



EXPLORATIONS OF LANDFILL DIVERSION IN RESEARCH, TEACHING, AND CLINICAL LABS

I2SL ANNUAL CONFERENCE

SEPTEMBER 28, 2016

CLEVELAND CLINIC, EMORY UNIVERSITY, CU BOULDER



TODAY

- Identify challenges and opportunities related to the diversion of solid waste materials from laboratories.
- Gain ideas for replicable innovations for diverting laboratory solid waste materials from landfills.
- Be motivated to develop tangible ideas for building connections among key stakeholders, engaging industry in innovation, and setting and achieving goals for closing the loop on the production and disposal of laboratory materials and supplies.

Overcoming Onsite Challenges to Recycle Lab Materials at Institutions

September 28, 2016

Some Common Challenges Faced for Lab Waste Diversion at Institutions

1. Inadequate space for collections
2. Need for funding
3. Support required by a mix of stakeholders
4. Finding a recycler that will take lab materials

Challenge: Inadequate space for collections

Issues:

- Older buildings with insufficient space for even typical recycling...not to mention lab recycling
- New buildings or renovations starting to include space for typical recycling, but not yet aware of space needed for lab specific recycling

Overcoming space challenges at CU-Boulder

Storing materials in labs until pick-up

Gaining trust of CU recycling



Overcoming space challenges at CU-Boulder

Working with fire marshal
and building managers to
find locations



Overcoming space challenges at CU-Boulder

Recycling spaces
incorporated into new
buildings and renovations

Good relationship with CU
Recycling benefits space
for lab materials



Overcoming space challenges at other institutions

Emory University has focused on finding equipment that fits inside of labs, and adjusting processes. Lab staff empty the small footprint containers inside of labs into larger containers in service elevator or hallway spaces.



Overcoming space challenges at other institutions



Clinical Plastics Recycling

PLEASE RECYCLE HERE

Bulk white Styrofoam
Soft plastics, including plastics mixed with paper
Plastic bottles, any size
All rigid plastic, recycling symbol or not
Paperboard

NOT RECYCLABLE HERE

Glass
Biohazardous material
Paper towels
Gloves



Cleveland Clinic partners with Buckeye Industries, a vocational services program for individuals with disabilities to recycle our clinical plastics. For detailed program overview, see COMET's Greening the Labs course.



CLEVELAND CLINIC RECYCLES. For more information visit the Office for a Healthy Environment website at portals.ccf.org/sustainability or email recycling@ccf.org

Challenge: Need for funding

Issues:

Specialized lab materials often cannot be mixed with traditional recycling

- Funding is needed for lab recycling
- But there is already insufficient funding for typical recycling

Overcoming funding challenges at CU-Boulder

Chair of MCDB offers to
pay for recycling

Lab member volunteers



Overcoming funding challenges at CU-Boulder

Expand MCDB model to
other departments

Method of approach is
important

Offer to cover start-up
costs and free trial period



Overcoming funding challenges at CU-Boulder

Adding more types of
materials to truck pick-up
without paying additional
service fees



Overcoming funding challenges at CU-Boulder

Applying for Sustainable
CU funds to cover initial
costs of new lab recycling

Good relations with CU
Recycling leads to support



Overcoming funding challenges at other institutions

Emory University offers a Green Lab Incentives Fund for all labs certified under the Green Labs at Emory program. Funding is provided by Emory's primary scientific supplier.



Challenge: Support required by a mix of stakeholders

Stakeholders:



- **Environmental Health & Safety (EH&S)**
- **Campus recycling/waste management**
- **Building managers, lab department, & lab members**
- **Local recycler**
- **Office of Animal Research (for select materials)**

Overcoming stakeholder challenge at CU-Boulder


Gathering input of and involving stakeholders

Addressing one hurdle at a time

Building relationships and engaging stakeholders

 METAL LAB CONTAINER RECYCLING 

YES





Metal Lab^{*} Containers

*** NO LIDS**

Please

- DEFACE LABEL, WRITE "EMPTY", and WRITE PI Name
- Vent residual solvents from empty containers in fume hoods for at least 24 hours
- Must not be used with any other chemical than what is on the label
- Remove vermiculite and other materials from cans

 CU Green Labs Contact:
Kathy Ramirez
greenlabs@colorado.edu
ecenter.colorado.edu/greenlabs
303-492-8308 

Overcoming stakeholder challenge at CU-Boulder

For complicated efforts:

- Roundtable of stakeholders



Overcoming stakeholder challenges at other institutions

Emory University developed its Green Lab Team in 2013, made up of representatives from EHSO, Procurement, Facilities, OSI, and lab users. Stakeholder buy-in has been successful with this model.

