

Transforming Solid Waste Management in Connecticut & Beyond

**Report Prepared by the Northeast Waste Management Officials' Association (NEWMOA)
for the Connecticut Department of Energy & Environmental Protection**

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Executive Summary

The Connecticut Department of Energy and Environmental Protection (DEEP) in partnership with the Connecticut Department of Economic and Community Development (DECD), U.S. Environmental Protection Agency (EPA) Region 1, Northeast Waste Management Officials' Association (NEWMOA), and others held a series of events focused on re-envisioning solid waste management for the 21st century. The purpose of this effort was to identify effective options for unlocking the value of the materials economy for Connecticut. Recyclers, manufacturers, waste management firms, waste haulers, representatives of non-governmental organizations, state and local government officials, industrial ecology experts, solid waste consultants, and academic researchers participated in the events.

DEEP started the conversation at a January 2012 Roundtable by framing some of the key challenges facing state and local waste management programs and the industry. Simply, the Agency leaders argued that the economics of raw and used materials have evolved over the past 20 years. How the U.S. manages waste in the 21st century is ripe for review and change. There are well-recognized weaknesses in some of the existing waste management methods. Disposal and transportation costs are rising. Municipal recycling rates are at an apparent plateau. Solid waste industry players have consolidated and diversified, and keeping up with these changes is challenging. Municipal budgets are strained.

The conversations at these events focused on the economic value of waste; how to increase this value; and how to close infrastructure gaps to increase collection, processing, marketing, and manufacturing locally while also examining markets abroad. DEEP Commissioner Dan Esty, in his opening remarks, noted that if Connecticut achieved a 40 percent recycling rate (10 percent higher than present), the estimated collective savings for the municipalities would be about \$35 million annually. Environmental and economic development agencies in the State and throughout the northeast see opportunities in shifting to sustainable materials management and building the necessary leadership capacity and infrastructure.

Throughout 2012, DEEP coordinated a series of events to continue the conversation started at the January Roundtable. These sessions generated many ideas and suggestions for helping Connecticut reduce the generation of municipal solid waste (MSW), increase waste reuse and composting, and meet its goal of increasing the recycling rate to 58 percent by 2024. The titles for the events were (including hyperlinks to agendas and presentations):

- [“Transforming Materials Management for the 21st Century”](#) Roundtable January 18, Hartford, CT;
- [“Unlocking the Value: Transforming the Connecticut Materials Economy”](#) Summit on March 22, New Britain, CT;
- [“Capturing the Value: Transforming Municipal Materials Management”](#) Summit on June 12, New Haven, CT
- [“Launching Innovation: Transforming Materials Management in Connecticut”](#) Summit on October 4, Hartford, CT
- [“Setting Product Stewardship Priorities for Connecticut”](#) stakeholder meeting on Oct. 25, 2012 meeting,” in Hartford, CT

Several presenters during these sessions discussed the importance of zero waste concepts as a framework to motivate and inform innovative waste reduction, reuse, and recycling initiatives. To address the costs to municipalities and the price signals for residents, the discussions focused on pay-as-you-throw or unit-based pricing (also called “Save Money and Reduce Trash, or SMART) as a critical strategy. Presenters shared results from various communities around the U.S. that have successfully implemented these programs.

To expand value extraction, a number of presenters and stakeholders discussed the need for implementing more extended producer responsibility programs. These programs have demonstrated their ability to achieve a high recovery rate, be flexible, place much of the responsibility for the product’s end-of-life onto the producer and not the government, and increase extraction of value.

Presenters also discussed opportunities for aggregation within Connecticut of materials to help improve the economics for recyclers interested in using waste as raw materials. Examples of successful recycling businesses based in Connecticut demonstrate that with the right incentives and a critical mass of the materials, the industry can develop and create in-state jobs.

A number of presenters discussed the need for improvements in organics management, including food and yard waste. This is a large portion of municipal solid waste (MSW) whose value is currently underutilized. The infrastructure is not yet in place to recover significant quantities of organics in Connecticut. Improving organics waste management represents one of the greatest opportunities for job creation. Creating the composting and anaerobic digestion infrastructure for Connecticut will require long term contracts for haulers, private investment particularly in new processing capacity, and more efficient and effective collection systems. There may be opportunities in Connecticut to reduce collection costs of other waste materials, through reduced fragmentation of the existing collection system, to help fund increased organics recovery.

This Report summarizes the major themes, ideas, and options for action by the State and regional leaders that emerged from this process. The following provides recommendations for next steps within Connecticut and for regional efforts that Connecticut could help to support.

The recommended options for next steps for actions within Connecticut:

- Follow-up on Governor’s Recycling Working Group recommendations in their [December 2012 Report](#);
- Take advantage of the renegotiated municipal contracts to optimize materials recovery;
- Modernize the pricing systems to provide economic signals that focus on saving money through greater reuse and recycling;
- Move to web-based data collection to simplify reporting and improve data quality;
- Make the connection between recycling as a business and creation of green jobs;
- Coordinate efforts among all state agencies including, DEEP, DECD, and CEFIA;
- Attract interest from organics recycling facilities to help fill infrastructure gaps;
- Advance proposals for extended producer responsibility (EPR) legislation; and
- Bring the ‘unlocking value’ conversation back to a regional conversation with other states in the northeast.

The results of the discussions in Connecticut can help inform and inspire action on a broader regional level. Since some solid waste recycling and disposal services for Connecticut-generated waste are located outside of the State there is a high degree of interdependence for waste management among nearby states. There are also several organizations, including [NERC](#) and [NEWMOA](#), which foster collaboration on waste management in the region. Efforts to collaborate regionally on the outcomes of the Connecticut forums should involve these organizations.

Some ideas for Connecticut's next steps toward regional collaboration include:

- Convene a regional meeting of state environmental agencies to review results of Connecticut's transforming solid waste management efforts, discuss the status of efforts focused on capturing the value of waste materials in other states, and find common ground on next steps;
- Coordinate regionally on the development of standards, criteria, and best management practices for food and yard waste;
- Advance efforts regionally to coordinate data sharing and analysis; move together toward more electronic data collection and management systems; and identify opportunities for regionalization of these functions;
- Develop a zero waste professional social network to support state and local zero waste programs;
- Support regional coordination on implementation of product stewardship laws;
- Present results of Connecticut's efforts to recyclers and other private stakeholders in the Northeast;
- Expand the recycled materials database, based on the existing NERC database that covers New York and a few other states to include Connecticut businesses;
- Develop a northeast center for markets development for recycled materials within the region;
- Expand the regional reuse marketplace; and
- Support regional coordination on developing product stewardship legislation.

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Transforming Materials Management in the 21st Century

In January 2012, the Connecticut Department of Energy and Environmental Protection (DEEP) in partnership with the Connecticut Department of Economic and Community Development (DECD), U.S. Environmental Protection Agency (EPA) Region 1, and the Northeast Waste Management Officials' Association (NEWMOA) coordinated a roundtable event in January 2012, which would become the kick off for a year-long conversation about re-envisioning solid waste management for the 21st century. The purpose of this effort was to identify effective options for unlocking the value of the materials economy for Connecticut.

Participants from industry, industrial ecology programs, non-governmental organizations, government at all levels, and economists met on January 18th to discuss steps that everyone could take to transform waste and materials management in the Northeast. DEEP hosted this initial regional event to help them and their partners address solid waste management plan and climate change action goals. At the Roundtable, DEEP recognized the need for internal dialogues with in-state stakeholders and encouraged other states to do the same. Throughout the rest of the year, DEEP held three “transformation” summits and a stakeholder meeting focusing on product stewardship. This Report summarizes the major themes, ideas, and options for action by the State and regional leaders that emerged from this process with recommendations for next steps.

DEEP started the conversation by framing some of the key challenges facing state and local waste management programs and the industry. Simply, the Agency leaders argued that the economics of raw and used materials have evolved over the past 20 years. How the U.S. manages waste in the 21st century is ripe for review and change. There are well-recognized weaknesses in some of the existing waste management methods. Disposal and transportation costs are rising. Municipal recycling rates are at an apparent plateau. Solid waste industry players have consolidated and diversified, and keeping up with these changes is challenging. Municipal budgets are strained.

During the January Roundtable and later summits, the speakers and participants framed the issues facing Connecticut and the Region as:

- The recycling rate in CT and the rest of the region is stagnant at around 30 percent and has been for more than ten years;
- Long-term contracts bind CT municipalities to resource recovery facilities (RRF), but these are expiring, which provides an opportunity to optimize materials recovery by reinforcing reduction, reuse, composting, and recycling as higher priorities for waste management;
- There is no stable funding source for CT DEEP and municipalities to support improvements in municipal solid waste reuse and recycling efforts;
- There are significant gaps in the collection and recycling infrastructure for certain materials;
- For too long, materials in waste have been viewed as having no economic value, and reframing this view is challenging;
- Natural gas prices are declining and driving electricity prices down;

- Costs for municipal solid waste hauling and disposal services are increasing; and
- Municipal budgets are declining and they municipalities are struggling to address the costs of solid waste management.

The conversations at the events in 2012 focused on the economic value of waste; how to increase this value; and how to close infrastructure gaps to increase collection, processing, marketing, and manufacturing locally while also examining markets abroad. Most of the presentations focused on ideas for unlocking the economic value of waste. Commissioner Esty, in his opening remarks, noted that if Connecticut municipalities achieved a 40 percent recycling rate (10 percent higher than present), their estimated collective savings would be about \$35 million annually. Environmental and economic development agencies in the northeast see these kinds of opportunities in shifting to a sustainable materials management approach as they move forward.

