Senate Agriculture Committee: DEC Waste Management & Prevention Division Plastics, Food Waste, Compost

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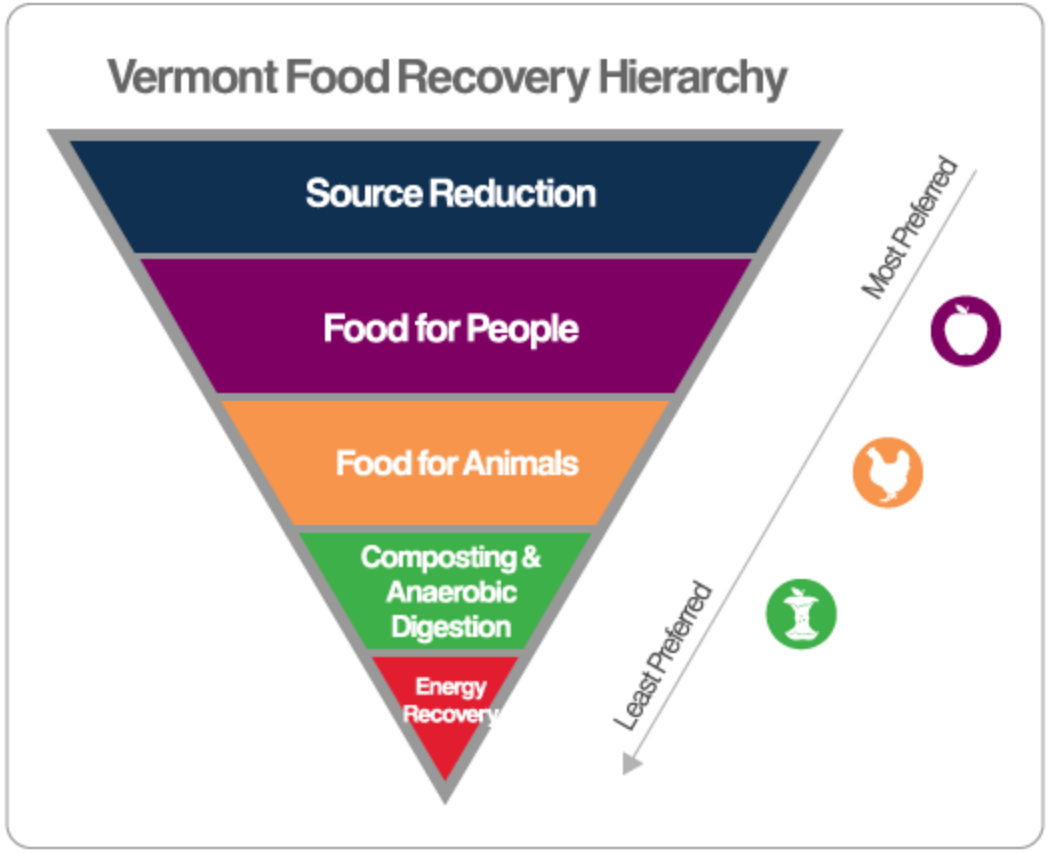
Food Residual Diversion

- Vermont generates an estimated 80,000 tons of food residuals per year.
- In 2020, solid waste certified compost facilities succeeded in processing 12,787 tons of food residuals and home composters processed an estimated 37,246 tons of food residuals.
- Still, there is roughly 30,000 tons of food in packaging generated in Vermont each year that cannot be recycled, composted, or anaerobically digested, as is.
- Depackaging facilities help achieve the food recovery hierarchy goals by diverting that organic tonnage from a landfill for anaerobic digestion or composting.



Plastic Use & Prevalence

- Plastic use is widespread in our culture because it’s a cheap, light & watertight material.
- Unfortunately, there are not convenient recycling outlets for many types of plastics. Films in particular.
- In 2015-2018 China stopped accepting the world’s contaminated recyclables. VT was impacted, and DEC responded with our *Recycle Like You Live Here* campaign to clean up the recycling stream.
- Society is now wrestling with the benefits and challenges of plastic use.
- We are exposed to microplastics daily. Direct ingestion via plastic bottles, dishes and utensils. Direct inhalation of airborne particulates. Dermally via clothing and personal care products. The effects of that exposure are not known.
- We do know that today's plastics become tomorrow’s microplastics. There is a need to reduce the presence of plastics in the environment and preserve the quality of composts, digestates and animal feeds.

What Are Microplastics?

Plastic Sizes

- Macroplastics – particles larger than 5mm.
- Microplastics – particles smaller than 5mm (or 0.20 inch)
- Nanoplastics – definitions vary, but generally refers to particles smaller than 1,000 nanometers.

Primary Particle Shapes – Fibers, Fragments and Films

- Each shape will behave differently in the environment based on size, surface area to mass ratio and polymer type (chemistry).

Kate Porterfield a PhD student of Civil and Env. Engineering at UVM examines sieved particles for microplastics. Photo credit: Luke Awtry Photography.

Data Gaps and Microplastics

- Concentrations, characterization and direct sources of microplastics in VT soil is not known.
- No standardized sampling method for microplastics.
- No human health or environmental toxicity data on microplastics.
- Fate & transport of microplastics in a soil environment is not known.
- Impact on soil organisms, soil structure and the rate of plant uptake

Greenhouse Gas Emissions from Food Waste

Using EPA's WARM Model, DEC compared landfilling vs. anaerobic digestion (using VT's estimated 80,000 tons/year of food scraps disposed)

- Landfilling = 34,843 MTCO2E
- Anaerobic Digestion = -7,830 MTCO2E

- This is equal to removing over 9,000 vehicles off VT's roads each year in terms of emissions not produced.

