

Florida and the 2020 75% Recycling Goal: 2019 Status Report Volume 1



Prepared by the Department of Environmental Protection

Table of Contents

Volume 1

Executive Summary	3
Introduction	5
Waste Reduction and Recycling Overview	7
Single Stream Curbside Recycling	11
Markets	12
Construction and Demolition Debris Recycling	16
Organics Recycling	18
Commercial Recycling	21
Education and Outreach	22
Top Strategies for Reaching 75% Goal	24
Sustainable Materials Management	26
Conclusion	29
Table 1 – Summary of Options	30

Volume 2 Appendices

Appendix A – Tables, Charts & Graphs	4
Appendix B – County Recycling Plans	12
Appendix C – References	238
Appendix D – Energy, Climate Change and Economic Security Act of 2008	242

Executive Summary

The Florida Legislature, through the Energy, Climate Change and Economic Security Act of 2008, established a statewide weight-based recycling goal of 75% by 2020 (see Appendix D). The Act instituted the 75% recycling goal, directed the Florida Department of Environmental Protection (DEP) to establish a reporting protocol and directed counties to report annually. The Legislature also established interim recycling goals: 40% by 2012, 50% by 2014, 60% by 2016 and 70% by 2018.

Florida achieved the interim goals established for 2012 and 2014; however, Florida did not meet the 2016 interim goal of 60% and the recycling rate has continued to decline since that time. Florida's 2018 recycling rate was 49%, falling short of the 2018 interim recycling goal of 70%. Based on the Department's evaluation of available data, the drop can largely be attributed to a reduction in the reported amount of construction and demolition (C&D) debris recycled in 2018.

The legislation also provided that large counties (counties over 100,000 in population) not achieving the recycling goals could be directed to develop a plan to expand recycling programs. In 2018, only four of the 36 large counties met the 70% interim recycling goal. The primary factors for their success were the recycling credits received for renewable energy and C&D debris. The 32 counties that did not meet the recycling goal have developed and submitted plans to DEP to expand current recycling programs to existing commercial and multifamily dwellings.

The law directs that if the interim recycling goals are not met, DEP must submit a report to the Legislature identifying additional programs or statutory changes needed to achieve the goals set forth in Section 403.706, Florida Statutes (F.S.). Since submittal of the *Florida and the 2020 75% Recycling Goal* report in December 2017, the next interim goal of 70% by 2018 was not achieved. This report provides an update of recycling in Florida; including optional program and statutory changes that may be needed to improve Florida's recycling rate.

Table 1 - Summary of Options, presented at the end of this report and updated from the December 2017 report, represents direct input received from waste and recycling business stakeholders, local governments and non-governmental organizations identifying additional programs or statutory changes needed to increase the recycling rate. Implementing some or all the suggested options requires action by the Legislature, DEP and other state agencies, as well as local government and many of the stakeholders involved. DEP has worked with local governments and the recycling industry of Florida to implement several of the options identified. These activities include: food waste diversion, market development research and engagement, education and outreach, and collection and evaluation of solid waste and recycling data. Even though these actions have had some success, impactful changes to the recycling rate will not occur without legislative changes.

Recycling in Florida, the United States, and the world has changed significantly over the last 10 years. Many of the challenges we currently face with recycling have occurred as a result of changes in collection methods, recycling markets and the types and quality of materials acceptable for recycling.