Challenge: Finding a recycler to take lab materials

Issues:

- Recyclers already receiving more material than they can handle
- Concern about biological and chemical hazards

Overcoming outlet challenge at CU-Boulder for brown glass

Local recycler was not interested in taking material

Rocky Mountain Bottling Company wanted to make sure glass had correct composition for Coors

Different collector found



RECYCLE
LAB BROWN GLASS

Brown Glass ONLY



NO lids!!

250 mL or larger

No acid or base bottles
No oil, glycerol, or ethylene glycol bottles

A yellow rectangular sign with a recycling symbol in the top left corner. The text on the sign reads "RECYCLE LAB BROWN GLASS" in large, bold, black letters. Below this, it says "Brown Glass ONLY" in red. In the center, there is a photograph of four brown glass bottles of different sizes, some with white labels. To the left of the photo, it says "NO lids!!" in red. To the right, it says "250 mL or larger" in red. At the bottom, it lists exclusions: "No acid or base bottles" and "No oil, glycerol, or ethylene glycol bottles" in red.

Lab materials recycled at Emory, Cleveland Clinic, and CU-Boulder

- #6 white block foam recycling & re-use
- #5 PP pipette tip boxes & conicals
- #2 HDPE & #4 LDPE plastic film
 - (Cleveland Clinic: including plastics mixed with paper)
- Plastic bottles and all rigid plastic
- Lab paper towel composting
- Metal lab containers
- Carboys for hazardous waste re-use
- Plexiglass shield re-use
- Solvent re-use (ethanol, acetone, methanol)
- Lab equipment
- Animal bedding composting
- Ice pack re-use
- Gloves in some locations
- Emory: all lab plastic, glass, metal, white paper, cardboard



GREEN LABS AT EMORY

What to recycle in labs?

Remember:

Contact Environmental Health and Safety, tel 404.727.5922 or chemwaste@emory.edu, with questions about hazardous or bio-medical waste, non-alkaline batteries, and fluorescent bulb disposal.

ALL REGULATED MATERIALS IN RED BAGS AND RED BOXES MUST BE EMPTY AND FREE OF HAZARDOUS MATERIALS.

INCLUDING:
Chemical
Biological
Radioactive Material

Co-mingled Bin

Plastics

- Plastic with codes 2-6 (e.g. Ziploc bags, HDPE bottles)
- Sachet waste—disposable bags of reagents made from plastic or nylon (e.g. Ziploc bags, Sotex vials, parafilm)
- plastic pipette tips
- empty pipette tips
- NOT POLYSTYRENE**—Styrofoam should be returned to vendor or disposed of in regular trash
- REMOVE ALL LABELS**

Mixed Paper/Cardboard

- Includes colored paper, magazines, paper bags, cardboard packaging for most lab materials
- No mixed or laminated paper and no spiral notebooks
- Empty glass boxes
- Place large cardboard materials in designated cardboard pickup location.

Glass

- Includes clean glass, and brown/amber glass
- Empty containers and bottles—rinse items placed where appropriate
- No Pyrex, borosilicate, or window glass
- REMOVE ALL LABELS**

Metal

- Aluminum and tin (includes foil)
- Steel—*at glass or handling desk send recycling bin for large pieces*
- REMOVE ALL LABELS**



White Paper Bin

- Includes, white/off-white envelopes, white paper with color print, stapled paper
- Remove plastic windows from business envelopes
- No glossy, mixed, laminated paper, or paper with plastic backing



Cold Pack Bin

- For all ice packs



Remember, it is always best to reuse or repurpose materials, then...
PLEASE RECYCLE!

Compost Bin

- Paper towels
- Plant materials and other natural fibers



*Recycled materials should be emptied and appropriate cleaning protocols followed. For other materials in question, contact Emory Recycles or refer to the complete lab recycling protocol.
**E-Waste—Emory-owned electronics are reused or recycled through Emory Staging/Surplus Properties. Call Customer Service (404.727.7464) or email ocsc@emory.edu for pick-up.

