The following is a summary report for the Stakeholder Meeting #2 held September 30, 2021.

**A. Stakeholder Meeting #2 Introductions**

Michelle Leonard, Senior Vice President with SCS Engineers (SCS) welcomed all participants and introduced the rest of the project consultant team (Christine Collier and Jeff Phillips with SCS and Karen Luken with Economic Environmental Solutions International). Michelle then welcomed Amie Davidson, Bureau Chief of Land Quality for the Iowa Department of Natural Resources (DNR).

Amie welcomed everyone and thanked them for their interest and participation as it is imperative to have the ideas and views of those that are engaged with the production, transportation, consumption, and end-of-life management of our materials. Amie stated that Iowa’s current policies focus on end-of-life management of materials and do not readily address upstream management practices. This Sustainable Materials Management (SMM) – Vision for Iowa project is in its early stages and Amie encouraged participants to remain engaged and continue to voice their opinions representing their various backgrounds and experiences.

The project consultant team reviewed the Stakeholder Meeting #2 agenda. The agenda and slides for the entire Stakeholder Meeting #2 are located in Attachment A.

The project consultant team then provided a brief review of what SMM means, the SMM – Vision for Iowa project, and a summary of the activities that have occurred since the previous Stakeholder Meeting #1 held on March 25, 2021.

**B. SMM – Vision for Iowa Background**

**What is SMM?**

SMM is an approach to producing, using and reusing materials most productively through their entire life cycles. An SMM approach represents a change in how our society thinks about the use of natural resources and environmental protection. SMM represents a transition from primarily focusing on managing materials at the end of life to considering how we manage materials throughout their entire life cycle. The two graphics below represent a traditional waste management hierarchy and an SMM approach.
**SMM – Vision for Iowa**

**Phase I - Summary:**

The DNR initiated the SMM – Vision for Iowa project in 2018 by holding several facilitated stakeholder strategic planning sessions across Iowa. The results of these stakeholder strategic planning sessions indicated that stakeholders strongly believed that transitioning Iowa to an SMM approach was very important. The results also indicated that stakeholders understood that transitioning to an SMM approach in Iowa would be challenging.

**Phase II - Summary:**

This is the current phase of the SMM – Vision for Iowa project.

Building upon the stakeholder consensus from Phase I, Phase II is working with a broad group of stakeholders representing a variety of institutions, organizations, industries and material management facilities to identify and prioritize specific materials and suggest strategies to transition towards an SMM approach.

During the Stakeholder Meeting #1 held March 25, 2021, the Stakeholders selected the following material categories for evaluation towards an SMM approach:

- Organics and Fibers
- Plastics
- Renewable Energy Equipment
- Construction and Demolition Debris

The project consultant team established these as the four Subcommittee groups. They then worked to recruit individuals to serve on the Subcommittee groups. Individuals representing various institutions, organizations, industries, and material management specialists were identified and invited to participate.
Phase II is planned to have a total of 32 Subcommittee meetings and four Stakeholder Meetings. The Subcommittee’s meet to identify and prioritize specific materials and suggest strategies for possible SMM transition. The Subcommittee’s then present these suggested strategies and timelines to the Stakeholders. The Stakeholders provide on-going guidance to the Subcommittees and consider and endorse suggested strategies and timelines.

During the first Subcommittee meetings held June 9 and 10, 2021 each Subcommittee identified and prioritized specific material types for evaluation of transitioning towards an SMM approach. These selected materials are identified below by the primary material categories (i.e., Subcommittee Group):

- Organics and Fibers
  - Edible Food
  - Pre-Consumer Spoiled Food
  - Compostable Paper, Food, and Yard Waste
- Plastics
  - Single-Use PET Water Bottles
  - Plastic Film and Bags
  - Polystyrene (Styrofoam™)
- Renewable Energy Equipment
  - Wind Turbine Blades
  - Solar Panels
  - Batteries
- Construction and Demolition Debris
  - Interior Building Components
  - Roofing Materials
  - Drywall, Plaster and Gypsum Board
  - Treated and Untreated Wood

Phase III - Summary:

Phase III will focus on building upon the results of the previous phases and working to implement the suggested strategies and timelines.

C. Subcommittee Status Presentations

The following is a summary of the information presented for each of the four Subcommittees. The full Stakeholder Meeting #2 slides are located in Attachment A.
Organics and Fibers

The project consultant team reviewed the specific materials that the Subcommittee members identified to focus on for evaluation of transitioning to an SMM approach. These include the following:

- Edible Food
- Pre-Consumer Spoiled Food
- Compostable Paper, Post-Consumer Food, and Yard Waste

The project consultant team then presented a summary of potential strategy categories identified in the ReFED\(^1\) *Road Map to 2030* report and State of Washington *Use Food Well* plan that focuses on strategies to minimize food waste. The strategies in these documents were discussed during the Subcommittee meetings. The Subcommittee primarily focused on consumer and end-of-life management as they reviewed and discussed potential strategies. It was discussed that the Organics and Fibers Subcommittee will likely split into two separate Subcommittees, with one group focusing on identifying and evaluating upstream management strategies and the other group focusing on consumer and end-of-life final management strategies. The results of the suggested strategies and timelines are identified in the figures below.

**Figure 3 - Reshape Consumer Environments – Suggested Strategies and Timeline**

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\(^1\) ReFED is a national nonprofit working to end food loss and waste across the food system by advancing data-driven solutions to the problem.
Figure 4 – Strengthen Food Rescue – Suggested Strategies and Timeline

Immediate (0-3 years):
- Donation Manpower - Volunteer/Paid
- Donation storage handling and capacity
- Donation Education

Medium (4-10 years):
- Explore Funding Opportunities
- Donation coordination and matching
- Donation value-added processing

Long-Term (11+ years):
- Edible food recovery legislation

Figure 5 – Increase Iowa Composting/Digestion – Suggested Strategies and Timeline

Immediate (0-3 years):
- Create inventory & survey of composting and AD facilities
- IDALS involved in process
- Phased in food reduction/recovery legislation

Medium (4-10 years):
- Research compost standards
- Create organic waste sheds
- Increase compost and AD infrastructure
- Incentivize keeping organics in state
- Define compostable vs. biodegradable

Long-Term (11+ years):
- Feed food scraps to livestock - legislation
- Provide food waste collection to all residents and businesses
- State to procure recycled organic waste products (compost, renewable gas, etc.)
The following are comments and or questions from Stakeholders:

- I would suggest we create weight/volume inventory and survey of composting material for residential and commercial generators.
- Can you elaborate on how many other states have implemented "feed good scraps to livestock - legislation" and which states?
  - Minnesota has established legislation.
  - Leftovers for Livestock: A Legal Guide for Using Food Scraps as Animal Feed (August 2016) is a good source for status of state regulations.

