NYC Environmental Protection

Resource Recovery

A wealth awaits in our WRRFS

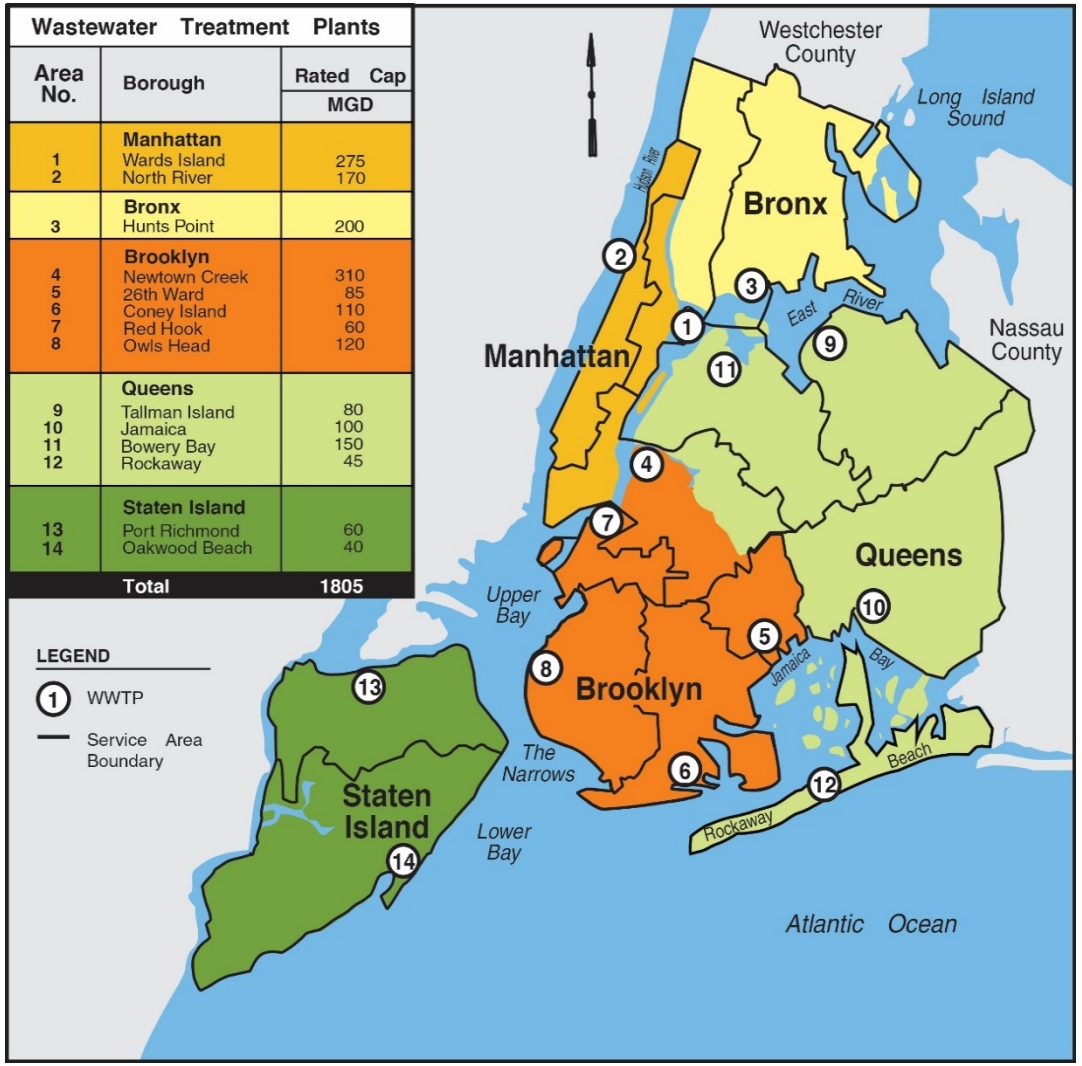
February 20, 2020

NYC Wastewater Resource Recovery

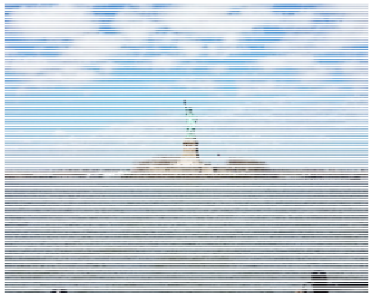
- 14 Wastewater Treatment Plants ranging in capacity from 39.9 MGD to 310 MGD dry weather capacity
- 6 Dewatering Facilities at our Treatment Plants
- 4 CSO Facilities
- 96 Pump Stations - Combined, Sanitary and Stormwater
- 497 Regulators; 152 Miles of Intercepting Sewers
- 14 Inner Harbor Vessels – 5 Sludge Vessels – and 1 Bio-solids Barge