The titles and participants for the events were (including hyperlinks to agendas and presentations):

- [“Transforming Materials Management for the 21st Century”](#) Roundtable January 18, Hartford, CT; involving about 90 participants representing multiple northeast states and CT State agencies, municipalities, U.S. EPA Regions 1 and 2, research and consulting firms, academic organizations, recyclers, waste management firms, and non-governmental organizations;
- [“Unlocking the Value: Transforming the Connecticut Materials Economy”](#) Summit on March 22, New Britain, CT; involving about 180 participants representing CT State agencies municipalities, U.S. EPA, research and consultant firms, recyclers, waste management firms, academic organizations, non-governmental organizations;
- [“Capturing the Value: Transforming Municipal Materials Management”](#) Summit on June 12, New Haven, CT involving about 150 participants representing the same stakeholders as previous events plus a vendors’ fair;
- [“Launching Innovation: Transforming Materials Management in Connecticut”](#) Summit on October 4, Hartford, CT involving about 120 participants representing the same stakeholders as previous events in addition to the Governor’s Recycling Working Group members; and
- [“Setting Product Stewardship Priorities for Connecticut”](#) stakeholder meeting on October 25, Hartford, CT involving about 40 participants representing CT State agencies, municipalities, Connecticut legislators, recyclers, waste management firms, and non-governmental organizations.

Current Status of Solid Waste Management in CT

To kick-off the year-long conversation, Commissioner Dan Esty, CT DEEP provided an overview of the current state of solid waste planning in CT. Municipal solid waste (MSW) includes non-hazardous waste generated by households and commercial facilities as well as non-hazardous construction and demolition (C & D) debris. Other wastes, such as non-hazardous and hazardous industrial by-products, were not a focus for the discussions at the Roundtable and Summits. Table 1 provides a profile of solid waste management in Connecticut.

A [Legislative Program Review and Investigation](#) (LPRI) report issued in January 2010 identified various funding, infrastructure and policy issues, such as the lack of stable funding for State and municipal MSW programs. The [State Solid Waste Management Plan](#), amended December 2006

Table 1

Connecticut Solid Waste Profile

- In 2010 (the latest year for which data is available) approximately 2.3 million tons of municipal solid waste (MSW) or 0.65 tons per person per year was generated and disposed of in landfills and waste-to-energy facilities. This is approximately 9 percent lower than for 2008. (source: [Municipal Solid Waste \(MSW\) Interstate Flow in 2010](#), NEWMOA, January 2013)
- Approximately 91 percent of the MSW generated in 2010 was managed in Connecticut facilities; the rest (about 6 percent) was disposed of in one of the Northeast states or shipped out-of-the-region (about 3 percent) for disposal. (source: [Municipal Solid Waste \(MSW\) Interstate Flow in 2010](#), NEWMOA, January 2013)
- Of the MSW that was disposed in-state in 2010, approximately 67 percent (2.15 million tons) was managed in waste-to-energy incinerators and 0.67 percent (21,400 tons) disposed of at in-state landfills.
- A calendar year 2009 [waste characterization study of MSW from CT residents, commercial, and industrial](#) sources found:
 - Approximately 2.38 million tons of waste generated;
 - Approximately 27 percent by weight of the overall disposed of MSW stream was organics (~623,00 tons) (including food and yard waste);
 - Approximately 26 percent by weight of the overall disposed of MSW stream was paper products (~617,000 tons);
 - Approximately 15 percent by weight of the overall disposed of MSW stream was plastic (~350,000 tons);
 - Approximately 14 percent by weight of the overall disposed of MSW stream was construction and demolition debris from buildings (~335,000 tons);
 - Approximately 9 percent by weight was classified as other waste, which are miscellaneous waste streams; and
 - Approximately 5 percent by weight of the overall disposed of MSW stream was metals.
- Residents and commercial facilities also generate other difficult to manage wastes, some of which contain hazardous constituents and require special waste management and handling, including used electronics, unused paints, unused or expired pesticides, and mercury-containing products and other household hazardous wastes.
- CT has four regional waste-to-energy plants that the [Connecticut Resource Recovery Authority](#) (CRRRA) operates and that serve communities throughout the state.
- [CRRRA](#) processes about 2 million tons of trash a year, which reduces the volume of what needs to be buried in sanitary landfills by about 90 percent.
- In 2011, [CT residents recycled 865,000 tons of material](#). This resulted in an energy savings of about 62.5 million gallons of gasoline. Nevertheless, significant quantities of metals, glass, plastics, and other easily-recyclable components were not recycled.
- The current estimated MSW recycling rate for CT is 30 percent.
- In 2006 (the latest year for which data is available), almost 1.5 million tons of construction and demolition (C &D) debris was generated; this was approximately 0.42 tons/person/year.
- In addition to management through recycling and disposal, reuse of MSW and C & D materials is growing in Connecticut, but there are no available estimates of the amount of reused waste that is exchanged and handled.

(which replaced the 1991 Plan) sets a 58 percent diversion rate by 2024. DEEP is examining this goal and developing strategies to meet it. The current diversion rate is approximately 30 percent, so the gap is approximately 28 percent.

Connecticut's legislature made a series of legislative improvements from 2006 to 2011, including:

- [PA 07-189](#) – established electronic waste collection and recycling program;
- [PA 09-211](#) – authorized individual beneficial use determinations;
- [PA 10-87](#) – expanded list of mandatory recyclables to include plastics #1 & #2, and boxboard; requires haulers as of July 1, 2012 to contract for separation of trash and recyclables; and
- [PA 11-217](#) – requires composting of organics by generators of 2 tons/week within 6 months after 2 composting facilities are operating within 20 miles of the generator; and
- [PA 11-24](#) – establishes a paint waste stewardship program.

There has been great momentum within Connecticut to enact product stewardship legislation to help engage product producers in addressing a variety of problem waste streams, including electronic waste, paint waste, mercury-added products, and others. Municipalities have been calling for enactment of legislation to address used mattresses through a product stewardship approach, and CT DEEP held a stakeholder meeting in 2011 to discuss the issue and possible approaches.

CT DEEP is in the process of implementing these laws and developing the necessary regulations and programs. Municipalities and residents should experience their benefits and associated impacts on MSW generation and recycling over the next five years. CT DEEP has also been conducting outreach with stakeholders, including a Commissioners' Roundtable and support for ongoing Solid Waste Management Advisory Committee meetings.

The State provides considerable municipal recycling assistance on a customized individual and regional basis, including technical assistance.

Governor Dannel P. Malloy created the [Governor's Recycling Working Group \(GWG\)](#) after the January Roundtable and during the planning for the March summit. The GWG was charged with examining ways to:

- Modernize the state's recycling and materials management policies, including organics composting, recyclables collection methods, possible market frameworks and education; and
- Review the governance, responsibilities, and operations of the [Connecticut Resources Recovery Authority \(CRRA\)](#) to ensure that the State has the proper mechanisms for reducing waste, maximizing recycling, and minimizing disposal.

Led by the Governor's Office in partnership with DEEP and other state agencies, GWG members included representatives of municipalities; experts in recycling and materials management, finance, and environmental justice; and representatives of the State Departments of Energy and Environmental Protection, Public Health, Economic and Community Development, and Policy and Management. While the GWG had not been appointed by the time of the March Summit, many of its members attended. The GWG members joined the June and October

Summits. At the October Summit, DEEP Deputy Commissioner Macky McCleary, co-chair of the GWG, provided an overview of what the Group had learned so far and some of the ideas that they were discussing. After he spoke, members of the GWG shared their insights and responded to questions from the participants.

The Governors Recycling Workgroup started meeting in April 2012 and quickly established subcommittees to address its mandate. A [Final Report](#) outlining their recommendations was issued in December 2012.

In addition, the Connecticut Product Stewardship Council (PSC) and DEEP decided to hold a separate session to set priorities and directions for extended producer responsibility (EPR). DEEP considers [product stewardship](#) to be a critical part of the transformation in the management of solid waste in Connecticut. EPR helps develop markets for recycled materials, thereby creating future businesses and jobs, while also helping municipalities reduce disposal costs. Working together with the [Product Stewardship Institute](#) (PSI), DEEP and PSC coordinated the October stakeholder meeting to create a pathway for the next five or so years and develop a list of priority products for product stewardship legislation.

CT DEEP Commissioner Dan Esty and Deputy Commissioner Macky McCleary lead all of the materials management transformation events and provided facilitation for panel discussions.

[Transforming Materials Management for the 21st Century](#) **Roundtable**

DEEP Commissioner Dan Esty kicked-off the “[Transforming Materials Management for the 21st Century](#)” Roundtable conversation by stating that the goal was to identify strategies that can help increase CT’s recycling rate to 58 percent by 2024. He asked the participants to think about what a 21st century waste system should look like and how the State can design and implement such a system. The system should be cost-effective, based on environmental stewardship, and create jobs. His challenge to the group was followed by presentations by a variety of business, non-governmental organization (NGO), and consulting leaders. The Appendix presents detailed notes from the Roundtable.

Presentations

Kim Jeffery, President and Chief Executive Officer, [Nestlé Waters North America](#) talked about how his company has reduced plastic used in bottles from 20 to 9.2 grams, which saves raw materials and transportation costs. The Company’s recycling goal is 60 percent by 2018 for all bottles. Virgin polyethylene terephthalate (PET) is now less expensive than recycled PET, but he emphasized the difficulty with recycling low density polyethylene (LDPE) plastic. He made the following points about what his industry should do going forward:

- Take the lead and improve single stream collection;
- Lower the cost of packaging and recycle more;
- Figure out how to more cost-effectively utilize recycled plastic resins;
- Fund projects and not rely on government incentives; and
- Educate people about the importance of recycling and how to do it.