**Plastics**

The project consultant team reviewed the specific materials that the Subcommittee members identified to focus on for evaluation of transitioning to an SMM approach. These include the following:

- Single-Use PET Water Bottles
- Plastic Film and Bags
- Polystyrene (Styrofoam™)

The project consultant team presented descriptions of each of these identified materials and summarized the results of life cycle analyses (LCA) research.

The project consultant team and Bryce Stalcup, Plastics Subcommittee Chair presented the suggested strategies and timelines identified by the Subcommittee members. These suggested strategies and timelines are divided between upstream, consumer, and end of life categories. The results of the suggested strategies and timelines are identified in the figures below.
Figure 6 – Plastics 0 – 3 Years Suggested Strategies and Timeline

Suggested Strategies & Timelines 0-3 Years

- Design for recycling or composting
- Encourage reuse and refill pilots and funding
- Develop reusable containers
- Encourage reuse/foil for take-out and delivery
- Research H & S codes on reusable containers
- Education and awareness campaigns for refill, reuse, and repurpose
- Reuse of take out containers for food distribution
- Data collection on post-consumer recycled content purchasing for government agencies
- State define recyclable, compostable, biodegradable
- Data on volumes of bottle bill vs MRF for collection
- Support research on plastics transformation into new product, fuel, etc.
- Education and awareness on final destinations of materials
- Collect data on reduction in contamination in recycling programs

Legend
- Upstream Measures
- Consumer Actions
- End of Life

Figure 7 – Plastics 4 – 10 Years Suggested Strategies and Timeline

Suggested Strategies & Timelines 4-10 Years

- Eliminate problematic and unnecessary packaging
- Reconsider Ban on Bans
- Require post-consumer recycled content purchasing for government agencies
- Implement to-go container and cup charges
- Standards for customer opt-in for food service packaging and accessories
- Implement plastic bag fee
- Add all non-carbonated containers to the Bottle Bill*
- Add SUPB (water) to Bottle Bill*

Legend
- Upstream Measures
- Consumer Actions
- End of Life
The following are comments and/or questions from Stakeholders:

- What LCAs results were presented?
  - The project consultant team will provide the LCAs reviewed.

Renewable Energy Equipment

The project consultant team reviewed the specific materials that the Subcommittee members identified to focus on for evaluation of transitioning to an SMM approach. These include the following:

- Wind Turbine Blades
- Solar Panels
- Batteries

The project consultant team presented a summary of the renewable energy market in Iowa as well as information from other states and countries regarding how the materials from this industry are being managed using an SMM approach. It was stated that the renewable energy market is expanding and changing rapidly. While the renewable energy equipment materials may not present a significant management concern now, it is important to observe the industry and consider strategies that will manage the equipment from this industry using a more SMM approach. Evaluating potential strategies and timelines for managing renewable energy equipment materials is a proactive approach and will help
identify SMM solutions for when significant materials may reach their expected end of life usefulness (approximately 20-40 years).

Steve Guyer, Renewable Energy Equipment Subcommittee Chair, presented the Subcommittee’s suggested strategies for consideration over the next five years which are as follows:

- Encourage policies that foster research for technologies to solve some of the end-of-life material management challenges.
- We need to encourage, to the extent that we can, solutions that drive businesses and solutions to move to Iowa.
- Consider re-establishing and expanding the renewable energy tax credit.
- Public education is important to help promote the benefits of renewable energy.

Steve stated that all outcomes of this project’s process must be fair and equitable to all utility customers. Steve also stated that each customer manages their renewable energy equipment differently (i.e., large utilities, cooperative utilities, commercial entities, residential systems, etc.) based on their desired return on investment, demands from customers, and size and complexity of the system.

The following are comments and/or questions from Stakeholders:

- We are now recycling windmill blades in Marengo, Iowa. They are being shredded and sent to Green America in Buffalo, Iowa and the shredded blades are being metered into the kiln for cement manufacturing.
- What were the business association reactions concerning solar panel manufacturer extended producer responsibility legislation passed in the state Washington?
  - The project consultant team will work to reach out to business associations, media outlets, and/or legislators and provide information resources to the Stakeholders.
- The Electric Power Research Institute (EPRI), a non-profit research organization that focuses on energy issues, is also conducting extensive research on renewable waste recovery. Alliant Energy is participating in this research in an advisory capacity.
- Several manufacturers of wind turbine blades have recently announced that they are producing 100 percent recyclable blades. This is a rapidly changing industry and they are addressing the issue of materials prior to becoming a significant waste issue.

**Construction and Demolition Debris (C&D)**

The project consultant team reviewed the specific materials that the Subcommittee members identified to focus on for evaluation of transitioning to an SMM approach. These include the following:

- Interior Building Components
- Roofing Materials
- Drywall, Plaster and Gypsum Board
- Treated and Untreated Wood
The project consulting team presented examples of C&D management programs in Iowa and a summary of LCA research results for targeted C&D materials.

Brian Seals, C&D Debris Subcommittee Chair presented the suggested strategies and timelines identified by the Subcommittee members and are divided between upstream, consumer, and end of life categories. These are illustrated in the three figures below.