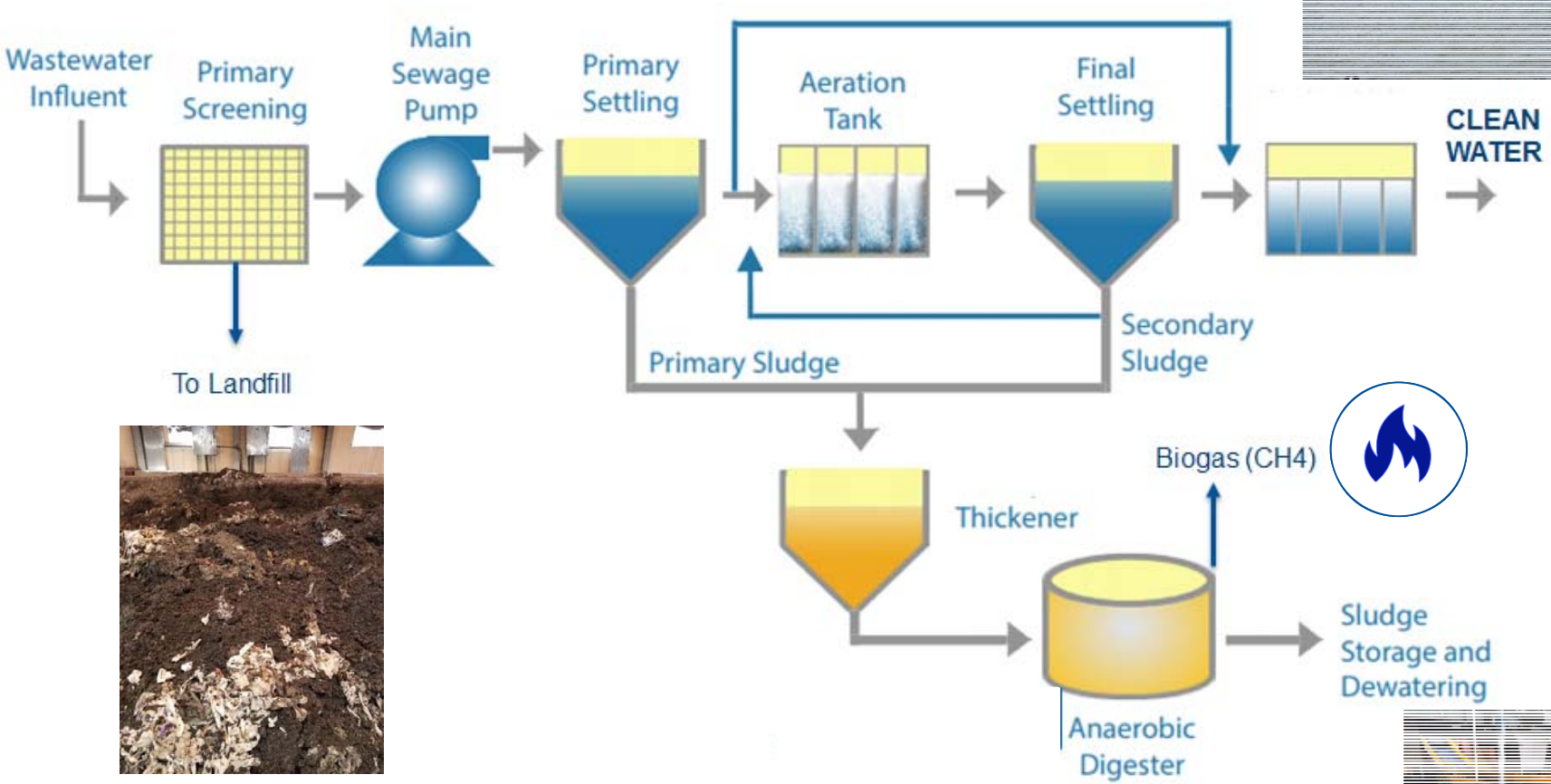
Wastewater Treatment Plants

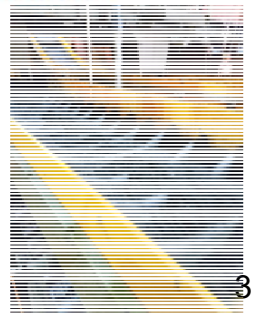
Area No.	Borough	Rated Cap MGD
	Manhattan	
1	Wards Island	275
2	North River	170
	Bronx	
3	Hunts Point	200
	Brooklyn	
4	Newtown Creek	310
5	26th Ward	85
6	Coney Island	110
7	Red Hook	60
8	Owls Head	120
	Queens	
9	Tallman Island	80
10	Jamaica	100
11	Bowery Bay	150
12	Rockaway	45
	Staten Island	
13	Port Richmond	60
14	Oakwood Beach	40
	Total	**1805**