He described how Nestlé is working toward developing an extended producer responsibility (EPR) system for bottles that would be led by the industry and provide an alternative to bottle bills.

Howard Brown, Founder, dMASS.net provided a “1000 foot” view of the future of materials management. He noted the stresses on the environment – resources and land are constrained, and the earth’s crust is being depleted. He said that this situation calls for doing more with less. He talked about the development of new materials to reduce consumption of the volume of materials and the need to change the relationship between products and economic value. He asserted that waste is the result of poor product design, so designers need to focus on maximizing value with the fewest resources. Improving resource performance is the future of innovation. He gave an example of Duracell transforming itself into a portable energy supplier (and not just a battery manufacturer) with a focus on designing products that do not need batteries. Other examples include:

- MP3 players that get energy from the user’s skin, movement, fabrics, and sun;
- Solar collectors using bio-mimicry techniques to collect energy from the sun; and
- Self-cleaning windows by Anderson Windows.

He talked about the need to break materials down into their constituents so they are more easily recycled or reused to make new products. He warned against becoming dependent on waste streams for resources and that overall, we need to produce less waste. His view is that government’s role is to create incentives, standards, programs, and policies to encourage the needed innovations. Research institutions need to work more closely with industry to address opportunities and challenges.

If communities are moving toward single stream collection, he said that better processing systems to separate plastics and other materials that get contaminated are needed. He noted that measuring the amount of value delivered by a product and the amount of material it contains is necessary to helping the public understand the associated impacts. He also talked about the importance of measuring the use of earth’s resources and not just greenhouse gas emissions and that “gross national product” is not an adequate measure of economic success.

Allen Hershkowitz’s, Senior Scientist, [Natural Resources Defense Council \(NRDC\)](http://NaturalResourcesDefenseCouncil.org) presentation “[The State of Waste: A Review of Waste to Energy & Recycling Take-Back Legislation](#)” provided a global view of how to transform solid waste management. He stated that globally, about 45 billion tons of waste is generated annually. To manage this waste, communities rely on technologies, such as incineration. He said that 75 – 80 percent of the materials that make up MSW should be recycled. About 12 percent of all MSW is currently combusted in the U.S. for energy recovery; NRDC estimates that more than half of all this material is recyclable, compostable, non-renewable, or non-combustible and should be diverted from combustors through “fuel cleaning”. He asserted that overall, using most waste streams as a renewable fuel is not environmentally sustainable. Waste-to-energy is a more expensive source of energy per kilowatt hour (kWh) than other fuel sources, and the greenhouse gasses/kWh are comparable to natural gas and oil.

He said that nationally moving from a 33 percent recycling rate to 75 percent would create 1.5 million new jobs. Manufacturers pass off to local governments the external costs and environmental impacts of the waste their products create. He noted that bottle bills have their flaws, but they have been shown to be the most effective way to collect these containers. He proposed that government agencies examine the optimal route ecologically and economically for every material and promote that method.

Allen reported that in the European Union, the waste management breakdown is about 65 percent recycling, 30 percent waste-to-energy, and 5 percent landfill. Extended producer responsibility (EPR) programs driven by the private sector are part of the solution in Europe, and these programs are being developed and implemented throughout other parts of the world. NRDC is currently working in Rhode Island to explore an EPR program for packaging and printed materials that could save approximately \$17.5 million annually if producers and first importers take on the costs of recycling their packaging and paper products waste.

Allen suggested that there is a great need for public education to create a cultural shift to help people be more respectful of the earth. He noted that 13 percent of the public pay attention to science while 56 percent pay attention to sports; NRDC and its partners are running ads on recycling and waste reduction at sporting events to help reach this wide audience.

Nikhil Krishnan, Associate Principal, [McKinsey & Company](#) provided an overall economic perspective on sustainable materials management. He reviewed available data on the rise in commodity prices since 2000. He noted that incomes are rising in developing countries, and in China there are likely to be about three billion people that are new to the middle class in the foreseeable future. He discussed the difficulty and expense of replenishing the reserves of raw materials that are being consumed. He asserted that the current waste management system does not focus on capturing the value in waste and that there is a need to transition from traditional waste management to more effectively utilizing these resources. Some waste streams have significant value; for example gold in circuit boards. He noted that e-waste recycling is poised for significant growth and material recovery. He asserted that opportunities to have dialogues and reframe the issues are needed along with efforts to unlock barriers and bring investment capital to projects. He concluded by stating that the business case is strong, but requires multiple players to work together to create change.

Amy Perlmutter, [Perlmutter Associates](#) discussed the model of the [Chelsea Center for Recycling and Economic Development](#) at the University of Massachusetts as an effective way to promote a sustainable materials economy. The Center created a brand, “Remade in Massachusetts” and worked with manufacturers to promote the use of recycled content. It supported demonstration projects and materials testing and issued community grants. When they surveyed recycling businesses about what they want from government, they found that the companies are seeking clean materials, help with product marketing, consumer education, funding, and connections with researchers.

She said that there is a need for partnerships and help with entrepreneurial training. She suggested that Connecticut involve communities, bring people together, provide more education and assistance, create competitions on who can build the best product out of recycled materials,

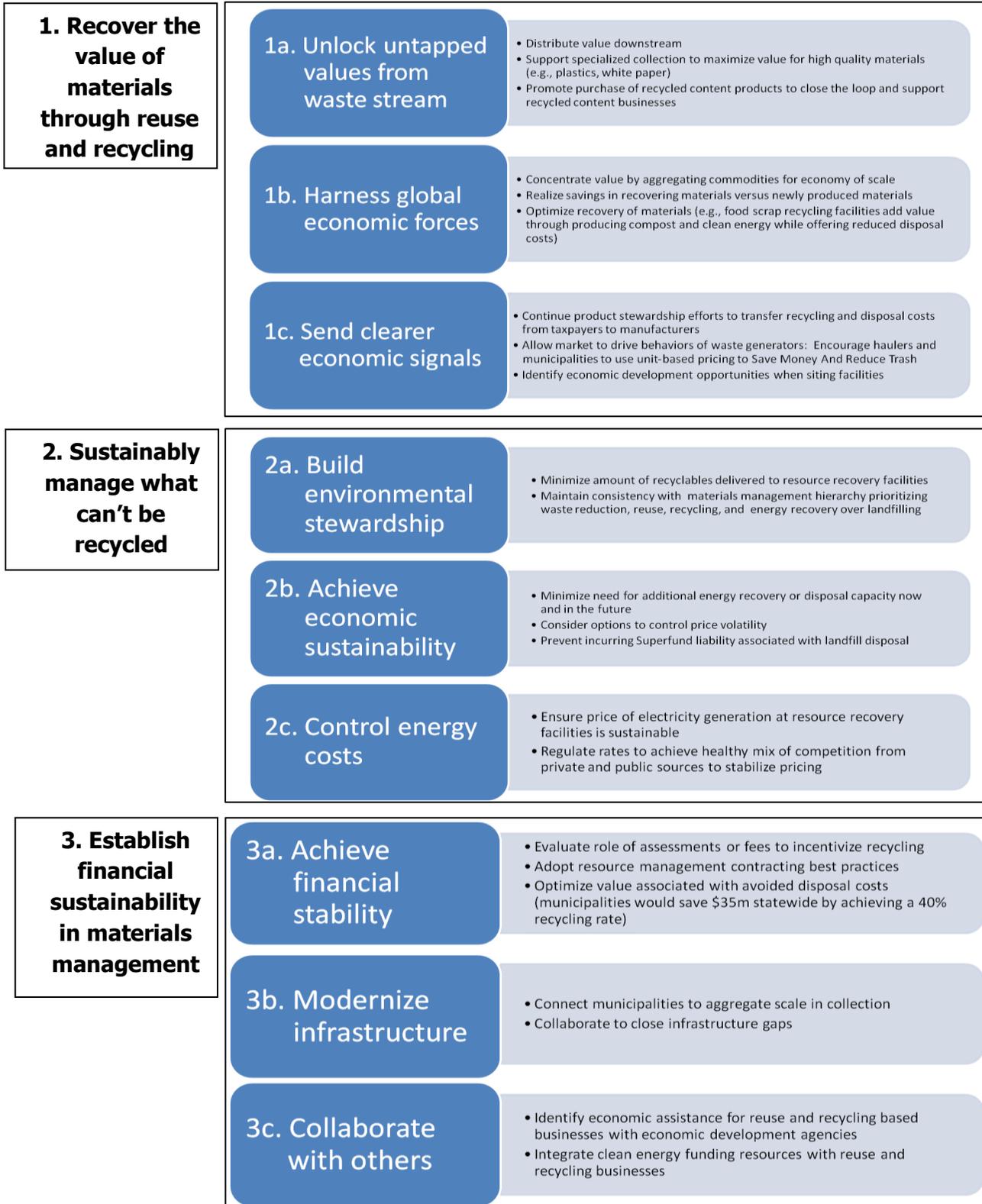
develop government contracts for products with recycled content to help with market development, work with venture capital firms to create partnerships, create business/municipal cooperatives, start with small businesses, develop minimum recycled content standards, use manufacturing extension programs to create partnerships and dialogue, help generate clean sources of materials, and engage all players. Based on her experience, she expects job growth in reuse and manufacturing of about 40 percent. She noted that more people in California work in recycling and waste management than in the film industry. She also discussed how product stewardship programs can work with local businesses.

In summary, key messages from the Roundtable are illustrated in Figure 1 and include:

- Recover the value of materials through reuse and recycling;
- Sustainably manage what cannot be recycled; and
- Establish financial sustainability in materials management.