Contact Emory Recycles with any questions regarding repurposing lab supplies, equipment or Styrofoam coolers:
Deena.Keeler@emory.edu 404.727.9275
Claire.Wall@emory.edu 404.712.8921

For more information please visit:
fm.emory.edu/recycling

EMORY

Emory
Recycles

Environmental
Health & Safety Office

Procurement and
Payment Services

Sustainability
Initiatives

@EmoryGreen
sustainability@emory.edu



GREEN LABS AT EMORY

Landfill Diversion in Research and Clinical Laboratories DOWNSTREAM Discussion

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EMORY

Campus
Services

Environmental
Health & Safety Office

Procurement and
Payment Services



  @EmoryGreen
sustainability.emory.edu



green buildings
green space



commute
alternatives



energy
awareness



water
conservation



sustainable
food

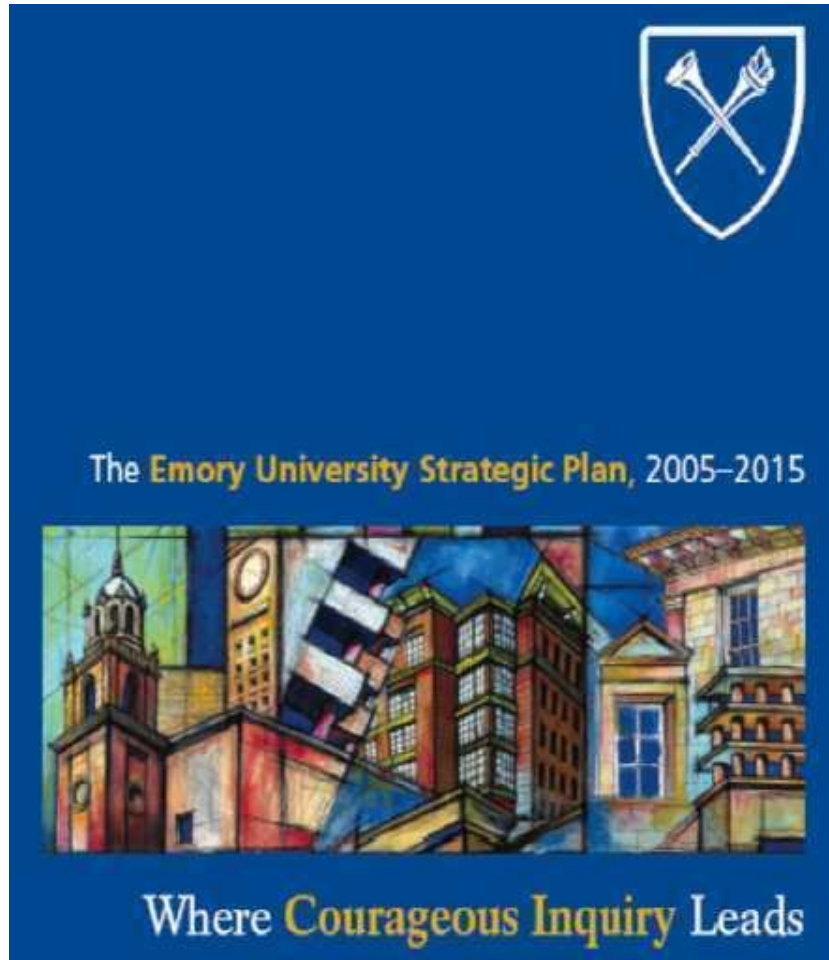


recycling
and re-use



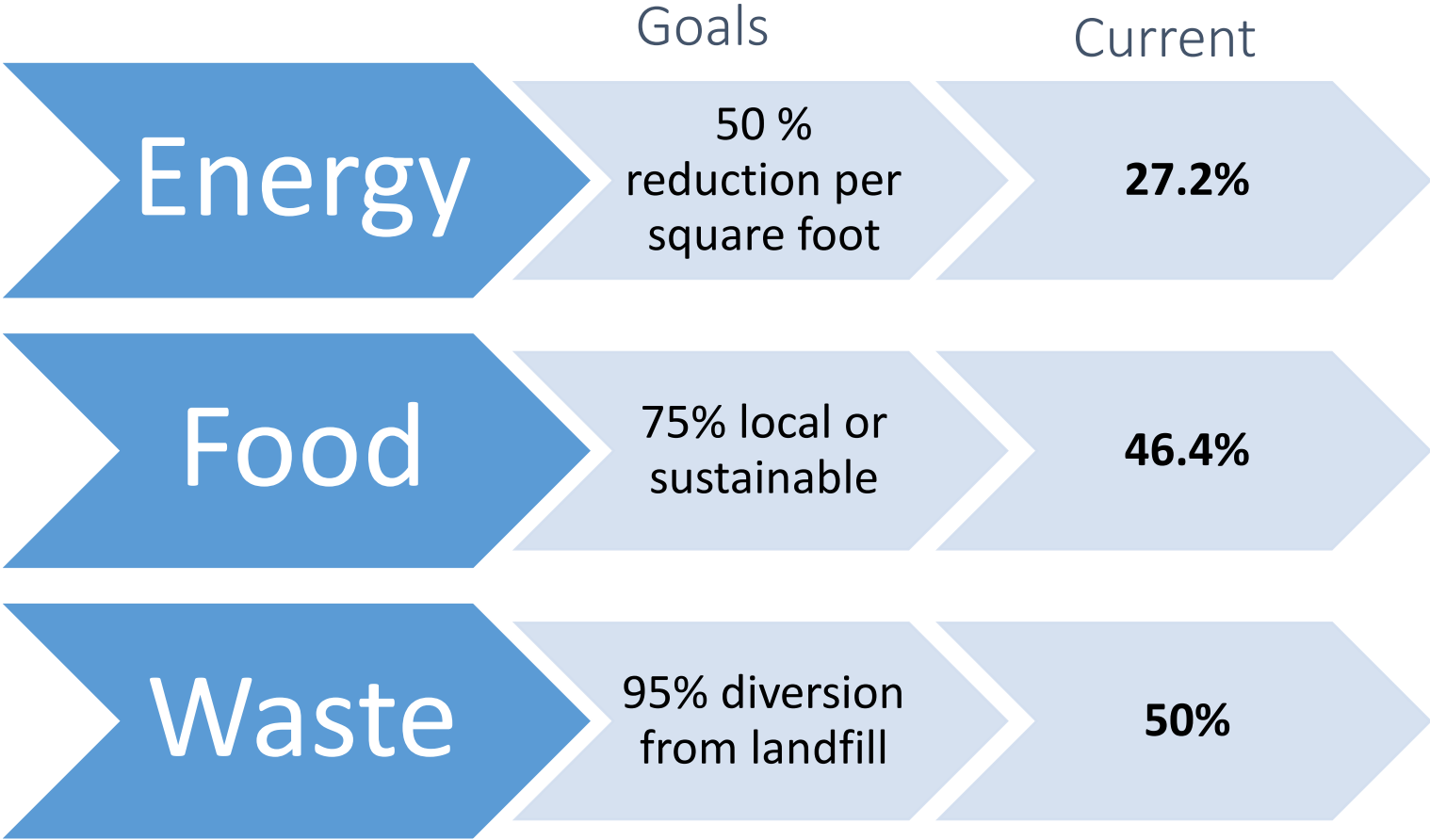
emory
as place

Emory's Sustainability Vision



Sustainability is related to the quality of life in a community—whether the economic, social, and environmental systems are providing a healthy, productive, and meaningful life for community residents, present and future.

2025 Sustainability Goals



Lab Recycling models: 3 institutions, 3 ways

- Emory University co-mingled model
- Cleveland Clinic downstream sorting model
- CU Boulder separated recycling model





What to recycle in labs?

WHITE PAPER



No mixed paper, paperboard, napkins or paper towels



IF YOU DON'T KNOW, PLEASE CONTACT US
Deena.Keeler@emory.edu 404.727.9275 Claire.Wall@emory.edu 404.712.8921

EMORY.
RECYCLES



What to recycle in labs?

COLD PACKS



No Styrofoam or packing materials



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EMORY.
RECYCLES



What to recycle in labs?

PAPER TOWELS FOR COMPOSTING



No Hazardous Materials



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EMORY.
RECYCLES



What to recycle in labs?