Resource Extraction Points

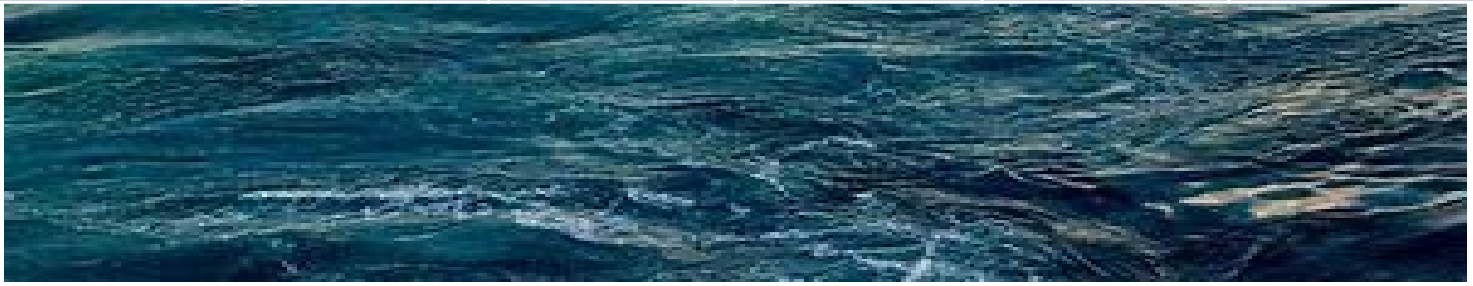






What's in biosolids??

	Heat Dried	Compost	Class A	Class B	Liquid
WATER	5%	50%	75%	75%	98%



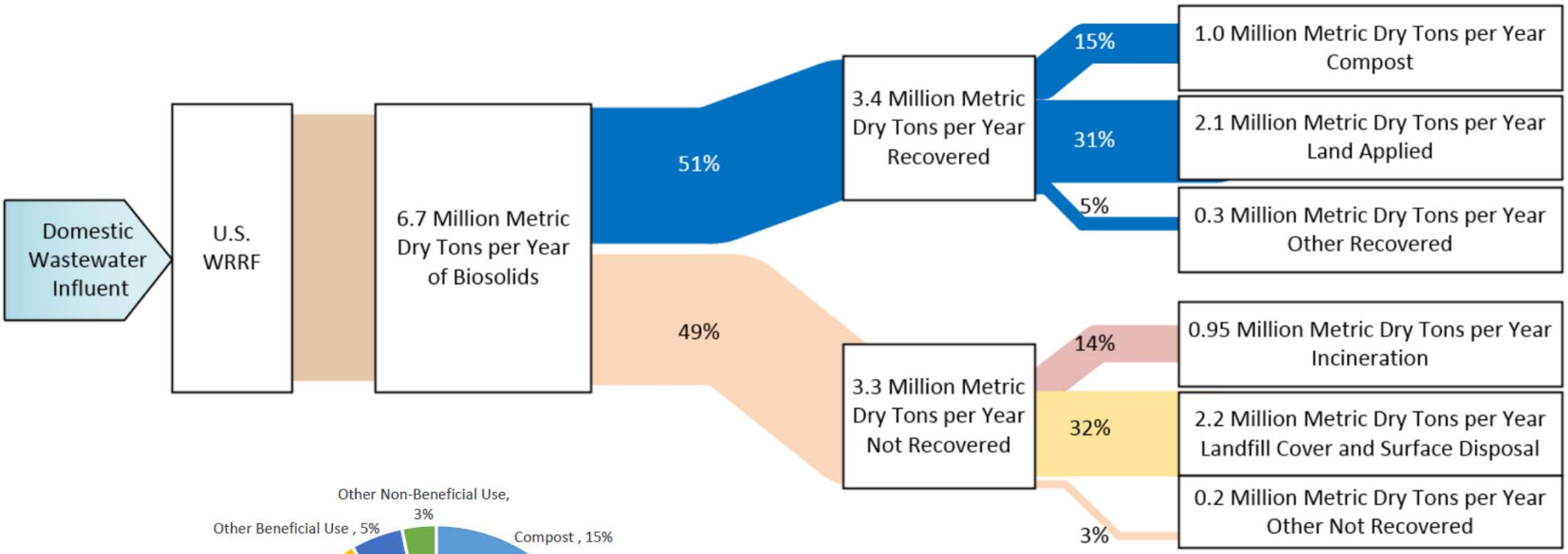
Also	about this much
Energy	5,000-10,000 Btu/d lb.
Organic matter	20-70% (dry)
N-P-K	4-3-0
Micronutrients	Ca, Fe, Cu, Zn