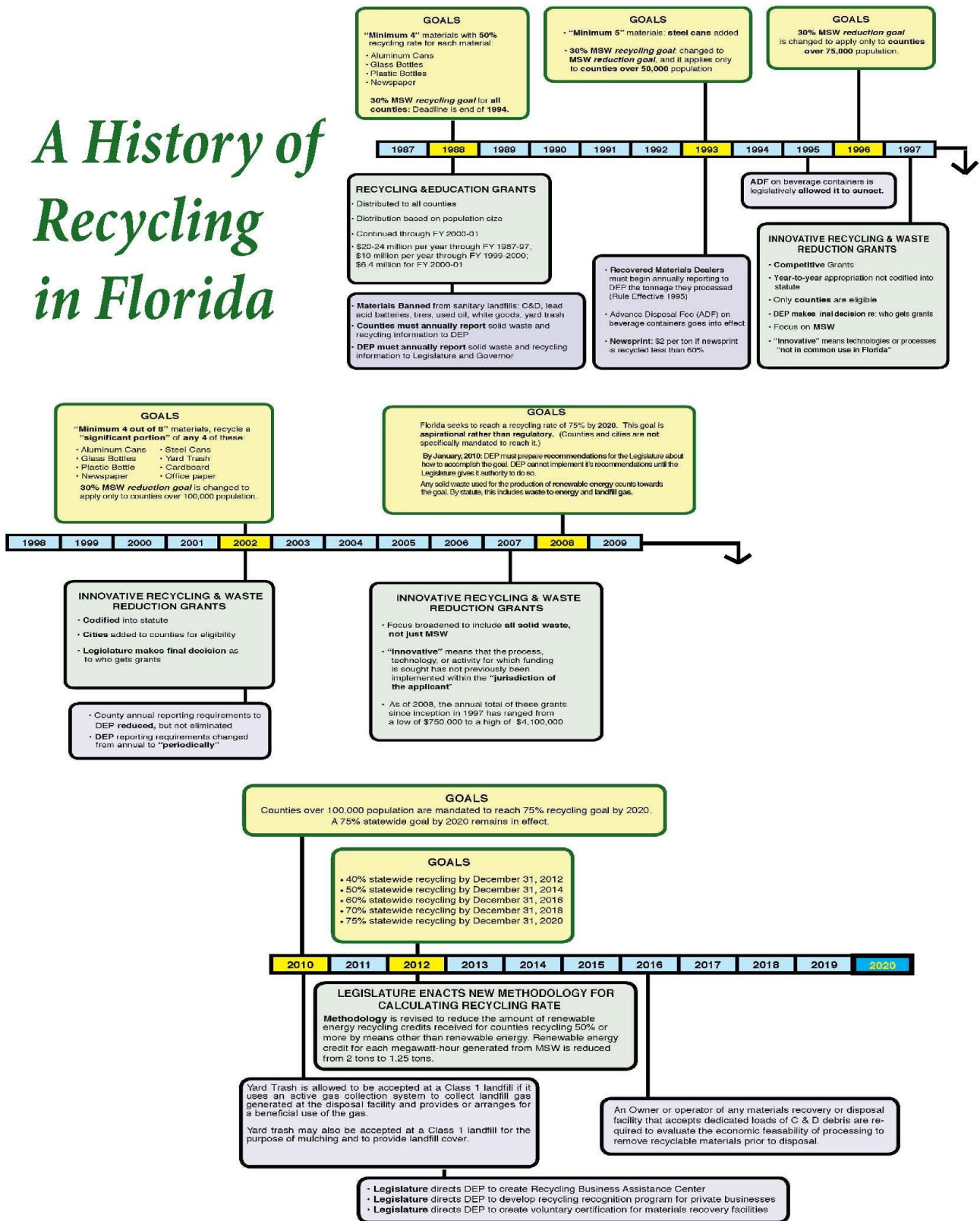
Given these challenges and others detailed in the report, the current practices in Florida are not expected to increase the recycling rate. The recycling rate has continued to decline since 2016 to the state's current recycling rate of 49%. Without significant changes to our current approach, 75% does not appear to be achievable. However, based on ongoing discussions with Florida recycling stakeholders, Florida's recycling program for 2020 and beyond could transition to a Sustainable Materials Management approach that would more effectively track environmental benefits.