CO-MINGLED RECYCLING

PLASTIC (including 1 to 6)



MIXED PAPER



METAL



GLASS



RINSE CONTAINERS AND DEFACE LABELS

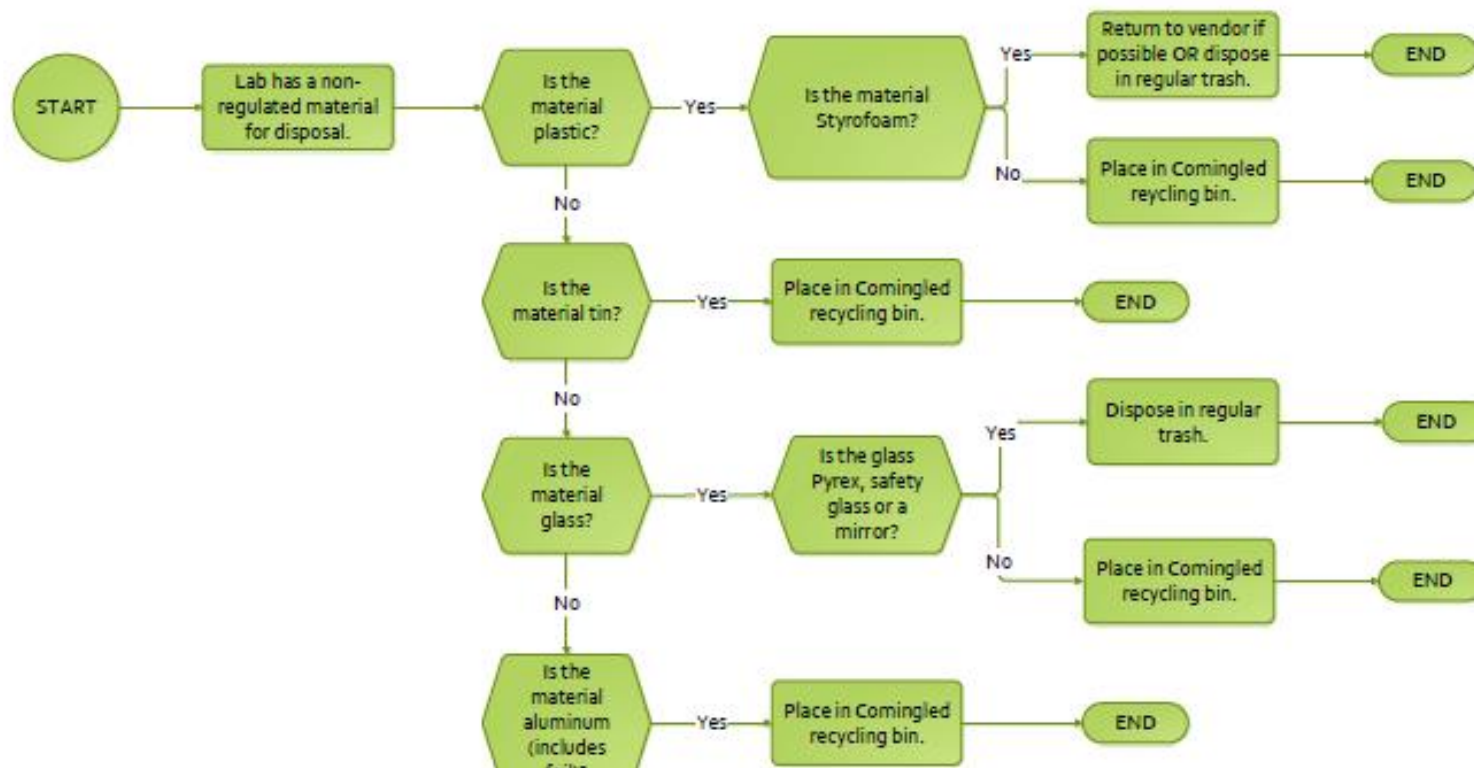


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EMORY.
RECYCLES

Lab Recycling Process Map

Step 2: How do I recycle my non-regulated materials?



QUIZ

2 current challenging waste streams that incorporate all 3 sectors being discuss today:

- Upstream
- Onsite
- Downstream



What to recycle in labs?

COLD PACKS



No Styrofoam or packing materials



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RECYCLES

To date at Emory

Upstream : Suppliers : Reduction : Take-back

Onsite : Collections : Reuse?

Downstream : partnerships for REUSE, new possibilities for recycling

Challenges

- Durability
- Perception
- Transportation
- VOLUME

University of Wisconsin Boxable



Video credit goes to Brooke Marten, UW student



Takeaways

- Broad conversation with solutions from manufacturers, suppliers, recyclers
- Extended producer responsibility = closed loop system
- Perception/liability
- Recycling innovations that address cost

Questions _ Contact Us

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Discussion

Please share a brief description of an innovation in upstream, onsite, and/or downstream that your institution is doing.

How has your institution overcome the barriers presented today or others?

What can your industry do to support higher diversion rates and better flow of materials through research and clinical laboratories?