Data Courtesy NEBRA

Bio/Chem Characteristics

- Binding Sites- reducing bioavailability of Pb, As, etc.
- Inert sand, silt, grit, and synthetic particles
- Trace elements (mostly in compounds)
- Pathogenic micro-organisms
- Synthetic and natural organic chemical compounds (e.g. including polymers)

Where do biosolids go?



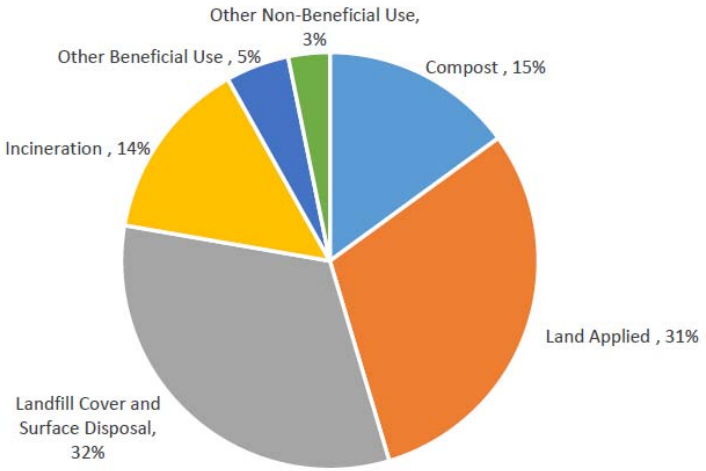
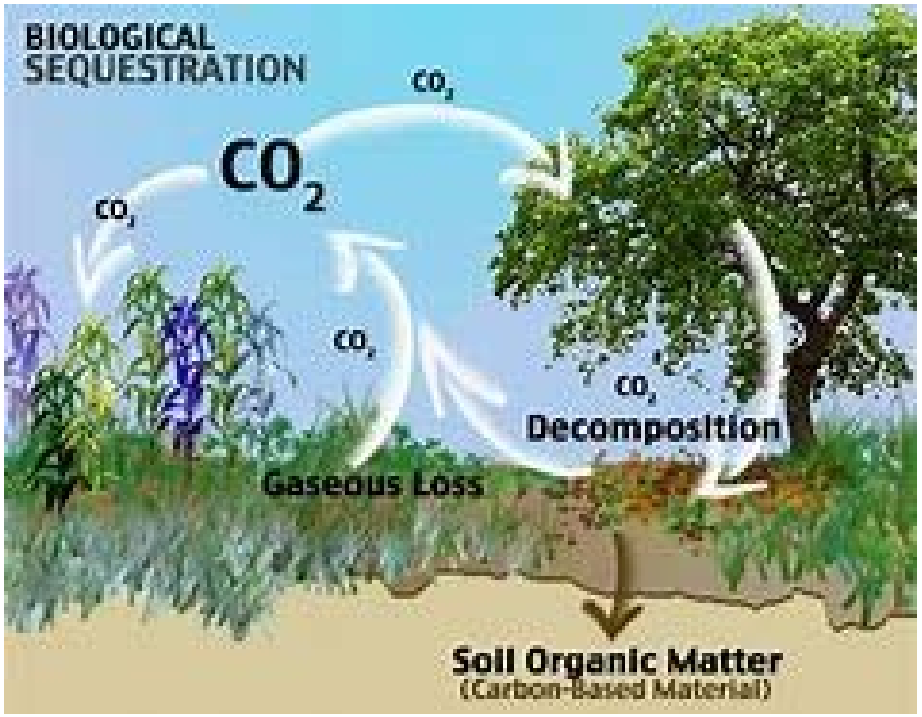


Figure 13 National Distribution of Biosolids End Use

WEF Resource Recovery Survey, 2018. N =109

Biosolids in the Field

Carbon Benefits of Biosolids Reuse



Adding biosolids to soil offsets greenhouse gas emissions in 3 major ways:

1. some of the carbon added to soil stays there for a long time
2. Biosolids make plants grow bigger faster which means more plants can take more carbon out of the atmosphere via photosynthesis.
3. Using biosolids instead of synthetic fertilizer. Synthetic fertilizer takes a tremendous amount of fossil fuel to manufacture.