**Figure 9 – C&D Debris 0 – 3 Years Suggested Strategies and Timeline**
Figure 10 – C&D Debris 4 – 10 Years Suggested Strategies and Timeline

Figure 11 – C&D Debris 11+Years Suggested Strategies and Timeline
The following are comments and/or questions from Stakeholders:

- The Iowa Economic Development Authority (IEDA) recently funded development of designs for an affordable home to address issues such as efficient design, reducing material waste, improving home performance, accessibility and universal design, shortening construction time, reducing construction costs, etc. Research and demonstration are forthcoming on integration of innovative technologies to improve the design process as well as the manufacturing process (digitalization, 3D printing, etc.). These efforts address future construction at this time. Still need to tackle challenge of rehabilitating/reusing/recycling current building stock.
- Collaboration between consumers “wants” and “actions” is important.
- What are some examples of cities revising building permits to support green building practices?
  - Ordinances and permits could provide resources, clarification, and incentives for designers and builders to incorporate recycled content into their building materials, select materials based on the amount of waste they generate, renovate existing infrastructure versus building new, support deconstruction activities, follow practices promoted by Leadership in Energy and Environmental Design (LEED) programs, and more.

D. Breakout Sessions

The project consultant team welcomed Stakeholders back from lunch and summarized the Breakout session process. The project consultant team asked Stakeholder participants to consider the following questions for discussion in the breakout sessions:

- Does anyone have any questions from the morning presentation?
- Are there any strategies that require additional clarification or discussion?
- Are there any new strategies that we should consider?
- If yes, are they short-, medium-, or long-term?
- Does anyone want to adjust the proposed implementation schedule?
- Are there any proposed strategies that anyone can NOT live with?

During the first Breakout session, participants were able to attend either the Organics and Fibers Subcommittee session or the Plastics Subcommittee session. The second Breakout session allowed participants the opportunity to attend either the Renewable Energy Equipment Subcommittee session or the Construction and Demolition Debris Subcommittee session. Each Breakout session lasted approximately 45 minutes. A summary of the discussions in these Breakout sessions is listed below for each Subcommittee.
Organics and Fibers Subcommittee – Breakout Session

The project consultant team quickly summarized the suggested strategies and timelines that were presented in the morning. It was then opened up for participants to ask questions and provide comments.

The following are comments and/or questions from Stakeholders:

- Lower the prices for half orders in restaurants to minimize food waste.
- Profitability goes up when food waste goes up at quick service restaurants. Consumers don’t want the last food item. So quick service restaurants are encouraged to keep filling the food display up to encourage purchasing.
- Just like the energy industry charges a flat rate as well as a use rate, perhaps the waste industry could consider a similar model. Would love to see the waste industry provide a hybrid option per pull and by weight.
  - Some commercial waste haulers do have the ability to weigh individual containers. We will look into how many of our commercial collection vehicles have these abilities and what it costs to install and maintain these tools.
  - Capturing container weight may help the industry consider charging customers a set rate fee for specific materials rather than just a single flat rate for commingled waste.
- The Dubuque Metropolitan Area Solid Waste Agency created a curriculum for their school district which included topics about organic management and minimizing food wastes.
  - School district instructional schedules are already very busy and providing additional curriculum is not a valid education/outreach approach for large scale implementation. Also, some topics have become very politically charged (i.e., climate change) and are difficult conversations to have with students and/or include in lesson plans.
- MEANS Database (in talking about database of donation sources) is an existing resource.
- Food Rescue Hero is another program that helps establish and manage food generation and donation information.
- It all comes back to money. Drive the generation fee (at the point of collection) and charge the generator by what they generate and how they are diverting materials. Charge people more that are not participating in waste diversion programs/services to help incentive participation in diversion programs.
- Mandatory organics residential collections will be implemented in Hennepin County in Minnesota. The question is what level of participation will you get?

The project consultant team facilitated a review and discussion of the suggested strategies and timelines that were previously presented. The Breakout Session participants provided comments and recommended changes. The figure below illustrates the changes recommended by the Breakout Session participants. This figure is also located in Attachment B of this report.
**Figure 12 – Organics and Fibers – Modified Suggested Strategies and Timelines**

**Note:** Green notes represent new strategies identified.

**Plastics Subcommittee – Breakout Session**

The project consultant team quickly summarized the suggested strategies and timelines that were presented in the morning. It was then opened up for participants to ask questions and provide comments.

The following are comments and or questions from Stakeholders:

- We should keep the “ban on bans”. Individual businesses on their own can elect to not use plastic bags or charge a small fee to customers that want to use a plastic bag.
- Bans or restrictions on products is not practical.
- It would be better if the goal was to replace the bottle instead of finding additional methods to capture and recycle more plastic bottles.
- Allocating space for additional collection services can be a challenge to many businesses. Additionally, finding collection service providers for specific services can also be challenging.

The project consultant team facilitated a review and discussion of the suggested strategies and timelines that were previously presented. The Breakout Session participants provided comments and recommended changes. The figure below illustrates the changes recommended by the Breakout Session participants. This figure is also located in Attachment B of this report.
Note: Green notes represent new strategies identified.

Renewable Energy Equipment Subcommittee – Breakout Session

The project consultant team quickly summarized the suggested strategies and timelines that were presented in the morning. It was then opened up for participants to ask question and provide comments.

The following are comments and or questions from Stakeholders:

- While portions of the solar panels are recyclable, where do the more difficult to recycle items (i.e., heavy metals) end up? We need to be sure we account for how these are managed and where they end up.
  - While solar panels may have heavy metals in them, they are in small quantities and the manufacturers are already working on ways to phase out the use of heavy metals. Recyclers are working to capture and treat heavy metals that are removed during the recycling process.
- Currently, the closest solar panel recycler is located in Wisconsin.
- Constraints on grid capacity does not allow rural areas to take advantage of renewable energy credits. This is especially true for rural co-op utilities.
• Rural electric utilities are not able to take advantage of renewable tax credits because of the financial structure in place at the Federal level.

• Counties are developing and requiring decommissioning plans for solar and wind energy infrastructure. These requirements differ from county to county and may even select different entities that are responsible for managing the decommissioning.
  o The Iowa Environmental Council, Great Plains Institute, Rural Initiative, and the Environmental Law Center have produced documents related to utility scale energy. These could provide a template for uniform ordinances based on these guidance documents.

