Paint.

The core of the IWRC's free, confidential and non-regulatory service is the On Site Review (OSR) program. Through a tour of a facility, an IWRC specialist will be able to identify necessary information to obtain and maintain regulatory compliance, avoid penalties and fines, reduce material waste, and possibly save a business time and money.

The Iowa Air Emissions Assistance Program (IAEAP) assists Iowa small businesses with air emission regulations and permitting requirements. IAEAP experts are able to help throughout the entire process of determining the necessary paperwork to submitting the paperwork. The services provided are free, confidential and non-regulatory.

The Spray Technique Analysis and Research for Defense (STAR4D) training program meets the needs of military spray technicians and training instructors. The STAR4D painter training process is "hands on" training where spray technicians paint with new technologies and apply coatings that the painters use at their facilities.

IWRC Paint contains the products available for the painting and coatings industry including the LaserPaint and VirtualPaint. These are products have both proven to be beneficial in training by improving overall techniques and knowledge of spray application.

### d. **Solid Waste Alternatives Program**

The Solid Waste Alternatives Program (SWAP) works to reduce the amount of solid waste generated and landfilled in Iowa. Through a competitive process, financial assistance is available for a variety of projects, including source reduction, recycling, and education.

The program provides financial assistance in the form of forgivable loans, zero interest loans, and 3 percent interest loans. A 50 percent cost share is required through cash match and in-kind match. Projects are selected through a quarterly competitive process. Emphasis for selected projects is placed on tonnage avoided or reduced, sustainability, and ability to replicate. Any unit of local government, public or private group or individual is eligible to apply for program funds. Funds can be used for such items as:

- Waste reduction equipment and installation
- Recycling, collection, processing, or hauling equipment (including installation)

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- Development, printing and distribution of educational materials
- Planning and implementation of educational forums, workshops, etc.
- Purchase and installation of recycled content products
- Salaries directly related to implementation and operation of the project

Extra consideration is given to applications addressing large or hard-to-manage targeted waste streams. The current SWAP targeted waste streams include: Process or Supply Waste Reduction, Fiber Projects – New Diversion projects only, Plastics Projects – New Diversion projects only, Organic Waste – Industrial / Commercial / Institutional facility projects only, and Construction and Demolition (C&D) waste.

### **B. Construction & Demolition**

#### **i. Homebuilders Association**

The task force subgroup met with several representatives from the Homebuilders Association. Based on the exchange, there are currently not many, if any, recycling programs being successfully utilized in the C&D arena in Des Moines. Several of the current programs and barriers are discussed below.

The Homebuilders Association representatives (HBA representatives) stated that they viewed legislation as a barrier to recycling. They noted that a local waste hauler had tried last year to get legislation to increase C&D recycling amounts, looking to do pellets for fuel, but it did not go anywhere because the hauler would take market share from landfills so legislation was not passed. HBA representatives stated that now there is no place to take it. That reinforces the need for viable markets with stakeholder education on what is viable and what is not.

HBA representatives also noted that if it costs extra, people will not do it. Add-ons to cost mean that things will not get done; for example, insulation on exterior garage walls only costs \$20 but is not required so does not get done. Recycling and reuse at times may cost more than straight landfilling; therefore, through market development and creative ways (such as tax deductions for materials donated to ReStore shops), a profitable market must be developed to encourage stakeholder participation.

Another issue noted by HBA representatives was the space on job sites, previously noted. Often times there is not room for more than one dumpster, which does not allow room for source separating to occur. Expansion of current efforts would need to include a solution to where dumpsters can be placed in order to successfully collect single stream or source separated materials from job sites. Once the container issue is resolved, there is the issue of control of sorting on-site and the ongoing issue of weekend dumpster users.

HBA representatives noted that education is going to be key. There are no major players in the building industry so communicating information to many small entities is a necessity. This can be accomplished through industry trade organizations.

Task force representatives stated part of our recommendation is to create another task force to focus on C&D with more industry players in place.