These themes provided the framework for the following three Summits and the Product Stewardship meeting. Presenters throughout these events discussed ideas for increasing recycling, composting, and reuse of targeted waste streams and model programs that could be adapted for implementation in Connecticut.

Figure 1



[Unlocking the Value: Transforming the Connecticut Materials Economy](#) **Summit**

The “Unlocking the Value: Transforming the Connecticut Materials Economy” Summit brought together a wide array of practitioners of innovative waste reuse and recycling programs to provide models and lessons learned. Over the course of the day, with multiple tracks, speakers presented inspiring stories of creativity and resourcefulness to help promote innovative thinking and ideas on transforming CT’s materials economy. Topics included organics recycling, challenges finding recycled feed stocks for local manufacturing, economic and community development opportunities for reuse and recycling businesses, and product stewardship programs.

All of the participants received an interesting article prepared by students from the Yale School of Forestry in partnership with DEEP, called [Unlocking the Value: Transforming the Connecticut Materials Economy](#), March 2012. The article describes the different quantities of materials remaining (i.e., unlocked) within the waste stream. Its intent was to measure the flow of materials through business, cities, and Connecticut towns to identify and quantify the potential to transform ‘waste’ into drivers of new products, new markets, new businesses, and new jobs as recommended in the [State Solid Waste Management Plan](#). (See Figure 3 for diagrams of locked and potentially unlocked materials economies).

Presentations

Terry McDonald’s, [St. Vincent De Paul](#), presentation, “[St. Vincent de Paul Society of Lane County: Treating Waste as an Asset](#),” provided an example of the potential for reuse by describing their innovative waste-based business initiatives. His theme centered on the idea that, “There is no such thing as trash. There are only resources waiting to be harvested. Think creatively about reuse and recycling.” St. Vincent DePaul has demonstrated tremendous success in their reuse programs.

Alison Keane’s, [American Coatings Association \(ACA\)](#), presentation, “[PaintCare](#)”, focused on paint waste as a major challenge for household hazardous waste (HHW) programs because of cost and volume. The ACA has transformed its view and approach to waste paint management and is now:

- Partnering with government to affect change;
- Focusing in helping to shift responsibility for end-of-life management of products from tax and rate payers to producers and consumers;
- Recognizing the value in left-over paint and containers; and
- Building a system to support new recycling opportunities.

John Segala’s, [Amazon Paints](#), presentation “[Amazon, Select Paint](#)”, described the company’s paint recycling program. His presentation complemented the points made by the ACA. He discussed why it is important to buy recycled paint and described their quality and environmentally preferable attributes. He noted that the resources that go into making a gallon of virgin paint are saved when consumers purchase recycled paint. Paint recycling also has higher energy savings than steel or glass recycling, and it keeps leftover paint out of landfills. Amazon’s paints are priced below comparable virgin paint and appeal to environmentally

conscious customers. Finally, he described how recycled paint can be specified in contracts for building or maintaining government facilities and can help builders obtain [Leadership in Energy and Environmental Design \(LEED\)](#) credits.

Susan Collins's, [Container Recycling Institute \(CRI\)](#) presentation, "[CRI's Jobs Study: Returning to Work](#)" described their efforts to:

- Measure the direct impacts of increased recycling of beverage containers, including glass, aluminum, and plastic on domestic jobs; and
- Compare and quantify container deposit return (CDR) programs, curbside recycling, and landfilling.

CRI created a calculator, "Measuring the Impact from Recycling on Jobs" to support their recent study that addresses these topics. They found that ton for ton deposit-refund systems require one and a half to four times more employees for collection and transport to the materials recovery facilities (MRF) than curbside systems. They concluded that a deposit refund collection system for beverage containers creates many more domestic jobs than curbside collection (and these are local jobs) and improved material quality directly impacts U.S. jobs; and clean/separated recyclables are more likely to stay in the U.S. for use by domestic manufacturers and not be exported to foreign markets.

Resa Dimino's, Recycling & Sustainable Materials Management Policy & Planning Services presentation "[Product Stewardship is Good for Business](#)", described her research on the impacts of product stewardship programs. She has found that product stewardship improves the bottom line for business and government; involves minimal government intervention; levels the playing field for all participants; helps make businesses green; and helps create green businesses.

Several speakers discussed the importance of reducing the amount of organic waste, particularly food and yard waste that is disposed of and the value of composting and anaerobic digestion. [Lorenzo Macaluso](#), [Center for EcoTechnology \(CET\)](#) described the benefits of composting food and yard waste by emphasizing the potential cost savings, connection to sustainability goals, local processing and support for farms, regulatory compliance, and customer demand. He described CET's food waste reduction work with a variety of sectors, including restaurants and coffee shops, hospitals and large caterers, corporate cafeterias, venues, supermarkets, universities and colleges, and food processors.

Lee Kane's, [Whole Foods](#) presentation "[I Sort; Therefore, I Am](#)", provided an example of how one grocery chain is advancing sustainable materials management throughout their stores. He noted that Whole Foods stores generate, on average, about 15 tons of "stuff" a week that goes out the back door. After diverting organics for composting, they are left with about 10 percent that is challenging to divert. The economics favor diverting organics for composting at their stores.

C.J. May's, Yale University, presentation "[Organics in the Ivory Tower, Lessons in Collecting Food Waste at Colleges and Universities](#)", described the lessons learned at Yale with collecting organics for composting. He stated that a successful program should involve:

- Pilot testing;

- Measuring;
- Labeling barrels and cans;
- Education and outreach;
- Inspecting facilities; and
- Institutionalizing.

He described the results of Yale’s program and their plans to address the challenges of expanding the program.

Chris Field’s, [GreenCycle](#), presentation, “[Food Waste Composting](#)”, discussed the benefits of food waste composting and described one of the available systems. He noted that according to the U.S. EPA, food waste comprises 14 percent of the waste stream. Significant increases in MSW recycling rates depend upon reducing the component of MSW. A properly performed composting system produces a marketable beneficial product returning nutrients to the soil. One example is small volume [windrow composting](#). Programs that have implemented this system have found:

- No odor issues, but odor potential especially when receiving and mixing;
- No vector issues;
- Minimal or no impacts to ground and surface water (based on the available data);
- Probably not economically viable as stand-alone project;
- Limited scalability;
- Source materials from a larger area to create needed scale, which increases hauling costs and impacts project economics;
- Proper siting is critical; and
- Concerns about future availability of bulking agents.

Wayne Davis’s, [Harvest Power](#), presentation, “[Anaerobic Digestion Opportunities and Challenges for Connecticut](#)” described their anaerobic digestion (AD) system, which mimics the processes that occurs in a cow’s stomach. They use similar micro-organisms in a large chamber, and capture and utilize the biogas as it is produced. They are able to optimize biogas production by creating an ideal environment for the microbes to do their work. Their system is able to recycle residential, commercial, industrial, and institutional organics using technologies that maximizes odor control and produces clean, reliable, and renewable energy. The advantages of AD for organics waste management include:

- Reduced greenhouse gas emissions;
- Local energy independence;
- Minimized footprint that allows for expansion; and
- Creation of nutrient-rich compost and fertilizer end products.

Dale Hedman’s, [Clean Energy and Finance Investment Agency \(CEFIA\)](#) presentation, “[Building State-Wide Capacity for Food Scrap Recycling](#)” described their three-year pilot program to support through loans, grants or power purchase agreements for Connecticut farms and other businesses using organic waste with on-site anaerobic digestion facilities to generate electricity and heat. Through the program, CEFIA:

- May approve no more than five projects, each of which shall have a maximum size of 1,500 kilowatts (kW) at a cost of \$450 per kW; and
- Allocate \$2 million annually to support the pilot program.

Michael D’Auria’s, [Fusion Paperboard](#), presentation, “[Manufacturing and Product Development Using Recycled Content](#)”, a CT-based paper recycler described their successful efforts at manufacturing and developing new products using recycled content. They can keep over 288,000,000 pounds of boxes out of landfills each year.

Day Moore’s, [GG2G](#), presentation “[Revitalized, GG2G: The Billboard Collection](#)”, provided another example of a Connecticut business that is committed to reuse and recycling. They make purses and other products out of used billboards and have found a robust market interested in purchasing their products. There are over 400,000 billboards along major U.S. interstates, with another 300,000 dispersed along minor roads. Some of these billboards are changed weekly and most weigh between 65 and 100 pounds. By recycling the materials from these billboards into new products, GG2G has been able to

- Reduce waste in landfills;
- Salvage materials locally;
- Manufacture locally;
- Hire locally; and
- Make beautiful things from salvaged materials with little additional energy.

Their biggest challenge lies not with finding materials but in finding the skilled labor to manufacture their products while remaining sustainable, keeping their carbon footprint low, and doing more than the status quo. The solution that is working for them is to establish a full service, cost effective “Made in the U.S.A.” cut and sew company that provides fair wage jobs, onsite education and training; and employment to low income, minority and non-English speaking individuals.

Jeff Leichtman’s, [BGreen 2020](#), presentation “[BGreen 2020 Sustainability Plan for Bridgeport, CT](#)” outlined the policies and actions to be implemented in the next decade to improve the quality of life, social equity, and economic competitiveness of the City while reducing carbon emissions and increasing the community's resilience to the effects of climate change and increasing energy costs. The program management team, led by a Regional Plan Association, convened the efforts of more than a hundred stakeholders in a Community Advisory Committee and working groups to develop strategies to address brownfields and land use, pedestrian and transit access, renewable energy production, and environmental protection while supporting the growth of green jobs.