• We have heard that people wanting to recycle their solar panels are having difficulty finding installers that are willing to or knowledgeable about providing recycling services.
  o Discussion concerning how the uninstalled materials are considered commercial or (if removed from a residential building) residential. Further discussion and research is needed to clarify this item.

• Does Iowa have definitions for what constitutes recycling? For instance, if windmill turbine blades are incinerated at a cement kiln would this be considered recycling?
  o Yes. According to the Iowa waste management hierarchy.

• Iowa needs to continue to encourage ways to find solutions for the recycling of renewable energy equipment.

The project consultant team facilitated a review and discussion of the suggested strategies and timelines that were previously presented. The Breakout Session participants provided comments and recommended changes. The figure below illustrates the changes recommended by the Breakout Session participants. This figure is also located in Attachment B of this report.
Construction and Demolition Debris – Breakout Session

The project consultant team quickly summarized the suggested strategies and timelines that were presented in the morning. It was then opened up for participants to ask questions and provide comments.

The following are comments and or questions from Stakeholders:

- Cedar Rapids and Dubuque had an incentive program to train contractors on green construction practices. These programs weren’t as successful as anticipated, primarily due to the low disposal fees assessed at landfills for C&D waste. Disposal rates were already fairly low, and the decreased tipping fees to incentivize participation in diversion were not enough for contractors to change their practices. Contractors felt that separating the materials and managing them separately wasn’t cost effective. Also – There is hesitation for people to want to reuse materials from other houses in their new house. The consumer wants new materials not materials from someone else’s building.
- The project should look into the Dubuque Green Building initiative/program.
- Are there already waste characterization studies done for C&D?
  - Yes. California performed targeted waste characterization studies and used these results to establish ordinances and policies.
The project consultant team will research existing waste characterization results that targeted C&D materials and try to apply that information to Iowa.

- As a disposal facility, we don’t know the type of C&D we are receiving. We categorize it all as one “C&D” category.
- Few LFs separate these C&D materials to weigh them individually. Perhaps we can ask Iowa disposal facilities if they have any specific C&D data or a different way of tracking the types of C&D waste they manage.

- Rock quarries that crush rock or materials just being reused immediately aren’t tracked as being generated because it isn’t coming across the LF scale. It would provide a better picture of what we generate, divert for reuse or recycling, and dispose of in Iowa.
- Other than a particular project that is going after LEED certification, are their other planning resources to help a project incorporate green initiatives?
  - Unsure. The project should reach out to representatives of the Iowa Chapter of the US Green Building Council (USGBC).
- The impact to communities of color should be taken into account with this project. Some of the materials that are being generated in or are going to (for processing and/or end of life) are likely ending up in areas occupied by communities of color. Solutions to material management (i.e., recycling processing, etc.) should consider and engage with the communities where these facilities are located.

The project consultant team facilitated a review and discussion of the suggested strategies and timelines that were previously presented. The Breakout Session participants provided comments and recommended changes. The figure below illustrates the changes recommended by the Breakout Session participants. This figure is also located in Attachment B of this report.
Figure 15 – Construction and Demolition Debris – Modified Suggested Strategies and Timelines

Note: Green notes represent new strategies identified. Orange notes represents strategies that modified (i.e., text change or timeline change) from the original identified strategy.

E. Wrap Up and Next Steps
The project consultant team presented a summary of the discussions for each Subcommittee and showed any modifications to existing suggested strategies and timelines.

The project consulting team thanked the Subcommittee members for their work and for all those that participated in the Stakeholder meeting. The information collected today will help guide each Subcommittee when they reconvene to further prioritize materials, strategies, and timelines. The project plans to have two additional Stakeholder meetings to allow individuals an opportunity to help review suggested strategies and timelines developed by the Subcommittees and continue to provide project guidance.
Jennifer Wright, Financial and Businesses Assistance Supervisor also thanked everyone for their comments and participation. Jennifer stated that participation is crucial for our success in our abilities to evaluate and identify strategies to transition to an SMM approach.

F. Stakeholder Meeting #1 Materials & Data
   - Attachment A – Stakeholder Meeting #2 Agenda and Presentation Slides
   - Attachment B – Modified Suggested Strategies and Timelines
   - Attachment C – Registration Information and Meeting Attendee Information
ATTACHMENT A

STAKEHOLDER MEETING #2 AGENDA AND PRESENTATION SLIDES
AGENDA

Stakeholder Meeting #2
September 30, 2021 (9:00 AM – 2:30 PM)

AGENDA ITEMS:

Introductions (15 Min)
A. Stakeholders, Staff and Consultants
B. Meeting Expectations

Subcommittee Updates (150 Min*)
A. Organics & Fibers
B. Plastics
C. Renewable Energy Equipment
D. Construction & Demolition Materials
E. Initial Discussion and Breakout Selection

Lunch Break (45 Min)

Breakout Sessions (95 Min*)
A. Breakout #1
   1. Organics & Fibers
   2. Plastics
B. Breakout #2
   1. Renewable Energy Equipment
   2. Construction & Demolition Materials

Next Steps (25 Min)
A. Summary of Breakout Sessions
B. Discussion on Next Steps

*Note: Breaks will be taken in these sessions as needed.
**Welcome!**

**Step 1**
Please rename your Zoom tile screen with your name and affiliation, such as company or organization. Right click on your video screen and select “rename.”

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**Stakeholder Meeting #2 Registrations**

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90 Total Registrants

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**Agenda**

- Introduction and Meeting Expectations
- Subcommittee Updates
  - Organics and Fibers
  - Plastics
  - Renewable Energy Equipment
  - Construction and Demolition Debris
- Stakeholder Q&A and Discussion
- LUNCH BREAK (45-min)
- Breakout Session #1
  - Organics and Fibers
  - Plastics
- Breakout Session #2
  - Renewable Energy Equipment
  - Construction and Demolition Debris
- Summary and Next Steps

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**What is SMM?**

“Sustainable materials management is an approach to using and reusing materials most productively throughout their entire life cycles.”