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- ii. Iowa Department of Transportation Shingle Recycling Projects  
Asphalt shingle recycling has made great strides in the last decade. Significant research has been done in multiple states and strong efforts are being put forth to share this information. The website [shinglerecycling.org](http://shinglerecycling.org) provides information on what each state is doing for these efforts, lists the states that allow a certain percentage of recycled asphalt shingles (RAS) to be used in hot mix asphalt (HMA) pavement, and provides information on the markets, economics, environmental regulations, worker health and safety, and current research that is being conducted. They recently held the 4<sup>th</sup> Annual Asphalt Shingle Recycling Forum which brought the technical updates to the stakeholders and allowed for networking among states that are already utilizing RAS and those that are progressing forward with doing so. The Iowa Department of Transportation (IDOT) was among those that attended this conference.

The IDOT is actively working on pilot projects, has drafted a Developmental Specification, and is working with the DNR on the environmental aspects of production and incorporation of shingles, as well as SWAP funding for industry development. The Developmental Specification will be available for select projects as early as January. For these select projects, 2-5% RAS will be required. RAS will come to the contractor as a certified product from an approved RAS supplier. The approval process will also be available within the next month. The IDOT currently has one demonstration project to date on an IDOT job. A total of 20,000 tons of HMA were placed on a shoulder with 5% RAS. The project was successful in terms of plant operations. They will continue to monitor the performance. They anticipate a project next summer with RAS and Warm Mix. The IDOT and the IDNR are also engaged in discussions with the Metro Waste Authority to ensure future directions are commensurate with the activities of waste collection and reutilization of shingles as a viable and cost effective resource for incorporation in asphalt paving.

- iii. Shingle Recycling at Solid Waste Agencies  
The Waste Commission of Scott County and Metro Waste Authority in Des Moines are two solid waste agencies who have initiated shingles recycling programs in Iowa. The Waste Commission of Scott County has been recycling shingles since 2004. To date, a total of 7,100 tons of material have been diverted from the landfill and used in local hot mix asphalt projects, with 2,900 tons diverted in 2009. As noted by staff, the program to date has been done without a large amount of advertising. With the progress mentioned previously in regards to the IDOT using and promoting the use of shingles in HMA, the Waste Commission plans on increasing education efforts in order to divert a greater amount from the landfill. To date, the Waste Commission's RAS has been used in several demonstration projects including: sections of main roads in Davenport, the Davenport Compost facility, and the landfill's tire recycling pad.

Metro Waste Authority started a shingle recycling pilot project in October 2009 as a way to divert this C&D material from the Metro Park East Landfill, near Mitchellville, Iowa. Metro Waste Authority began collecting shingles on October 18 and collected over 300 tons before the grind in November. These 300 tons will make up 5% of the hot mix asphalt in roadways that Des Moines Asphalt and Paving pours for clients and communities throughout the metro area. Through the pilot project, MWA was able to evaluate the project's long-term feasibility. It proved workable,

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resulting in shingle recycling becoming a part of Metro Waste Authority's internal operations. MWA will continue to expand on this program in the future.

- iv. **Solid Waste Facility (Landfill and Transfer Station) C&D Recycling**  
Many solid waste facilities throughout the State partake in some form of C&D recycling. Many have an area for appliances to be stored so they can be demanufactured under the facility's permit or collected and taken to a facility permitted to perform demanufacturing prior to scraping the appliances for scrap metal. Concrete and scrap metal recycling areas are also common at facilities. Several planning areas go beyond those items. The Waste Commission of Scott County is one that does. They recycle low scale clean wood, non-ferrous and ferrous metal, corrugated cardboard, gently used building products, aggregate, and unders that are approved for alternative daily cover. Aggregates are typically handled by other facilities in the area due to the availability of an end-market on them. Staff noted that the work the IDOT was doing with the specifications for shingle recycling would increase the amount recycled. In order to further expand their program, they have noted that better market availability is necessary. For example, drywall must be dry, clean, and palletized and pays \$8/ton. The material is not put as a waste product in a dry, clean, palletized manner and the return does not cover the cost of processing. Treated wood and carpet/textiles are other materials noted that required final markets.