Highly Regulated Material

- Biosolids beneficial use is regulated by the Federal Government through the "503s" (40 CFR 503); and disposal through 40 CFR 258
- States have the authority to further regulate biosolids use and disposal
  - Regulations are often more restrictive than federal
  - Regulations are not harmonized geographically
  - Some states are biosolids friendly {PA} others are not as {NJ}
- The 503s set a baseline for treatment and classification
  - Class A (aka EQ) – highest level of treatment, least restricted use
  - Class B – some treatment, some restrictions on use
  - Unstabilized (unclassified) – "incomplete" processing at the WRRF (only capture and dewatering*) and cannot be directly reused. AKA "sludge"

* Some Plants manage sludge as a liquid

What is regulated by the 503 Rule

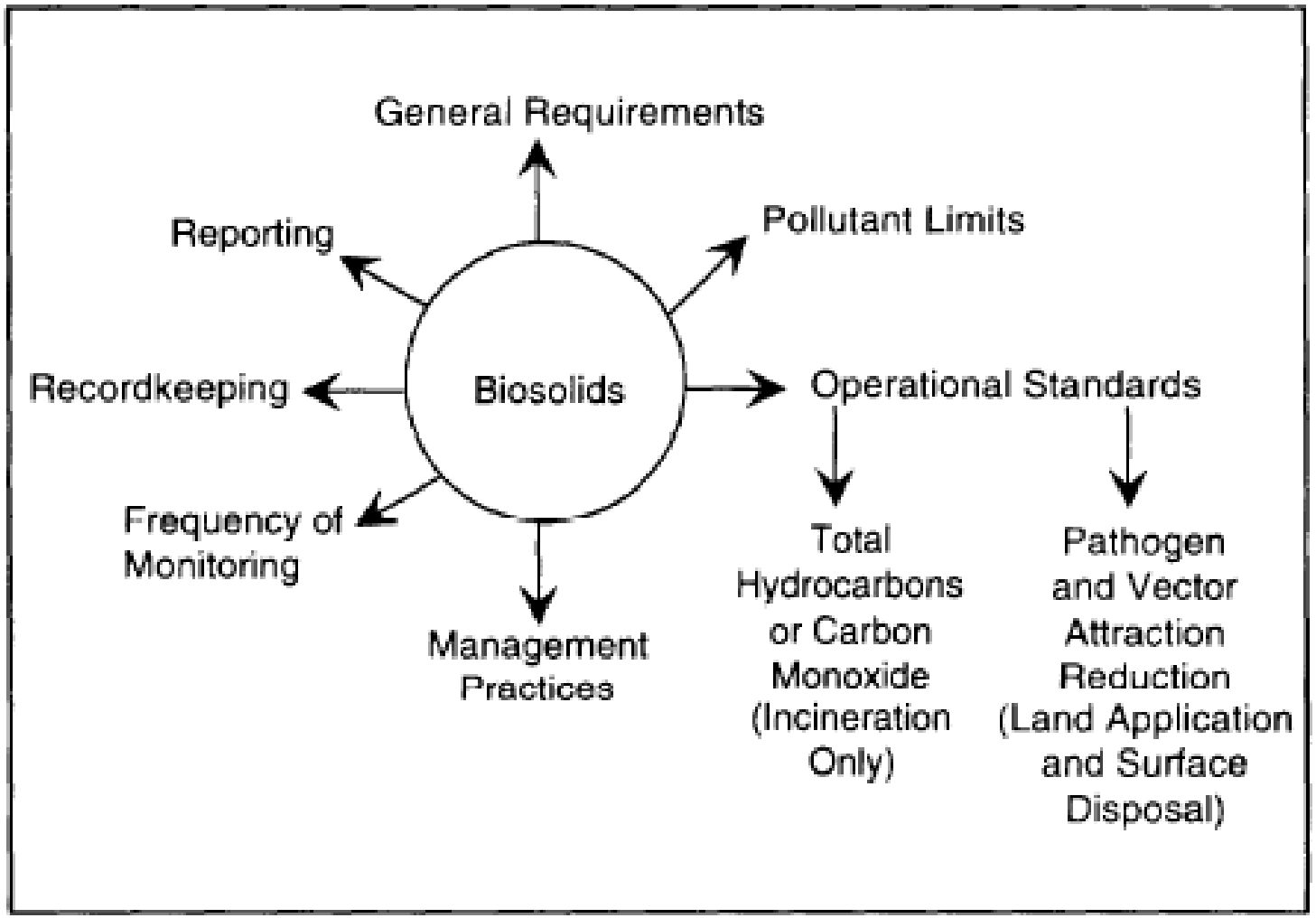
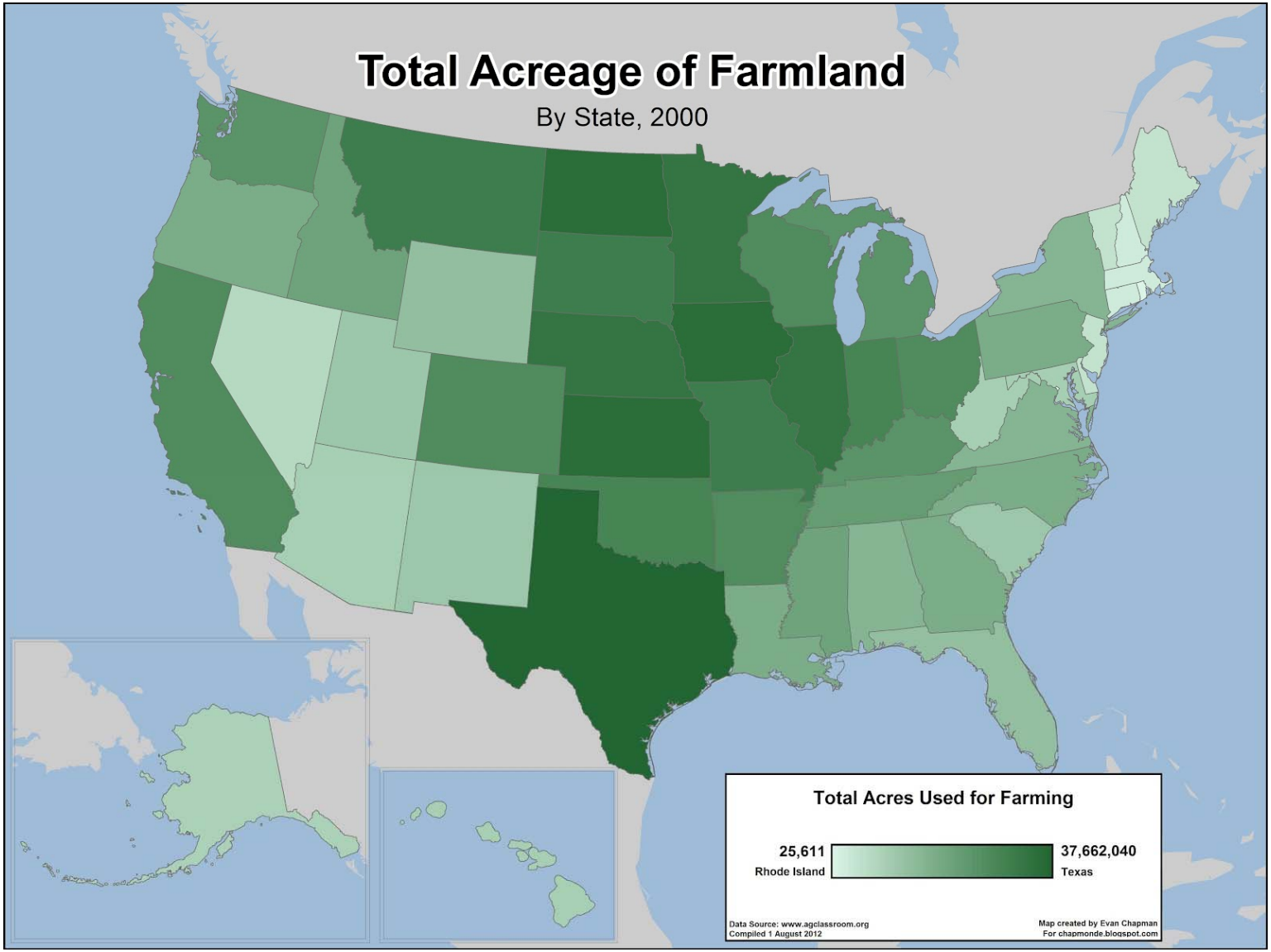