Sean Duffy’s, [ReCommunity](#), presentation “[Innovations: The Latest and Greatest in Collection and Processing](#)”, described an example of a local group that receives, processes, and markets more than 100,000 tons per year of single-stream recyclables for the CT Resource Recovery Authority. They provide 42 jobs for residents and have developed an innovative facility design that enhances the quality of the outbound materials. The key components of their success are:

- Putting safety first;
- Understanding inbound composition;

- Designing for maximum recovery;
- Focusing on quality;
- Knowing the end markets; and
- Matching investment with throughput.

[Capturing the Value: Transforming Municipal Materials Management Summit](#)

The “Capturing the Value: Transforming Municipal Materials Management” Summit brought together municipal leaders, haulers, and others to discuss the practical fiscal and environmental challenges facing municipal governments and models and lessons learned to help address them. Participants learned about infrastructure, collection issues, unit-based pricing, and how zero waste policies could be implemented at the local level. In addition, a vendors’ room helped participants to network and partake in learning about current issues and how to be part of the transformation. The displays included [Bigbelly Solar](#); [DEEP Recycling](#); [EPA Region 1](#); [Got Books](#); [GreenCycle of CT](#); [Harvest Power](#); [Park City Green Mattress Recycling](#); [Recycle Away](#); [Recyclebank](#); [SMART](#); and [Tags, Bags & Containers](#).

Presentations

Donna Barlow-Casey’s, [Center for Sustainable Practices](#), presentation, “[Finding the Opportunities in Waste](#)”, provided an overall vision for an effective municipal materials management systems by describing the need for:

- Downstream resource recovery through recycling and composting;
- Mid-stream product longevity through reuse, repair, and durable design;
- Upstream waste reduction through redesign, procurement, and purchasing initiatives;
- Producer responsibility; and
- New rules applied to products and materials that fall outside of these initiatives.

She asserted that organics diversion offers a wide path towards waste reduction opportunities because they represent such a significant percentage of the waste stream, and, because they intersect with issues related to hunger, climate change, energy independence, soil security, farm viability, and more.

Michael Alexander’s, [Recycle Away](#), presentation, “[Communities on the Path to Zero Waste](#)”, discussed the importance of zero waste strategies for improving local government SMM programs. Figure 2 illustrates his view of zero waste. He noted that key zero waste measures include:

- Universal curbside recycling and composting collections;
- Yard waste drop-off centers;
- Unit-based pricing or pay-as-you-throw;
- Minimum 25 percent construction and demolition debris recovery by incorporating recycling requirements and deconstruction into green building codes;
- Education of the public and businesses;
- Mandatory recycling and composting at homes and businesses;
- Trash service every other week, not weekly;

- More local zero waste infrastructure, including local:
 - CHaRMs (Center for Hard-to-Recycle Materials),
 - Reuse for used building materials (UBM's), and
 - “Reuse retail” businesses (thrift and repair);
- Mandatory participation across all sectors, including industrial, construction, and multi-family units;
- Producer responsibility policies:
 - Industry phases out toxic products to increase recovery potential,
 - Industry funds collection of hard-to-recycle products and packaging, and
 - Industry is rewarded for design-for-recovery; and
- Local markets for all discards – 85 percent of materials have a market today.

He advises that to increase recycling states should:

- Establish aggressive goals;
- Enact disposal bans;
- Expand bottle bills;
- Build local recycling capacity;
- Modernize infrastructure;
- Introduce product stewardship legislation;
- Expand market development; and
- Provide local government funding.

Jennifer Weymouth’s, CT DEEP, presentation, “[Save Money and Reduce Trash \(SMART\)](#)” provided numerous examples of communities that have successfully implemented unit-based pricing or pay-as-you-throw systems. She described how these programs have substantially reduced waste generation and lowered costs for municipalities. Based on her review of many successful SMART initiatives, she advises that communities:

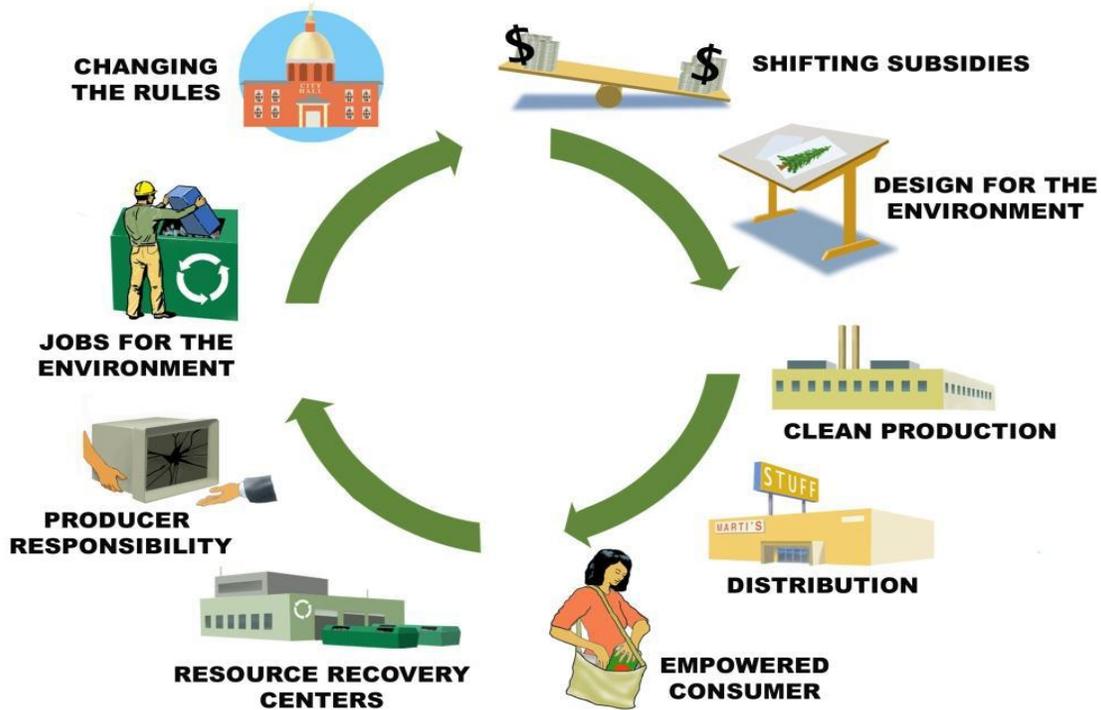
- Introduce unit-based pricing when other changes are taking place in town;
- Change their pricing system when adopting single stream collection or automated collection;
- Change their pricing systems when renewing hauler contracts; and
- Change the way households pay so they can control costs.

Natalie Starr’s, [DSM Environmental Services](#), presentation, “[Optimizing Services: Municipal Collection Contracting](#)”, focused on ideas for improving the collection of recyclables. She noted that this requires three key components:

- A collection infrastructure that makes it easy for residents to participate, including
 - Large carts,
 - Same day as garbage collection, and
 - Single stream collection of a wide range of materials;
- A consistent educational and promotional message; and
- An economic incentive to recycle.

Figure 2

ZERO WASTE SYSTEM



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She described several collection options, including:

- Subscription / free market, where haulers compete for customers (the standard for commercial collection);
- Franchises that are typically non-exclusive involving a specified service term and licensed haulers that are responsible for billing households or businesses; and
- Municipal collection contracts primarily for residential collection, in which the municipality specifies service terms and pays fee to private contractor and then recovers cost through property tax, separate utility billing, pay-as-you-throw (PAYT) pricing, or some combination.

Robert J. Metzler's, [Cohn, Birnbaum, Shea](#), presentation, "[Connecticut Municipal Solid Waste Contracting Issues, Collection, and Disposal](#)", provided more insights into how municipalities can structure their costs and meet their legal obligations. His basic message focused on the need to control waste collection so that a municipality can foster greater efficiency and more recycling, and lower costs.

Roger Guzowski's, [Connecticut Resources Recovery Authority \(CRRA\)](#) and [Northeast Resource Recovery Association \(NRRA\)](#) presentation "[Contracting for Sustainable Materials Management, Recycling, and Solid Waste Services for Schools](#)", described their work with K-12 schools to promote waste reduction and increase recycling. He stated that schools need to start their efforts by knowing what they have; familiarizing themselves with [Institute of Scrap Recycling Industries \(ISRI\)](#) specifications; and understanding the form of the materials (i.e., loose, compacted, baled), how much there is, and how it is aggregated and stored.

He discussed the importance of using procurement to advance waste reduction at schools. They can buy more durable and repairable products, focus on classroom furniture that has bolts not rivets so they can replace desk tablets or chair cushions without replacing whole units, and develop procurement policies that focus on reducing packaging or other materials. Unlike municipal trash, schools have a say about what comes into their facilities and should consider disposal costs in purchasing decisions and use their purchasing power to negotiate both pickup and delivery of products, not just delivery.

Mark Moriarty's, City of New Britain, Connecticut presentation, "[Tracking Participation: Not Just Recycling Rates](#)", described their efforts to increase recycling and reduce waste. Their goal has been to make recycling a habit. When they started their effort, they needed data that went beyond their recycling rate. They wanted to find out the rates of participation in the recycling program. They conducted a "City-Wide Recycling Survey" in February 2010 and developed a database with the information. The overall results of this effort found:

- An initial per property participation rate of 95 percent; and
- On-going enforcement effort increased this rate by a total of 3.5 percent.

They have been working on ideas for evolving and monitoring their process with a goal of 100 percent participation in recycling. They found that performance rates and participation rates are not the same and high participation rates can be achieved in any community. They advise communities to start with an accurate benchmark and to tailor public outreach and enforcement efforts to specific audiences.