- v. **Dubuque Metropolitan Area Solid Waste Agency's Green Vision Buildings Program**  
The Dubuque Metropolitan Area Solid Waste Agency's (DMASWA) Green Vision Buildings (GVB) Program is designed to assist construction and demolition professionals working in Dubuque and Delaware counties. The program offers building industry professionals guidelines, procedures, and worksheets for establishing reuse and recycling programs at project sites.

The GVB Enviro-Stars Honor Roll recognizes area individuals, businesses and organizations for their exceptional building project recycling, reuse, and diversion efforts. Award winning projects must divert at least 70% of the materials normally taken to the landfill.

Since 2003, 31 building and demolition projects have diverted more than 163,614 tons of material from the landfill, saving project participants more than \$5,250,667 in avoided disposal fees. As a result, ten local businesses and organizations have been honored for their efforts to recycle materials and minimize waste at their building construction and demolition sites. These businesses and organizations have demonstrated a commitment to protecting the environment by reducing, reusing, recycling, and otherwise diverting materials from the Dubuque Metro Landfill.

- vi. **Animal Rescue League Deconstruction/Demolition**  
Metro Waste Authority, in the beginning of 2009, identified the demolition of the Animal Recue League (ARL) as a potential deconstruction pilot project. Metro Waste Authority partnered with Metro Wrecking out of Des Moines, Iowa to develop a deconstruction plan to handle the materials that were in the facility and could be reused and/or recycled. The overall project lasted approximately three months and resulted in the recycling or salvaging of 807.6 tons of material. A total of 119.8 tons of material were landfilled, resulting in an 87.1% recycling/recovery rate. Materials recovered were reused in projects including Home Recycling Exchange, the Holistic

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Health LEED Project, Habitat for Humanity, and four residential building projects. This pilot project was performed in order to determine the recycling markets available and the cost associated with utilizing them.

vii. **C&D Processing Facilities**

Three C&D processing facilities have opened and operated for various times in the Des Moines market over the past ten years. To date two of the operations have failed, leaving behind hundreds of thousands of dollars of clean up costs. The third continues to operate, however, currently their operating permit has been rescinded which is being appealed by the operator. The operator is allowed to continue to operate until the appeal is completed. Lawsuits have arisen over the handling of C&D fines and questionable “beneficial use” for C&D fines. In addition, there have been permitting issues with large stockpiles of materials, materials that do not meet specifications and facilities that are challenged with finding end-markets and moving the material off-site within sufficient time frames. Research from other states demonstrates that there must be a market for the product produced from the C&D facilities in order to be successful and sustainable. The end-product can be achieved by source separating at the site which has been done for years by demolition contractors. The other option is to comingle the material on site and either separate at a recycling facility or blend some of the materials together by means of a grinding operation. Again success is determined by having a market place for the products produced, otherwise stockpiling and disposal off-site occurs, such as the case with 60,000 tons of material from one of the failed operators being stockpiled on a site in Bondurant which becomes problematic.

Material which has been successfully separated and marketed includes wood, metal, bricks, concrete, asphalt, cardboard and now shingles. All of the aforementioned have those willing to pay or take the material for free. Materials such as wall board can cause significant issues by producing hydrogen sulfide gas but if separated there is a future potential for a market. The most significant issue regarding source separation is the cost of labor involved with deconstructing for demolition and separating on-site for construction projects. Pilot programs for source separation have been implemented to see if there are ways to reduce the cost on-site. Construction and Demolition recycling can be successful with the level of recycling and reduction determined by end-markets and careful planning during design to reduce waste.