It represents a change in how our society thinks about the use of natural resources and environmental protection.

**Source:** USEPA

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**Iowa Transitioning from ISWM to SMM**
Project Phases

Phase I (Completed): What is SMM and should we do it?

Phase II (Active): Prioritization and timing of what we should do and how we should accomplish it

Phase III (Future): Ongoing Implementation

Phase I (Completed)

SMM Importance Results

Phase I (Completed)

Feasibility Results

Phase II Process

Select specific material types within each category

Define and prioritize specific strategies
- Legislation
- Policies
- Programs
- Infrastructure

Identify implementation timeline, responsible party, funding measures, and performance metrics

Stakeholder Group Role

Provide various perspectives on how SMM can be adopted and implemented in Iowa

Provide on-going guidance to subcommittees

Consider and endorse subcommittee suggested strategies and timelines

Criteria for Selection of Materials Categories

Build on What’s Already Working

Implementation Feasibility

Environmental Benefits

Percent of Disposed Waste Stream

Phase I Recommended
Material Categories Selected By Stakeholders

- Organics & Fiber
- C&D
- Renewable Energy Equipment
- Plastics

Subcommittee Presentations
- Organics & Fibers
- Plastics
- Renewable Energy Equipment
- Construction & Demolition Debris

Subcommittee Members

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Aaron Holt</td>
<td>Iowa Restaurant Association</td>
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<tr>
<td>Alan Schumacher</td>
<td>Quincy Recycling Paper/Ink Recycling Association</td>
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<tr>
<td>Aubrey Alvarez</td>
<td>Eat Greater Des Moines</td>
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<tr>
<td>Beth Rockenage</td>
<td>University of Iowa</td>
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<tr>
<td>Doyle Smith</td>
<td>City of Cedar Falls</td>
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<tr>
<td>Jennifer Jordan</td>
<td>City of Iowa City Landfill and Recycling Center</td>
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<td>Jennifer Todd</td>
<td>Iowa Waste Reduction Center</td>
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<tr>
<td>Jon Koch</td>
<td>City of Muscatine</td>
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<tr>
<td>Karen Rockengren</td>
<td>Old Dining, Iowa State University</td>
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<tr>
<td>Kathy Moote</td>
<td>Waste Commissary of Scott County</td>
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<tr>
<td>Michelle Hurd</td>
<td>Iowa Grocery Industry Association</td>
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<tr>
<td>Rich Stephens</td>
<td>Archer Daniels Midland Company</td>
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<tr>
<td>Scott Amundell</td>
<td>GreenPAC, LLC &amp; Charmines Technology, Inc.</td>
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Materials

**Organics**
- Yard trimmings
- Agricultural waste
- Edible food
- Pre-consumer spoiled food
- Post-consumer food scraps
- Biosolids
- Manure

**Fibers**
- Office paper
- Newspaper
- Magazines
- Corrugated cardboard
- Packaging
- Fiberboard
- Junk mail

Material Types Selected

- Edible Food
  - Pre-Consumer Spoiled Food
  - Post-Consumer Food Waste
  - Corrugated Cardboard
  - Paper
  - Fiberboard
  - Junk Mail
Food and GHG Emissions

- Food accounts for 10-30% of a household’s carbon footprint, typically a higher portion in lower-income households.
- Production accounts for 68% of food emissions, while transportation accounts for 5%.
- Food production emissions consist mainly of CO₂, N₂O, and CH₄, which result primarily from agricultural practices.
- Meat products have larger carbon footprints per calorie than grain or vegetable products.

Iowa Impacts

- Food Scraps
- Compostable Paper, Food and Yard Waste

Subcommittee Suggested Strategies & Timelines

Upstream

Consumer/End-Of-Life Final Management

Iowa Education and Outreach Examples

- ISU Dining Hall Plate Pilot
- Municipal & Solid Waste Agency Food Waste Reduction Education Campaigns
- Iowa Waste Reduction Center & Iowa Waste Exchange Food Waste & Prevention Services
- State Education Campaigns
Reshape Consumer Environments

- Use smaller-size options for dining
- Use premeasured ingredients for specific needs
- Choose healthy, vegetarian, and meat-free options
- Education and awareness campaigns
- Use leftover food
- Improve donation transportation
- Implement a food donation plan

Edible Food Recovery

Iowa Edible Food Recovery

Both Iowa State University and Drake University, as well as hundreds of other universities in 46 states around the country utilize the Food Recovery Network. The Food Recovery Network is a student-led program on campuses that aims to fight food waste and end hunger in America. Once out of the dining halls, FRN has over 300 partners nationwide where they deliver their unused food to be served to the public.

National Food Reduction and Recovery

- Support national date labeling standards
- Strengthen Good Samaritan Law
- Increase markets for lower-grade produce
- State Grant funding for food waste prevention, rescue, and recovery
- Infrastructure investment in schools
- Mapping food system flows
- Improve donation transportation
- Community food hubs
- Develop an emergency food distribution plan for Washington Schools
- 20-minute seated lunch minimum in Washington schools
- Recess before lunch in Washington schools

Suggested Strategies & Timelines

Strengthen Food Recovery

- Increase food recovery programs
- Increased donations
- Coordinated resource sharing
- Expanding food waste education
- Donation education
- Donation transportation
- Edible waste
treatment

Iowa Composting/AD
**Iowa Permitted Compost Facilities**
- Cedar Rapids/Linn County Solid Waste Agency Composting Facility
- Chamness Technologies Solid Waste Composting Facility
- City of Davenport Sludge Composting Facility

