Composting in U.S. and Virginia

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Why make compost?

- Improve recycling rates
- Make a profit/reduce costs
- Produce a soil amendment or organic fertilizer
- Manage a “waste”
- Conserve landfill space
- Provide a community service
- 35%-40% Waste Stream by weight

- Almost half of the states ban some form of organics from landfills.

- Half of all food is wasted

Source: US EPA 2016 Municipal Solid Waste Characterization
Definition of compost

- The product from the controlled biologic decomposition of organic material and stabilized to a point that it is beneficial to plant growth.
- Many uses and specifications add qualifiers
  - U.S. Composting Council Seal of Testing Assurance includes “under aerobic conditions” and “sanitized through the self-generation of heat”
Definition of Composting

- Process that produces compost
  - The biological decomposition of organic materials under controlled aerobic conditions.

- Both compost and composting may be defined by regulation (Federal, State, or Local).
  - Federal: 40 CFR Part 503
    - Establishes time-temp pathogen kill standards
  - State: 9 VAC 20-81-300, et.seq.
    - Establishes siting, design, operational, testing and product quality requirements
  - Local: P & Z regulations/policies/procedures
    - Ensures compatibilities with adjacent land uses
Compost Facility Feedstock-Process-Market Feedback

Start here or here

Analyze Markets

Identify and quantify Feedstocks

Develop and adjust recipes

Collect or receive feedstocks

Compost Facility Process:
Grind, Mix, Compost, Cure, Screen, etc.

Market and distribute

Assess
Composting is done at all scales:

Household/Community Composting
Facility/Institutional

Prison

University

POTW
Scalable Industrial/Municipal

Designed so that when hot air hits the fabric, it condenses and drips back in and helps control odors. No biofiltration.
Centralized Industrial/Municipal
2017 BioCycle State Of Organics Recycling In The U.S.
4,713 Total Composting Facilities In U.S.

Composting facilities by type

- Yard trimmings 57%
- Yard trimmings & food waste 5%
- Multiple organics 6%
- Mixed MSW 8%
- Biosolids 13%
- On-site institutional 2%
- On-farm 3%
- Other 2%
- Not specified 5%
### Composting Facilities, by method (34 states reporting)

<table>
<thead>
<tr>
<th>Windrow</th>
<th>Static Pile</th>
<th>Aerated Static Pile</th>
<th>In-Vessel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,135</td>
<td>409</td>
<td>170</td>
<td>81</td>
</tr>
</tbody>
</table>

### Composting Facilities, by scale (36 states reporting)

<table>
<thead>
<tr>
<th>Scale, Tons/Year</th>
<th>Smaller</th>
<th>Mid-Scale</th>
<th>Larger</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5,000</td>
<td>2,364</td>
<td>429</td>
<td>194</td>
</tr>
<tr>
<td>&gt;5,000 - &lt;30,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30,000+</td>
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</tbody>
</table>
U.S. trends in organics management

- Composting
  - Various state programs regarding organics
    - CT, VT, MA, RI – new bans on landfilling food scraps
    - IA – reversed ban on landfilling yard trimmings
    - CA, FL, MN – adopted 75% recycle goals by 2020
  - Several high-profile shutdowns recently
    - Odors, contamination, storm water quality major issues
  - Growing interest in small-scale community facilities linked to community-supported agriculture (CSA)
Trends in composting facilities

- Shift toward vendor-provided technologies
- Shift toward forced-aeration composting
- Shift toward community-scaled smaller facilities
- Shift away from large centralized facilities
- Shift away from open-air windrows (storm water quality)
- Much less tolerance about contamination
- Siting opposition challenges remain strong
Organics management in Virginia

- Composting
  - 21 operational composting facilities in Virginia
    - 6 food scraps
    - 8 yard trimmings
    - 2 sewage sludge
    - 5 manure/agricultural residuals
  - 3 new facilities in development (2 yard trimmings, 1 university food scraps)