### **III. Opportunities and recommendations for new programs**

#### **A. Industrial**

Through the experience of the subgroup task force members and the information obtained in the site visits, several opportunities and recommendations for new programs within the industrial sector have been identified. These include economic incentives, redirection of a portion of environmental penalties from the AG office that currently go to the Household Hazardous Materials (HHM) program to the IDNR Business Assistance Programs, a marketing plan for education on current programs available, a recycling vendor green list, green certification for businesses, and a user fee for recovery and recycling of used materials.

#### **B. Construction & Demolition**

Through the experience of the subgroup task force members and the information obtained in the site visits, several opportunities and recommendations for new programs within the C&D sector have been identified. These include a task force with multiple

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stakeholders to evaluate expansion/creation of programs, ensuring adequate financial assurance for C&D processing facilities, local ordinances that provide economic incentives for C&D recycling, state agencies supporting/promoting/utilizing recovered materials, increased shingles recycling, construction site source separated collection of materials, and legitimate beneficial use of C&D recovered/recycled materials.

### IV. Recommendations (prioritize and narrow down)

#### A. Economic Incentives

- i. Environmental impact
  - a. Increase recycling rates in industrial facilities
  - b. Extends life of current landfills by waste reduction
  - c. Promotes waste reduction at the source
  - d. Supports product stewardship principles
  
- ii. Economics
  - a. Infrastructure  
None
  - b. Development and implementation costs  
Legislative action required
  - c. Markets  
The targeted recycled materials need to have existing sustainable markets.
  - d. Economic impact  
Reducing of state tax receipts as it is being returned to industry as an incentive.
  
- iii. Education and awareness  
Legislative action will require publicizing incentive to industrial sector.
  
- iv. Funding – how will we fund the program?  
By redirecting tax receipts.

#### B. Existing Financial Incentive Programs

- i. Environmental impact  
Increase recycling rates in industrial facilities  
Extends life of current landfills by waste reduction  
Promotes waste reduction at the source  
Supports product stewardship principles
  
- ii. Economics
  - a. Infrastructure  
None
  - b. Development and implementation costs  
Programs need to be redirected to target industrial sectors waste management needs to promote waste reduction and recycling via infrastructure changes within industrial facilities.
  - c. Markets  
The targeted recycled materials need to have existing sustainable markets.
  - d. Economic impact  
Existing programs need to have sufficient funding to support initiative.
  
- iii. Education and awareness

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Program staff must in cooperation with industrial associations promote initiative to industrial customers. This may be done in a variety of ways including via industrial interaction, industrial newsletters, and conference attendance.

iv. Funding – how will we fund the program?

This effort would be funded through sustaining the existing programs resources.

**C. Redirection of a Portion of Environmental Penalties from the AG Office that currently go to the HHM program to the IDNR Business Assistance Programs**

i. Environmental impact

Increase recycling rates in industrial facilities

Extends life of current landfills by waste reduction

Promotes waste reduction at the source

Supports product stewardship principles

Multiple environmental benefits to air, water, soil, greenhouse gas, energy conservation, etc.

ii. Economics

a. Infrastructure

None

b. Development and implementation costs

Legislative action

c. Markets

Not applicable

d. Economic impact

The HHM program was established in 1987 and has developed into a network that covers 89 counties. This network serves Iowa households and businesses that are classified as Conditionally Exempt Small Quantity Generators of hazardous waste as a means for properly managing and disposing of hazardous materials. It is recommended that a portion of the money received by IDNR pursuant to Code of Iowa Section 29C.8A be redirected from the mature and well established HHM program, without degradation of the current program, to address funding shortcomings in IDNR's waste reduction and minimization programs for Iowa Industries established in the solid waste account of the Groundwater Protection Fund. An example of what this legislation should look like can be provided by the IDNR upon request.

Cost savings obtained by successful implementation of the existing programs will help to sustain jobs, business viability, and resources. For example, since 2001, the implementation of Pollution Prevention Intern recommendations has saved over 1 billion gallons of water, 117,475 tons of solid waste, 1.17 million gallons of hazardous waste, 83,640 tons of special waste, and over 258.6 million kilowatt hours and 16.5 million therms of electricity. Companies have cumulatively saved over 58.6 million dollars by implementing these environmental improvements.

iii. Education and awareness

None

iv. Funding – how will we fund the program?