**Iowa Permitted Compost Facilities**
- City of Iowa City Sanitary Landfill
- Clinton County Sanitary Landfill

**Suggested Strategies & Timelines Increase Iowa Composting/Digestion**

**Subcommittee Members Thank You!**

<table>
<thead>
<tr>
<th>Name</th>
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<tr>
<td>Bruce Stalcup</td>
<td>Waste Commission of Scott County</td>
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<td>Horton Busboom</td>
<td>Dee Zee, Inc.</td>
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<td>Jennifer Rieker</td>
<td>That’s Not Trash, LLC</td>
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<td>Joe Bolick</td>
<td>Iowa Waste Reduction Center</td>
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<td>Julie Ketchum</td>
<td>Waste Management</td>
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<td>Iowa State University</td>
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<td>West Liberty Foods</td>
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<td>Nick Barry</td>
<td>Mid-America Recycling</td>
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<td>Iowa Association of Business and Industry</td>
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<td>Vani Sanitation and Recycling</td>
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<td>Sue Waters</td>
<td>Plastics Recycling of Iowa Falls, Inc.</td>
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<tr>
<td>Troy Willard</td>
<td>Can-Shield LLC/Iowa Recycling Association</td>
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**Material Types**

- **Plastics**
  - Rigid containers/bottles
  - Other Single-Use Products
  - Food service ware
  - Straws
  - Plastic Bags
  - Packaging
  - Styrofoam
  - Film
Material Types Selected

Single-Use PET Water Bottles
- Single-use plastics are goods that are made primarily from fossil fuel–based chemicals (petrochemicals) and are meant to be disposed of right after use—often, in mere minutes.

Plastic Film/Bags
- Plastic bags are made out of “film,” or thin flexible sheets of plastic.
- Plastic film is typically defined as any plastic less than 10 mil thick.
- The majority of plastic films are made from polyethylene resin and are recyclable if the material is clean and dry and facilities are able to process it.

Expanded Polystyrene Foam
- Styrofoam is a Dow Chemical Co. trademark.
- AKA: Closed-cell extruded polystyrene, Expanded Polystyrene Foam (EPS)
- Plastic #6
- Non-biodegradable
- Limited Recyclability

Background-Plastics

Existing Activities in Iowa
- Iowa State University
- DOE Grants
- Center for Bioplastics and Bionanocomposites
- Institute for Cooperative Upcycling of Plastics
- Iowa Corn Promotion Board Patent for MEG

Research and Development
- No Plastic Bag Bans
- Advanced Plastic Recycling

Recycling Companies
- Quincy Recycling
- Plastics Recycling of Iowa Falls
- Power Plastic Recycling
- Mid America Recycling
- Recycling Inc.
- Cedar Falls
- Atlas Molded Products
- Foam Fabricators
Single-Use Plastic Bottles & Other Containers

Bottles Made of Virgin fossil, Recycled Fossil, and/or Virgin Bio-Based PET

Single Use Plastic Bags and Alternatives

Takeaway Food Containers Single-Use and Reusable

Clamshell Containers

Upstream Strategies

Design for recycling or composting
Eliminate problematic and unnecessary packaging
Require post-consumer recycled content for packaging
Adopt EPR policy framework for packaging
Establish producer registry and reporting for packaging
Ban polystyrene containers
Ban plastic bags
Consumer-Based Strategies

- Implement standard for customer opt-in for foodservice packaging and accessories
- Encourage reusables for dine-in
- Encourage reuse/refill for take-out and delivery
- Develop reuse and refill pilots and funding
- Provide education and awareness campaigns for refill, reuse, repurpose
- Implement to-go container and cup charges
- Implement plastic bag fee

End-of-Life Strategies

- Provide education and awareness campaigns on contamination in recycling
- Provide education and awareness on littering
- Collect data on final destinations of materials/recycling facilities
- Support development and adoption of reusable packaging systems
- Add single-use plastic bottles to Bottle Bill
- Add all non-carbonated containers to Bottle Bill

Suggested Strategies & Timelines 0-3 Years

- Design for recycling or composting
- Data collection on post-consumer recycled content purchasing for government agencies
- State define recyclable, compostable, biodegradable
- Data on volumes of single use to support research
- Data on contamination
- Education and awareness on littering

Suggested Strategies & Timelines 4-10 Years

- Eliminate problematic and unnecessary packaging
- Reconsider Ban on Bans
- Require post-consumer recycled content purchasing for government agencies
- Standards for single use for food service packaging and accessories
- Add all non-carbonated containers to the Bottle Bill
- Add SUPB (Water) to Bottle Bill

Suggested Strategies & Timelines 11+ Years

- Local or statewide ban plastic bags
- Local or statewide ban polystyrene containers
- Require post-consumer recycled content for packaging
- Monitor EPR policy framework for packaging in other states
- Consider/Adopt EPR policy framework for packaging
- Support development and adoption of reusable packaging systems
Subcommittee Members
Thank You!

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<tr>
<td>Brad Karlstad</td>
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<td>Char Allen</td>
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<td>Alliant Energy</td>
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<td>South Central Iowa Solid Waste Association</td>
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<td>Steve Guyer</td>
<td>Iowa Environmental Council</td>
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Category Material Types

Renewable Energy Equipment
- Wind Turbine Blades
- Solar Panels
- Batteries

Solar Energy

Background - Solar

Key Figures
- Total Solar Installed: 228,106 kW
- Solar Jobs: 809
- Solar Growth: 57.4% from 2019
- 21 Manufacturers
- 19 Installers
- 31 Developers

The solar industry has invested $435.18 million in Iowa, including $145.81 million in 2020.

Learn more at www.iowa.org/solar

Background - Solar

Iowa Annual Solar Installations

March 15, 2021

Background - Solar

Iowa Solar Installations by County

March 15, 2021

Iowa Solar Installations by City

March 15, 2021
Solar Energy in Iowa

- Large scale solar investment in Iowa has been limited due to the states emphasis on wind power
- 167 MW in 2020
- Iowa hosts six solar facilities that are each generating larger than 1.5 MW
- Iowa has somewhere between 1,694,800 and 1,059,250 solar panels currently installed
- Total number of solar panels with approved projects: 2,372,500
  - ≈ 47,450 tons
  - An additional 3,750,000 to 6,000,000 solar panels are expected to be installed within the next 3 years

Solar Reuse and Recycling

- In Iowa, solar panel waste has not been a significant issue yet, as the state is relatively new to solar power and most panels are original and have yet to expire.
- Most PV panels fall into two basic types and require two distinct recycling life cycles: silicon-based PV and thin film-based PV panels.