Food Residual Depackaging

Overview:

- Quickly mechanically separates inorganic packaging from organic contents. Anything from soda bottles to chip bags to baby food to Ben & Jerry's pints.
- Reuses locally available organic resources.
- Anaerobic digestion helps stabilize farms by diversifying farm income and offsetting energy costs and reliance on synthetic fertilizers.
- Solid and liquid digestate have agronomic benefits and solids can be reused as bedding on farms.
- Some recovered packaging materials are sent for recycling. Recovered packaging that is unrecyclable is disposed.

Data Gaps:

- What are the typical purity rates of depackaged slurry streams?
- Do some packaging materials result in greater contamination than other packaging materials?
- Laboratories and methods for analyzing microplastics in food residuals and depackager slurries need to be developed.
- Slurry "recipes", like compost acceptance standards, could be employed to reduce contamination.


Example of T42 - Wet & Dry Organic Processing System
INFEED HOPPER
INFEED CONVEYOR
T42 TURBO
WASTE CONVEYOR
INCLINED CONVEYOR
HORIZONTAL CONVEYOR
PISTON PUMP


SEEDS of CHANGE
BROWN & RED RICE
SPANISH STYLE RICE

Casella’s All Cycle T.S. Facility - Williston

Scott Equipment Mega Thor Turbo Separator

- 8 cubic yard hopper
- Dual feed screw augers pre-open & deliver material
- Variable speed rotating shaft with 52 swing hammers
- Packaging is split by the rotating swing arms.
- Organics are collected through screens in the bottom of the turbo separator chamber
- Packaging passes through the chamber similar to oversize particles through a trommel screener.
- Shaft rotation speed, swing hammer/paddle design, screen size & shape, dry or liquid addition and feedstock combinations can all be adjusted to optimize performance.
- 20 - 40 tons per hour maximum capacity. Depending on feedstocks and input rate.

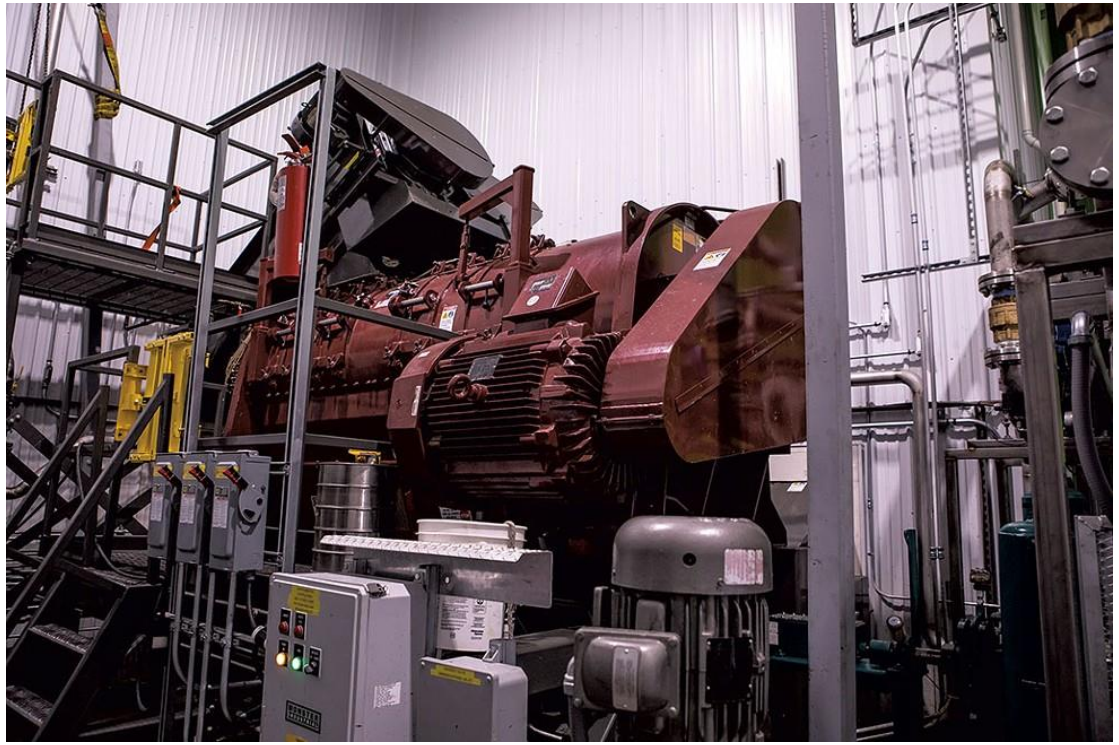


photo of the Mega Thor Turbo Separator at All Cycle Transfer Station courtesy of Luke Awtry Photography

Next Steps

- Continue public outreach campaigns to keep recycling and food residuals streams pure. Proactively reducing contaminants on the front-end improves the outcome for all.

- Collect data and characterize microplastics in compost, anerobic digestate and soils in conjunction with Agency of Agriculture Food and Markets. ANR and AAFM support gathering information to make informed decisions about the specific management requirements of food scraps. The Agencies will rely on the data from our sampling program and the guidance from VDH and EPA to ensure that the agricultural community, its land, and its products are not adversely impacted by managing food scraps.

- Avoid regulatory thresholds until they are determined to be necessary by data gathered in Vermont.