Redirection of current funds.

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**D. Marketing Plan for Education/Awareness of Current Programs through Trade Associations, etc.**

- i. Environmental impact
  - a. Increase recycling rates in industrial facilities
  - b. Extends life of current landfills by waste reduction
  - c. Promotes waste reduction at the source
  - d. Supports product stewardship principles
  - e. Multiple environmental benefits to air, water, soil, greenhouse gas, energy conservation, etc.
  
- ii. Economics
  - a. Infrastructure  
None - existing
  - b. Development and implementation costs  
Funding to secure additional resources (i.e. staff, publicity, travel) for increased outreach and delivery of programs to industrial sector within the State. This can be accomplished by shifting priorities and focus of existing programs and resources at IDNR.
  - c. Markets  
The targeted recycled materials need to have existing sustainable markets.
  - d. Economic impact  
Cost savings obtained by successful implementation of the existing programs will help to sustain jobs, business viability, and resources. For example, since 2001, the implementation of Pollution Prevention Intern recommendations has saved over 1 billion gallons of water, 117,475 tons of solid waste, 1.17 million gallons of hazardous waste, 83,640 tons of special waste, and over 258.6 million kilowatt hours and 16.5 million therms of electricity. Companies have cumulatively saved over 58.6 million dollars by implementing these environmental improvements.
  
- iii. Education and awareness  
Based on the subcommittee's research, awareness of education of industrial sector was lacking. Therefore, this is a very important area
  
- iv. Funding – how will we fund the program?  
By redirecting penalties. See recommendation. Or increasing current tonnage fees. Reassess current tonnage fee structure and its distribution.

**E. Recycling Vendor Green List (partner between IDNR to set standards, and ISOSWO or IRA to maintain)**

- i. Environmental impact
  - a. Increase recycling rates in industrial facilities
  - b. Extends life of current landfills by waste reduction
  - c. Promotes waste reduction at the source
  - d. Electronic format therefore not creating additional paper waste
  
- ii. Economics
  - a. Infrastructure  
Electronic database
  
  - b. Development and implementation costs

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Database development and ongoing maintenance, determination of qualifications criteria to achieve status on green list, ongoing verification of vendor certifications

- c. Markets  
The targeted recycled materials need to have existing sustainable markets. Vendors must have and utilize legitimate and viable markets.
  - d. Economic impact  
Losses will not be incurred by industrial users of this list. Minimizes potential for losses to be incurred by industrial users because it ensures viability of vendors.
- iii. Education and awareness  
Publicity for initial roll out through various strategies to hit residential, commercial, institutional, and industrial sectors.
  - iv. Funding – how will we fund the program?  
Initial development through SWAP grants. Ongoing development from sponsorships from certified vendors. Fee established for vendors to be certified and an annual renewal fee. Small user fee for industrial/commercial usage. Residential usage at no charge.

### **F. Green Certification for Businesses**

- i. Environmental impact  
Increase recycling rates in industrial facilities  
Extends life of current landfills by waste reduction  
Promotes waste reduction at the source  
Likely to meet and exceed compliance with environmental regulations  
Multiple environmental benefits to air, water, soil, greenhouse gas, energy conservation, etc.
- ii. Economics
  - a. Infrastructure  
None
  - b. Development and implementation costs  
Development of criteria for certification, ongoing verification of certification status, administration and maintenance of the list
  - c. Markets  
The targeted recycled materials need to have existing sustainable markets.
  - d. Economic impact  
Increased business for existing Iowa companies by customers who value/recognize distinction of the certification  
Increase employment opportunities by drawing “Green” businesses to the State  
An additional tool for the DED in attracting new businesses to the State of Iowa
- iii. Education and awareness  
DED promoting program  
Publicity for initial roll out through various strategies targeting customers and Iowa businesses.
- iv. Funding – how will we fund the program?