Solar Reuse and Recycling

- The silicon-based PV panels (the most common of the two panels) are first disassembled, and the glass and aluminum are separated.
  - 95% of the glass and 100% of the metal are reused.
  - The remaining silicon is recycled.

Solar Reuse and Recycling

- Thin film-based PV panels are shredded into roughly 5mm pieces and separated to remove the film using peroxide and acid.
  - Through the processes of removing interlayer materials and rinsing glass, nearly 90% of the glass is reused.
  - 95% of the semiconductor material is reused via a precipitation and dewatering process.
  - The remaining metals are separated and processed.

Wind Energy

- A recycler taking apart a standard, 60-cell silicon panel can get about $3 for the recovered aluminum, copper, and glass.
  - The cost of recycling that panel in the U.S. is anywhere between $12 and $15, including transportation costs.
  - It typically costs less than a dollar to dispose a solar panel in a solid waste landfill.
Growing U.S. wind energy generating capacity

The U.S. installed more wind turbine capacity in 2020 than in any other year.

Wind Energy in Iowa

- 5,590 total wind turbines that are producing over 10,951 megawatts (MW) of electricity
- 16,670 individual wind turbine blades

Cumulative Blade Material Including Manufacturing and Replacement

Blade manufacturing and replacement add around 1 million tons of waste by 2050.

Process innovation and new materials primarily impact manufacturing waste in the short term, with effects on EOL waste delayed 20 years or more.

Assumptions (based on Cambridge IfM, 2017)

- Composite waste from manufacturing estimated at 17% of annual installed blade mass.
- All blades replaced during operation.
- 3% of blades replaced prior to 20 years of age.
- 5% of blades replaced between 20 and 30 years of age.
- 10% of blades replaced after 30 years of age.

Wind Turbine Recycling Potential

Material breakdown of V120–2.0 MW turbine components

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<th>Incineration</th>
<th>Landfill</th>
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<td>Steel</td>
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<tr>
<td>Aluminum</td>
<td>92%</td>
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<tr>
<td>Copper</td>
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<tr>
<td>Polymers</td>
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<tr>
<td>Fluids</td>
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<tr>
<td>All other materials</td>
<td>0%</td>
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Storage Batteries Overview

- Batteries – generally lithium-ion batteries – used to store energy have become a key partner of photovoltaic solar, wind, and hybrid power plants, especially in areas that are not connected to a strong grid.
- Battery costs have come down sufficiently to make industrial rollout possible.
- California is currently the global leader in the effort to balance the intermittency of renewable energy in electric grids with utility-scale batteries.
- Florida, London, Chile and Lithuania are also installing large facilities.
Storage Batteries In Iowa

Currently, MidAmerican operates one battery plant outside of Des Moines and Alliant Energy operates three. Over the long term, growth in Iowa’s renewable energy industries will require more transmission lines to move power to a market and more storage to hold it until demand exceeds supply. Battery demand in Iowa will soon reach all time highs.

End of Life Models

End-of-Life Management Models

- Decommissioning Plan
- Product Stewardship
- Rate-Payer Funded
- Permittee Funded

Battery Reuse and Recycling

What the Program Covers

In 2017, the Washington state legislature passed Senate Bill 5939 to promote a sustainable, local renewable energy industry through modifying tax incentives. Manufacturers of photovoltaic (PV) modules to provide the public a free and convenient and environmentally sound system for recycling modules sold in or into the state after July 1, 2017.

End-of-Life Management

- Freestanding off-grid power generation systems such as water pumping stations, electric vehicle charging stations, solar fencing, solar-powered signs and solar-powered street lights

Washington Senate Bill 5939

In 2017, the Washington state legislature passed Senate Bill 5939 to promote a sustainable, local renewable energy industry through modifying tax incentives. Manufacturers of photovoltaic (PV) modules to provide the public a free and convenient and environmentally sound system for recycling modules sold in or into the state after July 1, 2017.
Subcommittee Observations

Utility scale projects are different than commercial or residential projects.

Most large utility scale projects already have decommissioning plans.
• But not during project life
• Maybe ordinances could require funding reserves for “during life recycling”

RE technology is advancing and some of the waste now produced will not be there in the future.

Subcommittee Observations

Solar panels could be reused in developing countries.
• Need to ensure proper end-of-life management

Iowa Economic Development Authority’s State Energy Center is to supporting research on end-of-life for wind turbine management.

Iowa could consider a solar panel take back program.
• Similar to battery take back

Next Five Years........

Encourage policies that foster research for technologies to solve some of the end of life material management challenges

We need to encourage, to the extent that we can, solutions that drive businesses and solutions to move into Iowa

Consider re-establishing and expanding the renewable energy tax credit

Next Five Years........

Public education is important to help promote the benefits of renewable energy.
• May be a negative connotation with the renewable energy infrastructure
• Need to ensure the public understands all of the benefits that renewable energy solutions provide

All outcomes of this process must be fair and equitable to all utility customers.

Subcommittee Members

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<th>Name</th>
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<tbody>
<tr>
<td>Becky Singh</td>
<td>Johnson County Planning, Development and Sustainability</td>
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<td>Brian Seals</td>
<td>Waste Commission at Scott County</td>
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<td>Cindy Kunin</td>
<td>Habitat for Humanity Restore in QCA</td>
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<td>Damion Saldid</td>
<td>Continental Cement Co.</td>
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<td>Hol Morton</td>
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<td>Kerry Dixon</td>
<td>Engie North America</td>
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<td>Lexi Stahl</td>
<td>Greater Des Moines Habitat for Humanity/Re-Store</td>
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<td>Nick Wyle</td>
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<td>Richard Greene</td>
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<td>Seth Shannon</td>
<td>SCHERMER</td>
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<tr>
<td>Tim Ruth</td>
<td>Home Builders Association of Iowa and Iowa City</td>
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</table>
Materials

C&D Debris
- Treated Wood
- Untreated Wood
- Roof Shingles
- Asphalt Paving
- Bricks, Rocks, Concrete
- Drywall, Plaster, Gypsum Board