Figure 1-1. What a Part 503 standard includes.

Land Application is great, but



Evolution of Solids Recovery

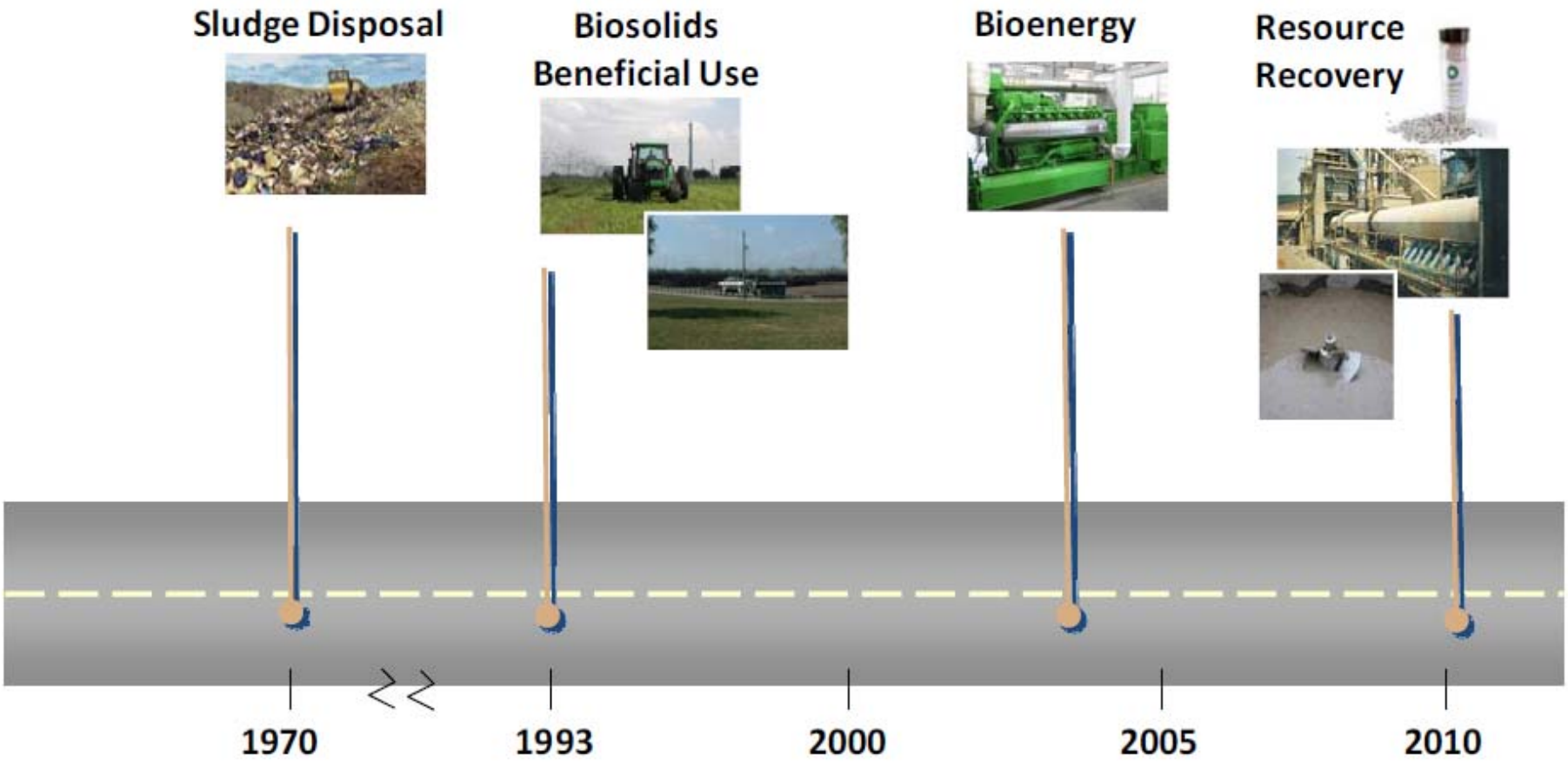


Figure ES-1: Our changing view of solids management

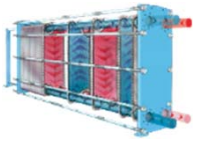
Resource Management and Recovery

Residential & Commercial Wastewater

Industrial Wastewater

Stormwater

Food Waste



HEAT

Process Water Reuse

ELECTRICITY CoGen & Di-Gas Reuse

CLEAN Water

Fit-for-Purpose Water

Biosolids Products

Renewable Energy

Next Generation Products

Inputs *Raw Materials* → **Processing** *Manufacturing* → **Outputs** *Products*

Food Waste Co-Digestion

Separation + Collection

Processing (EBS)

