Waste & Water Reduction

Tennant Company

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Minnesota Technical Assistance Program

UNIVERSITY OF MINNESOTA

Tennant Company

- Headquarters/Plant 1 in Golden Valley, MN
- 7 buildings

Mission of Sustainability

- Environmentally friendly products
- Conscious of carbon footprint
  - 25,731 gallons fuel
- Reduce waste

Project Overview

- Further sustainability efforts
- Improve waste management
- Reduce reverse osmosis water consumption

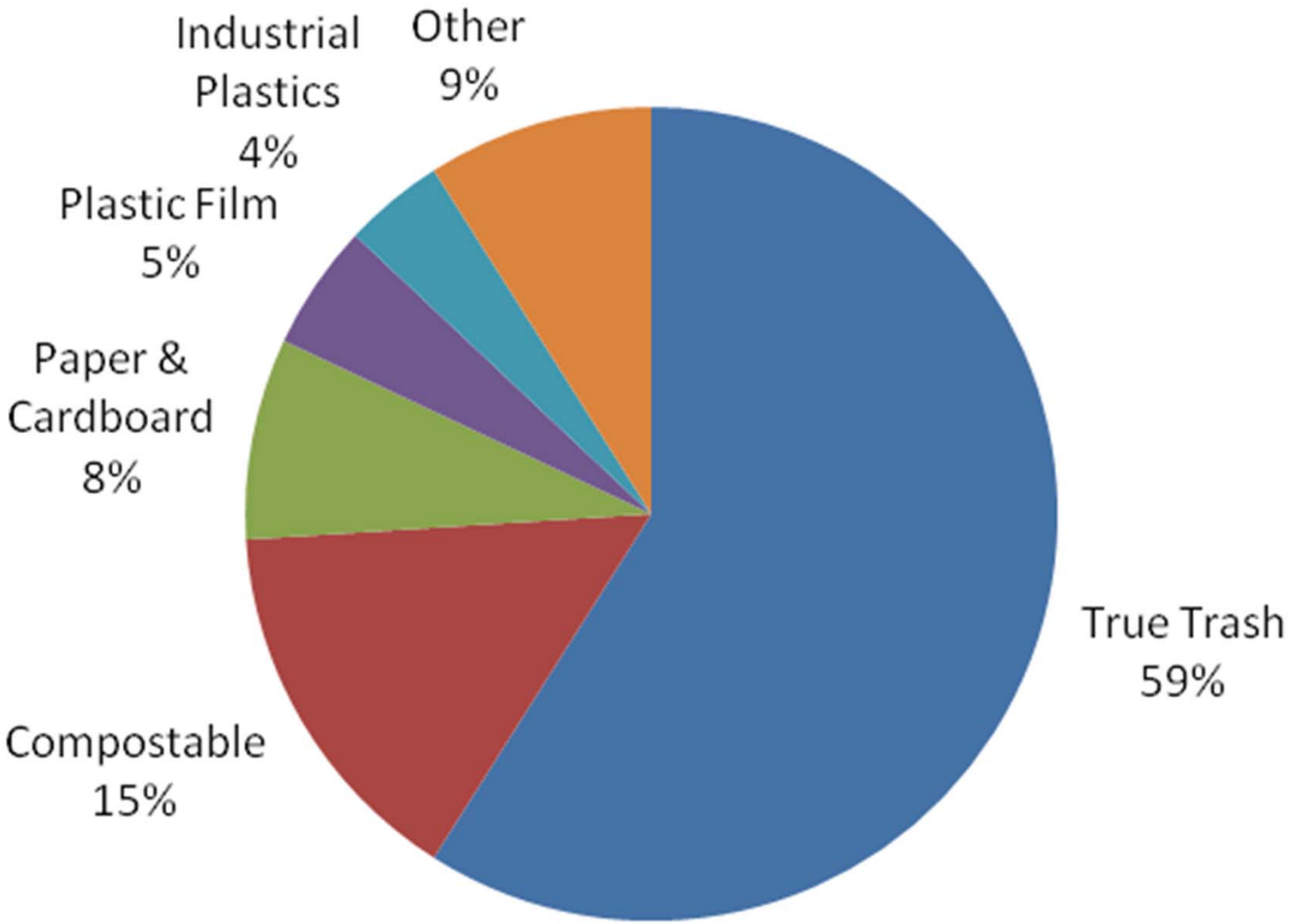
Approach to Waste Analysis

- Inventory of waste streams
- Waste sort
- Identify opportunities for reduction & diversion

Currently Recycle

- Bailed cardboard & paper
- Cans & bottles
- Pallets
- Bailed plastic film
- Scrap metal

Waste Sort Findings



True Trash

Compostable Material

- Comprises 15% of total trash by weight
  - Food waste
  - Paper towels
  - Disposable food ware
- 40 cubic yards/year