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Initial development through SWAP grants or sponsorships by businesses that champion the Green label. Ongoing development from sponsorships from certified vendors. Fee established for vendors to be certified and an annual renewal fee.

### **G. Task Force with Multi-Stakeholders to Evaluate**

- i. Environmental impact
  - Developing and directing environmental impact of C&D for the future in the State
- ii. Economics
  - a. Infrastructure
    - Legislative mandate to create a taskforce
    - Development and implementation costs
    - Similar to the recycling task force (Tom H.?)
  - b. Markets
    - Need to develop end markets for majority of recoverable materials in the State.
  - c. Economic impact
    - Potential to reduce a major solid waste stream
    - Longer life on landfill capacity and transfer station equipment
    - Decreased revenue to landfills and transfer stations
- iii. Education and awareness
  - Not applicable
- iv. Funding – how will we fund the program?
  - Similar to the recycling task force

### **H. Adequate Financial Assurance for C&D Processing Facilities**

- i. Environmental impact
  - Proper financial support to fund closure costs of a no longer operating facility.
  - Avoidance of a negative environmental impact from improperly or not fully closed facilities.
- ii. Economics
  - a. Infrastructure
    - None needed
  - b. Development and implementation costs
    - Identifying the proper financial instrument and amount needed to adequately protect human health, safety, and environment.
  - c. Markets
    - Not applicable
  - d. Economic impact
    - Avoided use of public funding to clean up privately owned, improperly funded, and now defunct facilities.
    - Additional burden on public and private entities required to fund closure of a facility that may not be needed for many years to come.
- iii. Education and awareness
  - Training of IDNR staff on sound technical evaluation methods of cost of proper closure of these facilities.

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- iv. Funding – how will we fund the program?  
Existing funding and staff.

### **I. Local Ordinances that Provide Economic Incentives for C&D Recycling**

- i. Environmental impact
  - Increase recycling rates in renovation and demolition
  - Extends life of current landfills by waste reduction
  - Promotes waste reduction at the job site
- ii. Economics
  - a. Infrastructure
    - At local level, environmental impact fees would be rebated at X% if project meets code criteria [Heather, fill in]
  - b. Development and implementation costs
    - Cost incurred by cities/county to develop ordinances
  - c. Markets
    - Not applicable
  - d. Economic impact
    - More cost effective construction and demolition projects
- iii. Education and awareness
  - Builders associations promoting to members
- iv. Funding – how will we fund the program?  
Builders association to develop model they would prefer to see

### **J. State Agencies Support/Promote/Utilize Recovered Materials**

- i. Environmental impact
  - Increase recycling rates in construction, renovation, and demolition
  - Extends life of current landfills by waste reduction
  - Promotes waste reduction
  - Reduced use of new materials
- ii. Economics
  - a. Infrastructure
    - As new materials would be permitted for reuse, additional infrastructure may be needed
    - Pilot area where newly permitted material recycling collection would be tested at a construction project
  - b. Development and implementation costs
    - Unknown until materials are identified and background is known for what research has already been completed in or out of State.
  - c. Markets
    - The targeted recycled materials need to have existing sustainable markets.
  - d. Economic impact
    - More cost effective construction and demolition projects
    - Potential to reduce a solid waste stream
    - Longer life on landfill capacity and transfer station equipment
    - Decreased revenue to landfills and transfer stations
- iii. Education and awareness

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Builders associations promoting to members

- iv. Funding – how will we fund the program?  
To be determined with specific applications