Material Types Selected

Iowa Background

- 5.4% of disposed waste stream
- Construction industry = 5% of employment
- Some construction material manufacturing
- No alternative building material manufacturing
- LEED Certified buildings

Iowa Background

- DNR Derelict Building Program
- Aggregate Recyclers
- Habitat for Humanity Home ReStore
- Local Deconstruction and Reuse Programs
- State University 75% C&D Recycling Goal
- Wood Chipping

LCA of Buildings-Stages

- Material Manufacturing
- Construction
- Use and Maintenance
- End of Life
- Buildings account for 39% of global GHG emissions
  - 28% from operations
  - 11% from building materials and construction
- Structural systems comprise up to 80% of a building’s carbon emissions

LCA: Wood, Concrete, Steel

Wood
- Least air impacts
- Greatest land and water impacts

Concrete
- Greatest GWP due to chemical processes releasing CO2 during manufacturing

Concrete and Steel
- Similar impacts for abiotic depletion, human toxicity potential, and eutrophication
- Greatest impacts during manufacturing due to energy use and emissions
LCA: Waste Prevention in Residential Construction

- Home size is most important determinant
- Multi-Family homes capable of realizing 10-15% reduction in impact compared to Single-Family homes
- Carpeting, asphalt shingles, fiberglass insulation, drywall, wood, and appliances are chief contributors to environmental impacts
- Metal, plastic, fiberglass insulation, and wood have high potential for benefit from reuse

Strategies

Upstream
- Conduct LCA's and waste characterization studies
- Increase building community's understanding of the impacts of building design, materials use, and construction practices
- Review and update building codes for commercial and residential projects
- Review and update requirements for government projects
- Reduce sales tax on recycled content construction materials
- Implement carbon taxes on new construction

Consumer
- Increase building community's awareness and support of IWE services
- Implement green building practices
- Educate consumers on deconstruction principals and practices
- Incentivize building repurpose and material reuse
- Assess and report impacts of new construction and major renovation projects

End of Life
- Support donation and deconstruction facilities
- Remove barriers to development of C&D processing facilities
- Incentivize development of C&D facilities
- Adopt Recycling Certification Institute methods

Example End-of-Life Strategies

Suggested Strategies & Timelines
Suggested Strategies & Timelines

### 0-3 Years

- **Upstream Measures**
  - Conduct LCA and waste characterization studies
  - Intensifying community’s awareness and support of waste services
  - Increase building community’s awareness and support of waste services
  - Educate consumers on decertification and best management practices

- **Consumer Actions**
  - Increase building repositioning
  - Support donation and decommissioning facilities
  - Develop education to design, materials use, and construction processes

### 4-10 Years

- **Upstream Measures**
  - Review and update building codes for residential and commercial projects
  - Develop education to design, materials use, and construction processes

- **Consumer Actions**
  - Implement green building practices
  - Intensify development of C&D recycling facilities
  - Reduce sales tax on recycled construction materials

### 11+ Years

- **Upstream Measures**
  - Implement green building practices
  - Intensify development of C&D recycling facilities
  - Develop education to design, materials use, and construction processes

- **Consumer Actions**
  - Implement green building practices
  - Intensify development of C&D recycling facilities
  - Develop education to design, materials use, and construction processes

---

**Break-Out Groups**

- **First Break-Out Choose:**
  - Organics & Fibers
  - Plastics

- **Second Break-Out Choose:**
  - Renewable Energy Equipment
  - Construction & Demolition Materials

**Remember:**
- We want your input
- Respect different viewpoints
- Various perspectives will be heard when we reconvene as stakeholders
Break-Out Group Agenda

- Does anyone have any questions from the morning presentation?
- Are there any strategies/recommendations that require additional clarification or discussion?
- Are there any new strategies/recommendations that we should consider?
- If yes, are they short-medium or long-term?
- Does anyone want to adjust the proposed implementation schedule?
- Are there any proposed strategies/recommendations that anyone can not live with?

Wrap-Up

- Break-Out Group Results
- Modifications to Strategies and/or Timeframes
- Facilitator Conclusions
- DNR Comments

Where Do We Go Next

Subcommittees Reconvene to:
- Consider Stakeholder input
- Reevaluate rankings of strategies
- Identify implementation timelines, responsible parties, funding measures, and performance metrics
- Present implementation suggestions to Stakeholder Group
ATTACHMENT B

MODIFIED SUGGESTED STRATEGIES AND TIMELINES

Note: Green notes represent new strategies identified. Orange notes represents strategies that modified (i.e., text change or timeline change) from the original identified strategy.
Reshape Consumer Environments

Immediate (0-3 years)
- Create smaller size options for menu items - K-12/Institutions
- Sell pre-measured ingredients for specific meals
- Advocacy campaigns to raise awareness and educate consumers about ways to prevent food waste and environmental effects
- Work with USDA to evaluate rules that minimize food waste and allow for unconsumed food to be taken home
- Work with restaurant industry and quick service restaurants to encourage smaller portions

Medium (4-10 years)
- Create smaller size options for menu items - restaurant
- Standardize food label dates to two phases (quality and safety risk)
- Education and outreach campaigns to reduce plate waste on buffets
- Flat service rate for waste collection plus a charge by weight

Long-Term (11+ years)
- Change K-12 lunch programs (effort already performed)
- Optimize food packaging size and design for complete consumption
- Explore curriculum that connects food waste with environmental challenges
Next 5 Years

- Encourage policies to solve end of life challenges
- Consider re-establishing and expanding the renewable energy tax credit
- Encourage solutions that drive businesses and solutions to move to Iowa
- Promote the benefits of renewable energy
- Fair and equitable outcomes for all utilities
- Survey of installers on types of waste - residential or business and proper disposal
- Encourage research on recycling on RE materials
- Research what counts as recycling in Iowa - does burning?
- Review ordinances and determine if they should be standardized

Beyond 5 Years

Renewable Energy Equipment
ATTACHMENT C

REGISTRATION INFORMATION AND MEETING ATTENDEE INFORMATION
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<td>Matthew Gregory</td>
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