Disposal cost as trash	$1,620
Cost for compost hauling	$680
Savings/year	$940

Expand Recycling on Plant Floor

- Paper & cardboard comprise 8% of trash
- Industrial plastics comprise 4% of trash

Savings: Recycle	$1010
Implementation costs	-Cost of bins -Educate employees -Upsize recycling dumpster

Plastic Film

- Plastic film comprises 5% of trash
  - Shrink wrap
  - Bags
  - Trash liners

Savings: Recycle	$520
Savings: Reuse	$1,230
Savings: Reduce	$13,200

Plastic Film Reduction

- All locations single-sort services
- Remove 92 bins
- Save $13,200/year in liners & labor

Waste Reduction Summary

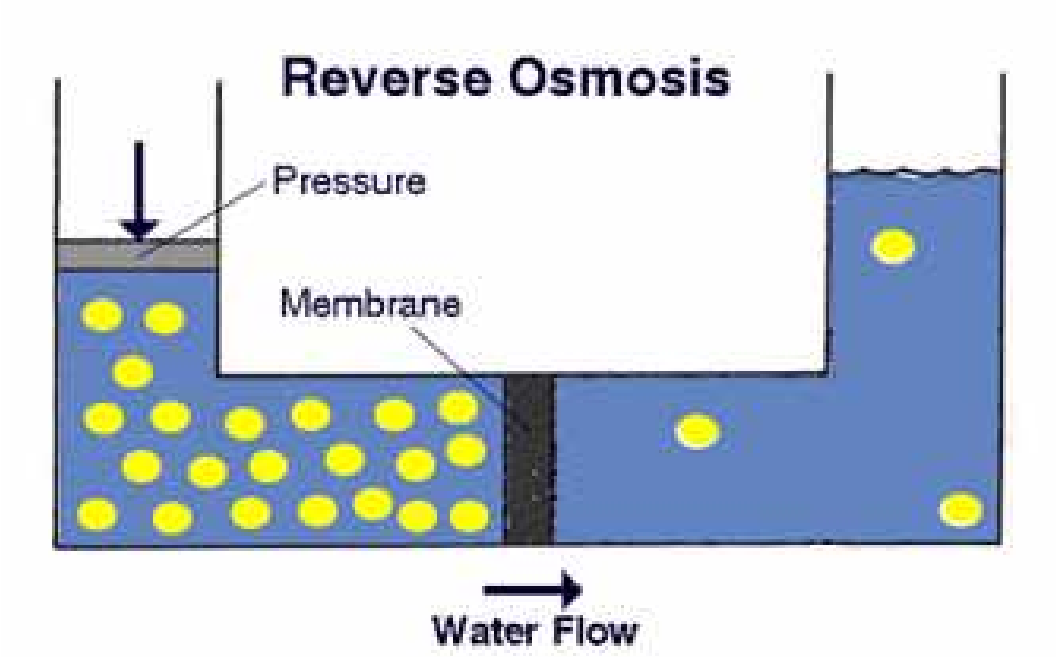
Recommendation	Annual Savings	Annual Material Reduction/Diversion
Compost	$940	24,260 lbs.
Plant Floor Recycle	$1010	19,250 lbs.
Plastic Film Recycle	$520	7,620 lbs.
Plastic Film Reuse	$1,230	800 lbs. (5,020 liners)
Plastic Film Reduce	$13,200	3,700 lbs. (23,090 liners)
Right-Size Dumpsters	$6,440	
Pallet Ordering	$16,140	2,860 pieces plywood
Drum Ordering	$3,130	
Alternative Vendors	$2,080	
Misc. other	$240	1,040 lbs.
Total	**$44,930**	**56,670 lbs.**

Approach to Water Analysis

- Inventory of water consumption
  - Irrigation
  - Fresh water
  - Reverse osmosis
- Reverse osmosis water most costly
- Reduce reverse osmosis water consumption
  - Improve efficiency of unit
  - Reduce end use of water

Reverse Osmosis Water

- Highest level of water purification



- Critical requirement of a process

RO Unit Recommendations

- Identified three opportunities for improving performance of reverse osmosis unit

Recommendation	Annual Savings	Implementation Costs	Annual Reduction	Payback
Re-bed filter	$4,928		395,000 gallons, 923 kWh	Implemented
Water Pump	$6,360	Up to $4,556	487,772 gallons, 5.57 kWh	9 months
Pre-treatment	$3,614	$10,494	Maintenance	2.9 years
Total	**$14,902**	**$15,050**	**882,770 gallons; 929 kWh**	

Final Summary

Recommendation	Annual Savings	Implementation Costs	Annual Reduction/ Diversion
Waste Reduction	$44,930		56,670 lbs.
RO Unit Efficiency + other water recommendations	$18,390	$15,170	1.6 million gallons; 929 kWh
Totals	**$63,320**	**$15,170**	**56,670 lbs.; 1.6 million gallons; 929 kWh**

Questions

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