Mike Paine's, [Paine's Inc.](#) presentation, "[Trash and Recycle Services for the Private Subscriber Sector](#)", described their efforts as a local hauler to transition to automated single stream recycling for the communities they service. The company listened to their customers who wanted to improve the environment while making recycling easier. Their new system has made recycling much simpler. They now have a blue barrel for recycling and green barrel for trash.

Launching Innovation: Transforming Materials Management in Connecticut Summit

The “Launching Innovation: Transforming Materials Management in Connecticut” Summit brought together a group of experts to propose models and ideas for what changes Connecticut should make in the future.

Presentations

Jeri Weiss’s, [EPA Region 1](#) presentation, “[Pathways to Zero Waste](#)”, provided an overview of zero waste policies and programs. She described the components of zero waste as:

- Comprehensive recycling that can handle multiple materials, is as convenient as trash pickup, and available to all generators;
- Organics diversion, including yard trimmings, food scraps, and compostable paper;
- C&D debris diversion that is generator- and hauler-based and involves facilities;
- Policies, including new rules, disposal bans, mandatory recycling, product stewardship, and comprehensive outreach and technical assistance; and
- Infrastructures at the neighborhood scale that include reuse and recycling, materials recovery, C&D materials processing, and organics processing.

Kristin Brown’s, [Green Waste Solutions](#), presentation “[South Carolina’s Recycling Market Development Advisory Council and New Mexico’s Recycling Coalition Recycling Energy Stimulus Grant Project](#)”, asserted that the only way to immediately and sustainably reduce residential waste is through pay-as-you-throw (PAYT) programs. As part of such programs, there is a need for consistent measurement and that using per capita waste disposal as a benchmark could be important. She presented a summary of available results from PAYT programs around the U.S. She believes that it is useful to separate the commercial sector from the residential sector and measure their waste trends separately.

Kerrin O’Brien’s, [Michigan Recycling Coalition \(MRC\)](#) presentation, “[Recycling in Michigan, A Way Forward](#)” described the efforts of the Coalition to develop a comprehensive program to help the State achieve a 50 percent recycling goal. Their proposal as outlined in a recent [Report](#) includes initiatives for:

- Measurement and data collection;
- Education and technical assistance;
- Market and economic development;
- County solid waste planning;
- State solid waste policy administration; and
- Community services and infrastructure.

The MRC Report identified potential funding mechanisms for the proposed program, including:

- A landfill surcharge;
- General fund sources;
- Changes to Michigan’s bottle bill; and
- A sustainability fee.

She said that MRC has examined changes to their bottle bill, which includes a bottle deposit – refund and instead creating a sustainability fee on all retail transactions over \$2. The idea of this fee is to help consumers connect consumption with waste.

Lynn Rubinstein’s, [Northeast Recycling Council \(NERC\)](#) presentation, “[Recycling Market Development Opportunities](#)”, discussed ideas for next steps for Connecticut based on NERC’s efforts over the past two decades. She described ideas for development of a regional recycling markets database and a regional recycling markets center. Other ideas include:

- Educate the public to make the relationship of economy, reuse, and recycling more widely understood;
- Develop more active environmentally preferable purchasing (EPP) programs;
- Create reciprocity for state beneficial use determinations;
- Create loan funds and grants and provide tax credits for reuse and recycling;
- Engage state economic development agencies;
- Create recycling investment forums and opportunities for educating investors;
- Develop consistent legislative strategies among states in the region, including disposal bans, mandatory recycling, and EPR;
- Create educate programs for reuse and recycling businesses;
- Fund research and development; and
- Streamline permitting.

David T. Hudson’s, [Strategic Materials, Inc.](#) presentation “[Glass Recycling Overview](#)”, discussed his company’s glass and other recycling businesses. He noted that using recyclables saves energy, creates jobs, reduces reliance on foreign-sourced materials and energy, prolongs equipment life, and reduces emissions. He described the current high demand for recycled glass. His industry has set goals for recycling, including 50 percent for glass; 50 percent for plastic, and 75 percent for aluminum. He noted that consumers are demanding sustainable packaging, and Strategic Materials is working on meeting this demand. His ideas for addressing the needs of the recycling industry include:

- Continued education and awareness campaigns on the benefits of recycling in schools and public spaces;
- Policy changes, including EPR programs, container deposits, and landfill and disposal bans;
- Stewardship programs, including industry-funded curbside collection;
- Expansion of single-stream programs;
- PAYT systems;
- Required public space and event recycling;
- Improved materials recovery facilities (MRF) and processor technology to more effectively separate materials;
- Collaborative industry-centric programs; and
- Focus on untapped markets, such as bars and restaurants and commercial recycling.

[Product Stewardship Stakeholder Meeting](#)

About 40 attendees representing and CT State agencies, municipalities, Connecticut legislators, recyclers, waste management firms, and non-governmental organizations participated in a meeting to develop a path for future product stewardship in the State. The [Product Stewardship Institute](#) (PSI) prepared a November 2012 briefing document, "[Setting Product Stewardship Priorities for Connecticut](#)", which provided background information for the stakeholders at the meeting. As defined in the Report, while product stewardship can be either voluntary or regulatory, extended producer responsibility is a regulated approach. PSI sent a draft of the Report to the meeting participants prior to the meeting. The final version incorporates decisions made during the meeting. The meeting participants recommended the following products as priorities for EPR laws in CT in the near term (in order of priority):

1. Mattresses
2. Carpet
3. Batteries
4. Fertilizers and Pesticides
5. Packaging

Summary & Observations from Waste Transformation Dialogue

The Roundtable, Summits, and product stewardship meeting generated many ideas and suggestions for helping Connecticut reduce the generation of MSW and increase the rate of recycling to 58 percent by 2024.

Macky McCleary's, CT DEEP wrap-up presentation, "[Waste Transformation Emerging Insights and Next Steps](#)" at the final Summit, focused on the following issues:

- Current system and municipal costs are too high;
- Current system is too complex;
- Lack of useful data hinders progress;
- Commodity extraction is too low; and
- System infrastructures need to be diversified.

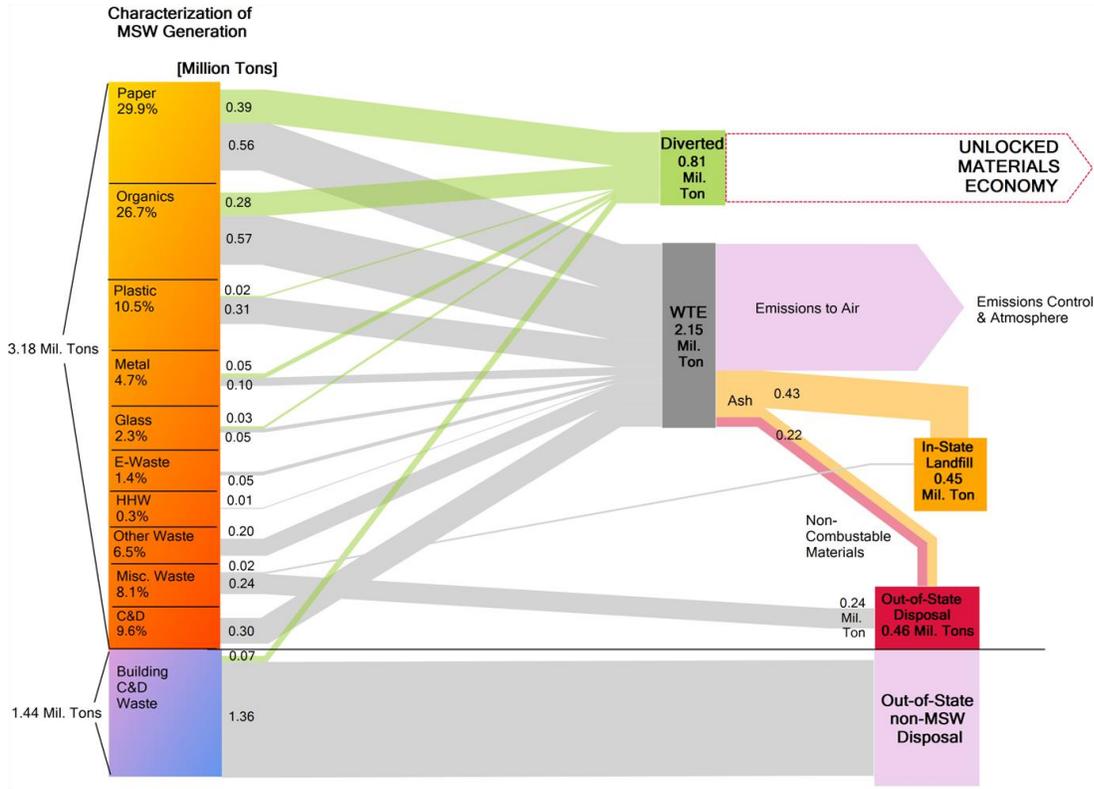
Major cost drivers include collection costs, fragmentation and duplication driven by municipalities, and too many transfer stations and some that are not optimally located. The current system in Connecticut is heavily reliant on waste-to-energy. Most waste management is paid through property taxes, which socializes the cost across the community and creates a situation where some citizens are subsidizing the costs of others. This system does not provide the needed price signals to drive lower disposal and higher recycling and composting. Figure 3 depicts the gaps in the current waste system for extracting value.