### **K. Shingles Recycling**

- i. Environmental impact
  - Increase recycling rates in renovation and demolition
  - Extends life of current landfills by waste reduction
  - Promotes waste reduction at the job site
  - Reduced use of virgin aggregates and asphalt binder
- ii. Economics
  - a. Infrastructure
    - Continued support of the program by State agencies
  - b. Development and implementation costs
    - Develop regional processing systems
    - Collection methodologies
    - Processing
    - Storage
  - c. Markets
    - Existing market for incorporation into recycled asphalt
  - d. Economic impact
    - Cost effective savings through recycling of old asphalt shingles into roadway
    - Potential to reduce a solid waste stream
    - Longer life on landfill capacity and transfer station equipment
    - Potential decreased revenue to landfills and transfer stations
    - Potential for landfills and transfer stations to diversify their business plan and handle shingles recycling programs
- iii. Education and awareness
  - IDOT currently educates through industry conferences and specification updates
- iv. Funding – how will we fund the program?
  - Collaborative efforts of the IDNR, IDOT, and Metro Waste Authority with available resources
  - Targeted SWAP loans
  - Self funding due to end product having a value as recyclable product

### **L. Construction Site Source Separated Collection of Materials**

- i. Environmental impact
  - Increase recycling rates in construction, renovation, and demolition
  - Extends life of current landfills by waste reduction
  - Promotes waste reduction at the job site
- ii. Economics
  - a. Infrastructure
    - Pilot area where source separated recycling collection would be tested at a construction project
  - b. Development and implementation costs

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- Targeted SWAP grant
- c. Markets  
The targeted recycled materials need to have existing sustainable markets.
- d. Economic impact  
Potential for revenue source for contractors if feasible amounts generated  
Potential for addition of privately or publicly operated collection/processing/distribution facilities.  
Potential cost reduction in construction costs due to less waste generation.
- iii. Education and awareness  
Builders associations promoting to members
- iv. Funding – how will we fund the program?  
Pilot through SWAP, if successful develop in to business model for private/government (landfills) partnerships

### **M. Legitimate Beneficial Use of C&D Recovered/Recycled Materials**

- i. Environmental impact  
Increase recycling rates in construction, renovation, and demolition  
Extends life of current landfills by landfill diversion  
Promotes waste reduction  
Reduced use of new materials  
Avoidance of negative environmental impacts from improper disposal of C&D materials under the guise of beneficial use.
- ii. Economics
  - a. Infrastructure  
Not applicable
  - b. Development and implementation costs  
Legislative action that provides more clarity and stronger definitions of beneficial use of C&D and other solid waste.
  - c. Markets  
Not applicable
  - d. Economic impact  
Avoidance of cleanup costs associated with negative environmental impacts from improper disposal of C&D materials under the guise of beneficial use.
- iii. Education and awareness  
Clear authority for the IDNR to enforce and educate industry of the regulations.
- iv. Funding – how will we fund the program?  
Existing funding and staff.

### **V. Are our recommendations sustainable? How?**

See Section IV above for details on sustainability.

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### Appendix Material

- J. Concrete Washout for New Construction
  - code enforcement issues (written for large developments versus individual construction projects)
- a user fee for recovery and recycling of used materials.

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Good Future Sources:

[http://www.mansfieldct.org/town/departments/pw/refuse/waste\\_from\\_home\\_renovations.php](http://www.mansfieldct.org/town/departments/pw/refuse/waste_from_home_renovations.php)

Mandates waste materials resulting from contractual work, such as reshingling, remodeling, and painting, must be properly separated, recycled and disposed. Regardless of who is responsible for the disposal of waste materials, contractors must abide by State and Town Solid Waste Laws. Recyclables may not be mixed with demolition debris, bulky waste or household refuse. In addition, hazardous products such as oil-based paints, epoxies, oil, insecticides, paint strippers, acids, etc. must be kept separate from other wastes. If the contractor leaves waste disposal arrangements up to the Mansfield resident or business, the contractor must inform them of the type of waste that will be generated and the necessary provisions that must be made. In Town of Mansfield, Connecticut

[http://www.agc.org/cs/industry\\_topics/environment/recycling\\_toolkit/how\\_do\\_i](http://www.agc.org/cs/industry_topics/environment/recycling_toolkit/how_do_i)