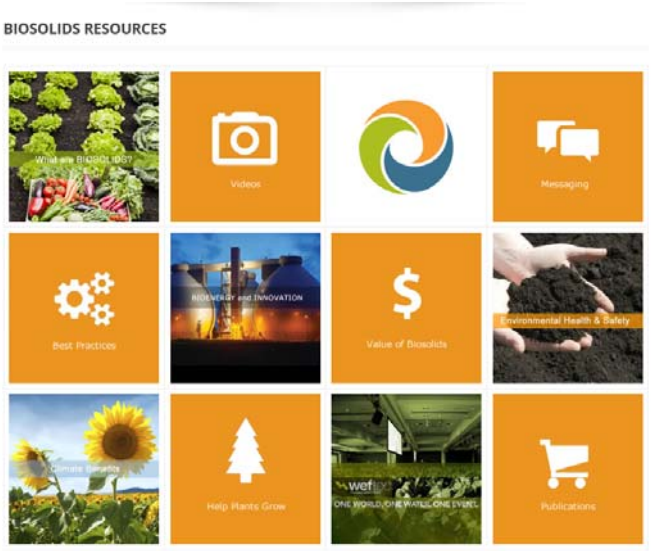
Transport + Storage + Co-digestion

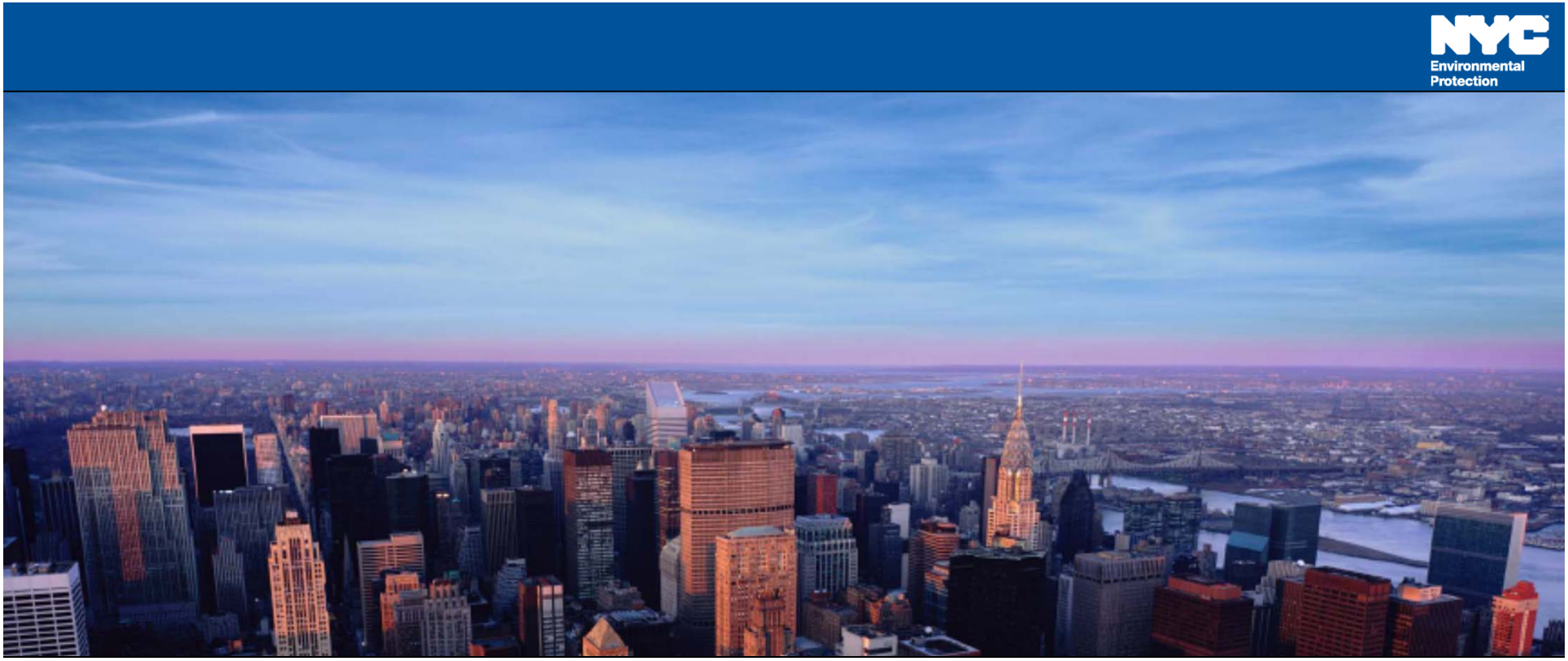
Food Waste Co-Digestion

- Newtown Creek Pilot Project 2016 – 2019
- Looking at impacts to biosolids quality – N, P, K. Carbon? **Nutrient Recovery**
- Potential for synergy in the solids + energy nexus

Resources and References

- www.nebiosolids.org
- https://www.epa.gov/ghgemissions
- https://www.epa.gov/lmop
- https://www.ccme.ca/en/resources/waste/biosolids.html
- https://www.nytimes.com/2018/04/18/magazine/dirt-save-earth-carbon-farming-climate-change.html





Jennifer McDonnell

Resource Recovery Program Manager

DEP Energy Office

jmcdonnell@dep.nyc.gov