There are a number of issues facing Connecticut that create opportunities for innovation to address these issues, including:

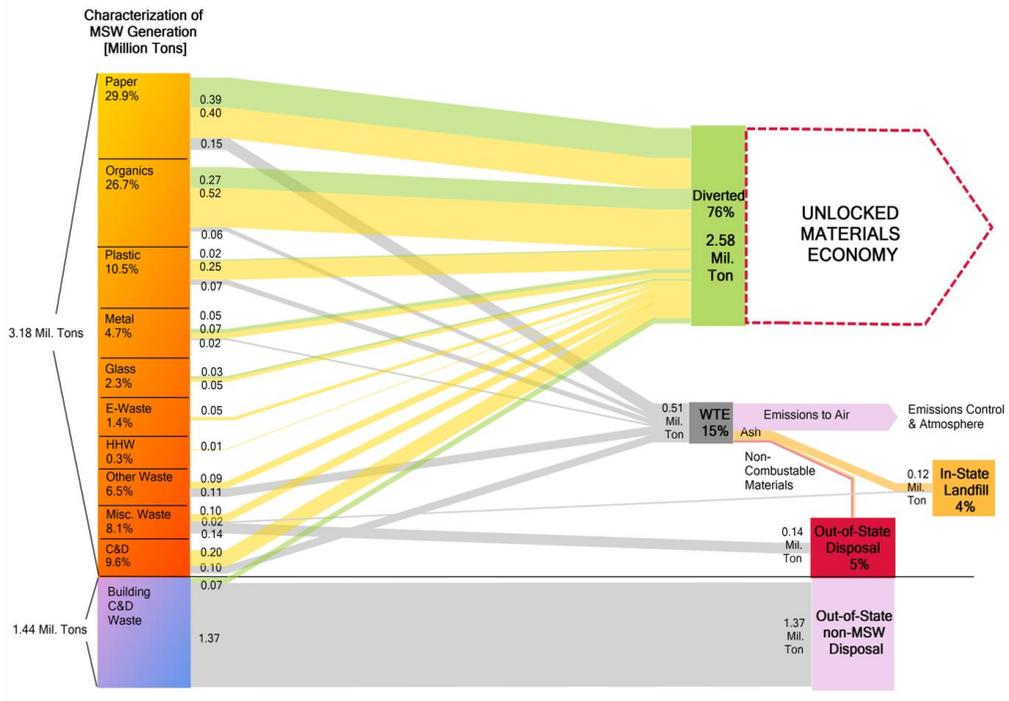
- Low and declining natural gas prices, driving electricity prices down;

Figure 3

Sankey Diagram Depicting Waste Characterization and “Locked” Flows FY2010



Sankey Diagram Depicting Economic Opportunities with “Unlocked” Waste Flows FY2010



- Electricity contracts for the resource recovery facility that will be ending soon; and
- High and increasing costs facing municipalities responsible for MSW disposal and declining budgets.

Given electricity pricing, incineration is not the most efficient way to extract value from waste. Greatly expanded reuse and recycling, particularly of high value communities, is needed to accomplish this.

Presenters and stakeholders recommended that addressing the costs to municipalities and creating optimal price signals would require implementation of pay-as-you-throw (or SMART or unit-based pricing). Presenters shared extensive data from various communities around the U.S. that have successfully implemented these programs.

To expand value extraction from CT MSW, a number of presenters and stakeholders discussed the need for implementing more extended producer responsibility programs. These programs have demonstrated their ability to achieve a high recovery rate, be flexible, place responsibility for the product's end-of-life onto the producer and not the government, and increases extraction of value.

Several presenters throughout the transformation events talked about zero waste as a framework for sustainable materials management. This framework encompasses much of what others described, including EPR, SMART, closing the loop, increasing waste reduction and reuse efforts, and supporting an increase in organics composting and anaerobic digestion. Zero waste emphasizes “upstream” efforts, including product redesign and waste reduction and increasing “downstream” efforts, such as EPR and reuse programs, while recognizing the industry and/or businesses that provide these resources as adding significantly to local economies.

Presenters also discussed opportunities for regional aggregation of materials to help improve the economics for recyclers interested in using waste as raw materials. The examples of successful recycling business based in Connecticut demonstrate that with the right incentives and a critical mass of the materials, the industry can develop and create in-state jobs.

A number of presenters discussed the need for improvements in organics management, including food and yard waste. This is a large portion of municipal solid waste (MSW) whose value is currently underutilized. The infrastructure is not yet in place to recover significant quantities of organics in Connecticut. Improving organics waste management represents one of the greatest opportunities for job creation. Creating the composting and anaerobic digestion infrastructure for Connecticut will require long term contracts for haulers, private investment particularly in new processing capacity, and more efficient and effective collection systems. There may be opportunities in Connecticut to reduce collection costs of other waste materials, through reduced fragmentation of the existing collection system, to help fund increased organics recovery.

The following provides recommendations for next steps within Connecticut and for regional efforts that Connecticut could help to support. **The key options for next steps for actions within Connecticut include:**

- Follow-up on Governor’s Recycling Working Group recommendations in their December 2012 Report;
- Take advantage of the renegotiated municipal contracts to optimize materials recovery;
- Modernize municipal pricing systems to provide economic signals that focus on saving money through greater reuse and recycling;
- Move to web-based data collection to simplify reporting and improve data quality;
- Make the connection between recycling as a business that creates green jobs;
- Coordinate efforts among all state agencies including, DEEP, DECD, and CEFIA;
- Attract interest from organics recycling facilities to help fill infrastructure gap; and
- Advance priority list EPR legislation, which includes mattresses.

The [Product Stewardship Institute](#), a national non-profit membership-based organization located in Boston, Massachusetts could assist CT DEEP and stakeholders in the State with advancing EPR legislation for mattresses and other key products. The Institute works with state and local government agencies and partners with manufacturers, retailers, environmental groups, federal agencies, and other key stakeholders to reduce the health and environmental impacts of consumer products.

The results of the year-long discussions in Connecticut can help inform and inspire action on a broader regional level. Since many solid waste recycling and disposal services for Connecticut-generated waste are located outside of the State, there is a high degree of interdependence for waste management. There are also several organizations, including [NERC](#) and [NEWMOA](#), which foster regional collaboration on waste management. Efforts to collaborate regionally on the outcomes of the Connecticut forums should involve these organizations.

Some ideas for Connecticut’s next steps toward regional collaboration include:

- Convene a regional meeting of state environmental agencies to review results of Connecticut’s transforming solid waste management efforts, discuss the status of efforts focused on capturing the value of waste materials in other states, and find common ground on next steps – possible lead organization: NEWMOA, additional state funding may be necessary;
- Coordinate regionally on the development of standards, criteria, and best management practices for food and yard waste – possible lead organization: NEWMOA, additional state funding may be necessary;
- Advance efforts regionally to coordinate data sharing and analysis; move together toward more electronic data collection and management systems; and identify opportunities for regionalization of these functions – possible lead organization: NEWMOA, additional state funding may be necessary;
- Develop a zero waste professional social network to support state and local zero waste programs – lead organization: NEWMOA, under development;
- Support regional coordination on implementation of product stewardship laws – possible lead organizations: NEWMOA and PSI collaborating, additional funding may be necessary;
- Present results of Connecticut’s efforts to recyclers and other private stakeholders in the Northeast – possible venues could include a NERC conference, Regional Solid Waste

Association of North America (SWANA) workshop, Environmental Business Council (EBC) meeting, and NRRA conference;

- Expand the recycled materials database, based on the existing New York database (which is managed by NERC), to cover CT and other states in the Northeast – lead organization: NERC, additional funding would be necessary;
- Develop a northeast center for markets development for recycled materials within the region– possible lead organization: NERC, additional funding, particularly from the private sector, would be necessary;
- Expand the regional reuse marketplace – possible lead organization: NERC, additional funding would be necessary;
- Support regional coordination on developing product stewardship legislation – possible lead organizations: PSI, NERC, and NEWMOA, additional funding would be necessary.

NERC is a multi-state non-profit organization that is committed to environmental and economic sustainability through responsible solid waste management. NERC's mission is to advance an environmentally sustainable economy by promoting source and toxicity reduction, recycling, and the purchasing of environmentally preferable products and services. Its programs emphasize source reduction, reuse, recycling, composting, environmentally preferable purchasing (EPP), and decreasing the toxicity of the solid waste stream in the ten-state region comprised of Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. NERC's member states make up one-sixth of the nation's population. The members of NERC's Board of Directors represent state recycling and economic development agencies in the participating states. NERC also includes Advisory Members who join as non-voting members, thereby giving interested businesses and associations the opportunity to participate.

NEWMOA is a non-profit, nonpartisan interstate association that was established by the governors of the New England states as an official interstate regional organization, in accordance with Section 1005 of the federal Resource Conservation and Recovery Act (RCRA), to coordinate interstate hazardous and solid waste activities. The organization was formally recognized by the U.S. EPA in 1986. NEWMOA's membership is composed of the state environmental agency directors of the hazardous waste, solid waste, waste site cleanup, emergency response, pollution prevention, and underground storage tank programs in Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

NEWMOA's mission is to develop, lead, and sustain an effective partnership of states that helps achieve a clean, healthy, and sustainable environment by exploring, developing, promoting, and implementing environmentally sound solutions for:

- Reducing materials use and preventing pollution and waste,
- Properly reusing and recycling discarded materials that have value,
- Safely managing solid and hazardous wastes, and
- Remediating contaminated sites.

The overall organizational goals are to:

- Improve the management of waste in the region, including advancing greater waste reduction, reuse, and recycling;
- Improve the capacity of state staff to implement waste management, pollution prevention, toxics reduction, and waste site clean-up programs and regulations;
- Promote interstate coordination on understanding and addressing priority issues;
- Facilitate development and implementation of regional approaches to solving critical environmental problems;
- Articulate state program views on federal rulemakings and other policy developments; and
- Facilitate communication and cooperation among member states, between the states and the U.S. EPA, and between the states and other stakeholders.