- Digestion
  - 18 WWTP AD facilities (no co-digestion)
  - 1 livestock AD facility operational (no co-digestion)
  - 1 solid waste AD facility in development (food scraps)
Virginia solid waste management regulations

- Permit-by-Rule Process
  - Types of compost facilities
  - Feedstock categories
- PBR Basic Requirements
- Siting
- Design
- Operations
- Closure
Solid Waste Permit-By Rule Process
9 VAC 20-81-410

- Contact Regional Land Protection Manager
- Notice of Intent to Operate per 81-450.B
- Description of type of facility and material to be composted
- Certification of site criteria and Operations Manual
- PE certification of design/construction and closure plan
- Demonstrate legal control over site
- SCC Certification
- Financial Assurance
- Results of Public Participation
- Application Fee $390 (per 9VAC20-90-10 et seq)
Types of Composting
9 VAC 20-81-310

- Type A: confined or enclosed vessel method of composting

- Type B: windrow or aerated static pile method
Categories of Feedstock
9 VAC 20-81-310

- Category I: Pre-consumer plant or plant-derived wastes
- Category II: Animal derived waste material
- Category III: Animal and post-consumer food wastes with pathogen potential
- Category IV: Other wastes (non-rendered animal waste, MSW, industrial sludge)
PBR Requirements

- Conform to requirements of regulations
- Operate under supervision of a DPOR-licensed solid waste management facility operator
- Submit annual SWIA 50-25 form
- Pay annual permit fee
- Comply with Financial Assurance regulations 20-70-10
Siting
9 VAC 20-81-320

- Access to paved/surfaced roads
- Not subject to base (100-year) floods
- 100 foot buffer from property line
- 50 feet from stream or wetland
- 200 feet from residential area, health care facility, school, recreational park, other public institution
- Minimize traffic congestion
- Management of run-on, run-off, and leachate
Handling area for receiving & sorting – covered if Cat II, III, or IV

If seasonal high-water table within 2 feet of ground surface, composting & handling areas must be hard-surface and diked/bermed

If receiving Cat IV feedstock, or > 1,000 tons/quarter Cat II or Cat III feedstock, several options for surface underlying all receiving, mixing, composting, curing, screening, and storing operations
  – Asphalt, concrete, soil-cement, HDPE liner (w/ leachate detection and collection)

Uncovered sites – surface water control features sized for 1-hr / 10-year intensity storm event
Operations
9 VAC 20-81-340.A

- Noncompostable and undesirable material disposed of at an appropriate permitted facility
- Implement a safety program to include fire prevention & suppression
- Control dust, odors, vectors, and mud
- Self-inspections & maintenance
- No runoff discharge without VPDES permit
Finished Compost Testing & Analysis
9VAC 20-81-340.A.2

- Does not apply to facilities composting only Category I (i.e. yard trimmings)
- Frequency of analysis based on tons of finished compost per year (1x/mo to 1x/yr)
- Use stability testing methods (to prove that it is a product and not a waste)
Microbial testing required, Cat. III & Cat. IV:
- Parasites
- Bacteria
- DEQ may approve alternate microbial testing or operating standards as applicable for specific facility

Metals testing for all finished products produced from Cat. IV materials
Compost product trends

- USCC Certified Compost program
  - [www.certifiedcompost.com](http://www.certifiedcompost.com)
  - 9 DOTs now require STA compost

- More producers moving into blended soils markets
  - Rootzone mixes for golf, athletic turfgrass
  - Bioretention & bioswale growth media
  - Manufactured/engineered topsoils

- Growing recognition of market demand needed for lesser quality composts made from processed MSW
  - Land reclamation, ADC, final/intermediate cover
Where do we go from here?
Realities

- Raising recycling rates very difficult without capturing and recycling organics in some way

- Work of siting and building new landfill airspace capacity very challenging, if not impossible in some areas

- There is no “one size fits all” solution
Questions?

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