The Legislature could consider laws that allow for the transition to a methodology that incorporates alternative life-cycle metrics; i.e., sustainable materials management goals into Florida's recycling efforts. While no one single goal can measure the full environmental impact of the materials used from cradle to grave, multiple goals can be set, based upon the environmental attribute(s) that are most important to the state.

Introduction

The modern era of recycling in Florida began with the Florida Legislature's passage of the Solid Waste Management Act (SWMA) of 1988, including a 30% recycling goal. Over the past thirty years, the goal and methodology used to calculate the recycling rate has been revised to reflect the changes in the waste stream, legislation and technology. In 2008, the Legislature reasserted the importance of recycling and established a new goal: 75% to be achieved by 2020. The Legislature also set interim recycling goals to be met while on the state's trajectory to 75%. In 2018, the state failed to meet the 70% interim recycling goal and as a result must submit a report to the Legislature identifying additional programs or statutory changes needed to achieve the goals set forth in Section 403.706, F.S.

A History of Recycling in Florida



Waste Reduction and Recycling Overview

In 2018, Florida residents and tourists generated municipal solid waste equivalent to over 2 tons per resident per year. This is above the national average of roughly 1 ton per resident per year, since it does not count the number of tourists, as measured by the U.S. Environmental Protection Agency (EPA) and other states. Likewise, Florida's recycling efforts are not easily compared to those of other states as there is no universal methodology used for measuring progress toward recycling goals.

Florida's recycling goal is a municipal solid waste (MSW) goal; meaning that waste from industrial, agricultural, and mining operations as well as sludge from wastewater treatment is excluded from the calculations. In 2012, DEP implemented a new methodology for calculating the recycling rate to include renewable energy recycling credits as a result of legislative changes to Section 403.706, F.S.

To promote the production of renewable energy from solid waste combustion, the Legislature allowed that each megawatt-hour produced by a renewable energy facility using solid waste as a fuel counts as 1 ton of recycled material and is applied toward meeting the recycling goals. Section 403.708(12)(c), F.S., states that DEP shall, by rule, develop and adopt a methodology to award recycling credit for the use or disposal of yard trash at a Class I landfill having a gas-collection system that makes beneficial use of the collected landfill gas.

In addition, the methodology outlined in Rule 62-716.480, Florida Administrative Code (F.A.C.), states that recycling credits are to be awarded for MSW used as landfill cover (daily, intermediate and final), MSW reused or returned to use in the form of fuel or fuel substitutes, and MSW processed and used as lake or land fill provided it is integral to a land or real property improvement. The new methodology also expanded construction and demolition (C&D) debris materials and uses that can now count toward the recycling goal. See Appendix A, Figure 4 flowchart that explains the methodology for calculating the recycling credits.

The percentage adjacent to each new category below shows the relative contribution to the state's 2018 recycling rate of 49%.

- Renewable Energy Recycling Credits – 9%
- Yard Trash Disposed in a Landfill Beneficially Using Landfill Gas – 1%
- Landfill Cover Recycling Credits – 18%
- Fuel or Fuel Substitutes – 0%
- Construction and Demolition Debris used as Lake or Land Fill – 5%
- Construction and Demolition Debris (asphalt and concrete from roads and bridges) – 3%