NEWMOA has organized its activities into the following program areas:

- Hazardous waste;
- Sustainable materials management and solid waste;
- Waste site cleanup;
- Assistance, pollution prevention, and sustainability;
- Priority chemicals; and
- Cross program initiatives.

Appendix

Roundtable: Transforming Waste Management for the 21st Century

Agenda, Bios, & Presentations available at:

www.newmoa.org/solidwaste/cwm/transformwm/

January 18, 2012

Hartford, CT

Sponsored by the Connecticut Department of Energy and Environmental Protection (CT DEEP)

Co-sponsored by the Northeast Waste Management Officials' Association (NEWMOA) and
EPA Region 1

Introduction & Welcome

Dan Esty, Connecticut Department of Energy and Environmental Protection (DEEP)

Commissioner

- Recycling rates have hit a plateau of about 30 percent;
- Roundtable goal: identify strategies that can help increase the rate to 58 percent by 2024;
- Context: strategies that worked 30 years ago need to change;
- Challenge: how we can view waste from a fresh perspective?;
- What would a 21st century waste system look like, and can we design and implement such a system?; and
- Overarching goals for system: cost-effective, based on environmental stewardship, job creation.

Panel – Visions for the 21st Century

Kim Jeffery, President and Chief Executive Officer, Nestlé Waters North America

- Nestlé has reduced plastic used in bottles - 20 to 9.2 grams, which saves raw materials and transportation costs;
- Company's recycling goal is 60 percent by 2018 for all bottles;
- Virgin PET is now cheaper than recycled PET; can't recycle LDPE plastic;
- Industry needs to take the lead and improve single stream collection; lower cost of packaging and recycle more;
- Need to figure out how to cost-effectively utilize recycled plastic resins;
- Work toward developing an extended producer responsibility (EPR) system for bottles that would be led by the industry and provide an alternative to bottle bills;
- Private projects need to be funded by industry; states need to provide approvals; industry should self fund and not rely on government incentives; and
- People need to know how to recycle; need public education.

Howard Brown, Founder, dMASS.net

- Major stresses on the environment – resources and land are constrained, and the earth's crust has been depleted;
- Situation calls for doing more with less;

- New materials are being developed to reduce consumption of the mass of materials;
- Need to change the relationship between products and economic value;
- Example – Duracell: a portable energy supplier rather than a battery company; focus on designing products that do not need batteries;
- Example – MP3 players that get energy from user’s skin, movement, fabrics, and sun;
- Example – improve the efficiency of solar collectors by using bio-mimicry techniques;
- Example – self cleaning window by Anderson Windows;
- Need to break down materials into constituents so they are more easily recycled/reused to make new products;
- Do not become dependent on waste streams for resources; need to produce less waste;
- Waste is the result of poor product design; focus on maximizing value for fewest resources;
- Improving resource performance is the future of innovation;
- Government’s role is to create incentives, standards, programs, and policies;
- Research institutions need to work more closely with industry to address opportunities and challenges;
- If moving toward single stream collection, need better processing to separate plastics and other materials that get contaminated;
- Need to measure the amount of value delivered by the products produced and the amount of materials they contain and help the public understand the associated impacts; and
- Need to measure the use of earth’s resources and not just greenhouse gas emissions; “gross national product” is not an adequate measure of economic success.

Key points made by participants:

- Need to examine ways to improve permitting;
- Need to use states as laboratories for new approaches to extended producer responsibility in collaboration with EPA;
- Need to engage with industry, reinvent business models, and fix structural problems;
- Need more public education and engagement;
- Look to pay-as-you-throw programs; and
- Need better data from companies on the materials in the products they produce to conduct studies and analysis to help foster change and educate the public.

State of Waste Presentation

Allen Hershkowitz, Senior Scientist, Natural Resources Defense Council

- Globally, about 45 billion tons of waste generated annually;
- To manage this waste, communities rely on environmentally unsound technologies, such as incineration;
- 75 – 80 percent of the materials that make up MSW should be recycled;
- About 12 percent of all MSW is currently combusted in the U.S. for energy recovery; more than half of all this material is recyclable, compostable, non-renewable, or non-combustible and should be diverted from combustors through “fuel cleaning”;
- Overall, using most waste streams as a renewable fuel is not environmentally sustainable;

- Waste-to-energy is a more expensive source of energy per kilowatt hour (KWH) than other fuel sources and the greenhouse gasses/KWH are comparable to natural gas and oil;
- Moving from a 33 percent recycling rate to 75 percent would create 1.5 million new jobs;
- Manufacturers pass off to local governments the external costs and environmental impacts of the waste their products create;
- Bottle bills programs have their flaws but they have been shown to be the most effective way to collect containers;
- Government agencies should examine the optimal route ecologically and economically for every material and promote that method;
- Landfills still needed to dispose of ash and non-recyclable materials;
- In the European Union the waste management breakdown is about 65 percent recycling, 30 percent waste-to-energy, and 5 percent landfill;
- Extended producer responsibility programs (EPR) driven by the private sector are part of the solution; EPR programs are being developed and implemented throughout the world;
- Example – NRDC is working in Rhode Island to explore an EPR program for packaging and printed materials; could save approximately \$17.5 million annually if producers and first importers take on the costs of recycling their packaging and paper products waste; and
- Need public education and a cultural shift to help people be more respectful of the earth – 13 percent of the public pay attention to science while 56 percent pay attention to sports; NRDC and its partners are doing ads at sporting events to help reach the public.

Key Points Made by Participants

- 70 EPR laws in place around the U.S.; CT has paint, electronics, and mattress EPR initiatives underway;
- EPR for packaging and printed materials is challenging; and
- Landfills should also be addressed and not just waste-to-energy.

Panel - Economic Opportunities in the Waste Stream

Nikhil Krishnan, Associate Principal, McKinsey & Company

- Commodity prices have risen sharply since 2000;
- Incomes are rising in developing countries; in China there are likely to be about 3 billion people that are new to the middle class in the foreseeable future;
- Replenishing reserves of raw materials is difficult and expensive;
- Current waste management system does not focus on capturing value in waste;
- Need to transition from waste management to capturing value and resources;
- Some waste streams have significant value; for example gold in circuit boards;
- E-waste is poised for significant growth and materials recovery;
- Need to create opportunities to have a dialogue and reframe the issues; and
- Need to unlock barriers and bring investment capital to projects; business case is there, but requires multiple players to get together to create change.

Amy Perlmutter, Perlmutter Associates

- Chelsea Center for Recycling and Economic Development at the University of Massachusetts can provide a model for how to promote sustainable materials economy;
- Created a brand, “Remade in Massachusetts”;
- Worked with manufacturers to promote use of recycled content; conducted demonstration projects and materials testing and issued community grants;
- Surveyed recycling business about what they want from government and found that they are seeking clean materials, help with product marketing, consumer education, funding, and connections with researchers;
- Need partnerships and help with entrepreneurial training;
- Suggestions for actions: involve communities, bring people together, provide more education and assistance, create competition on who can build the best product out of recycled materials, government contracts for products with recycled content to help with market development, create business/municipal cooperatives, start with small businesses, develop minimum recycled content standards, help generate clean sources of materials, engage all players;
- Expected job growth in reuse and manufacturing about 40 percent (more people in California work in recycling and waste management than in the film industry);
- Use manufacturing extension programs to create partnerships and dialogue;
- Need to get venture capital involved in partnerships; and
- Product stewardship programs can work with local businesses.

Key Points Made by Participants

- Problem is waste is something that people just want to get rid of; not viewed as having value;
- Recycling businesses want clean, source separated materials; and
- Need to coordinate private sectors and emphasize job creation.

Transforming Our Materials Economy Discussion

Comments from the participants:

Challenges/Barriers

- Tipping fees underpriced and artificially low – need national support;
- Lack of guaranteed feed stocks, quality problems with materials from single stream recycling;
- Investment/investors needed;
- Lack of effective communications among states;
- Lack of effective communications between waste suppliers and manufacturers that can use materials;
- Community by community to address issues;
- Lack of disposal capacity;
- Waste nomenclature inconsistent state-to-state;
- Wastes banned in one state moves across borders – example C&D waste ban in MA has led to movement of material across borders;

Opportunities

- Focus on economic development and greenhouse gas reductions;
- Improve local disposal capacity so states can become importers of waste and not exporters;
- Use disposal fees to raise funds to advance reduction, reuse, and recycling programs;
- Focus matching markets for reused/remanufactured materials with sources of needed waste materials;
- Use group purchasing model on a regional basis; and
- Raise cost of carbon to stimulate more interest in recycling because cost of virgin materials increases.

Additional Ideas

- Reduce waste at source;
- Create political will – government should act as a catalyst;
- Mandate waste bans first;
- Need standardization across the region;
- Create a shift in culture toward great acceptance of and involvement in recycling;
- Need stimulus funds for recycling;
- Need disposal bans to increase recycling rates, for disposal ban to be successful need market for the material;
- Need to harmonize terminology and metrics to promote consistency across region and ability to analyze data; and
- Need to create greater transparency around the real cost of disposal.

Tools

- State bonding authority to help fund expansion of recycling;
- NERC's Recycling Market Database;
- State preferences for purchasing goods with high recycled content;
- Portfolio standards, similar to the one that's established for energy;
- Regulatory waste bans;
- Pay-as-you-throw for residential and commercial sectors;
- CT's organics law; and
- Tax credits for making products from recyclables.

Resources

- NERC;
- NEWMOA; and
- PSI.