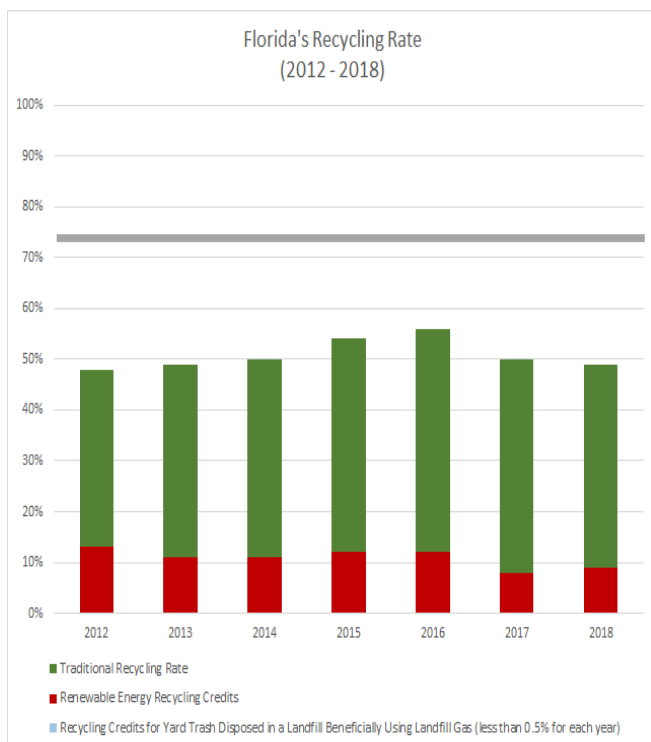


Figure 1

Figure 1 illustrates Florida's progress toward meeting the 75% recycling goal. In addition, the chart distinguishes between the different recycling credits received. The Traditional Recycling Rate excludes renewable energy recycling credits and recycling credits received for yard trash disposed in a landfill beneficially using landfill gas. In 2018, Florida's Traditional Recycling Rate was 40%. Renewable energy recycling credits and the recycling credits for yard trash disposed in a landfill beneficially using landfill gas accounted for 10% of the Overall Recycling Rate or Adjusted Recycling Rate of 49%. See Appendix A, Figure 1, for an analysis of the recycling rates.

Renewable energy is statutorily defined as electrical energy produced from a method that uses one or more of the following fuels or energy sources: hydrogen produced from sources other than fossil fuels, biomass, solar energy, geothermal energy, wind energy, ocean energy and hydroelectric power. A means of creating renewable energy by using solid waste occurs through waste-to-energy (WTE). WTE is the process of generating energy in the form of electricity and/or heat from the primary treatment of MSW. Most WTE processes produce electricity and/or heat directly through combustion or produce a combustible fuel commodity. Currently, there are 10 WTE facilities that reported accepting MSW from 17 Florida counties.

Approximately 8% of Florida's MSW is combusted in WTE facilities. Research suggests that increasing the number of WTE plants in Florida could raise the recycling rate under the 2012 methodology. For example, by strategically adding new WTE capacity in higher population areas we could see a potential increase in the adjusted recycling rate by more than 5%.

In addition to the new methodology and criteria established in 2012, Section 403.706(2)(d), F.S. provides that large counties (counties over 100,000 in population) that do not meet the

In 2011, prior to implementation of the new methods and criteria used to calculate the recycling rate, Florida's recycling rate was 30%.

If the same methodology was applied to the 2012 - 2018 data, Florida's recycling rate would be as follows:

- 2012 – 30%
- 2013 – 31%
- 2014 – 32%
- 2015 – 33%
- 2016 – 33%
- 2017 – 27%
- 2018 – 25%

recycling goals may be directed to develop a plan to expand recycling programs to existing commercial and multifamily dwellings, including, but not limited to, apartment complexes. The calendar year recycling goals are specified in Section 403.706(2)(a), F.S., as 40% recycling rate by 2012, 50% by 2014, 60% by 2016, 70% by 2018 and 75% by 2020.

In 2018, 32 of the 36 large counties **did not** reach the interim recycling goal of 70%. Alachua, Charlotte, Lee and Pinellas were the only four counties that successfully met the 70% interim recycling goal. Recycling credits received for renewable energy and construction and demolition (C&D) debris were the primary factors in their success. Alachua, Lee and Pinellas achieved the goal using both renewable energy and C&D debris credits. Only Charlotte County achieved the rate without inclusion of renewable energy credits.

Florida’s overall recycling rate declined from 52% in 2017 to 49% in 2018. Based on the Department’s evaluation of available data, the drop can largely be attributed to a reduction in the reported amount of C&D debris recycled in 2018. See Appendix A, Figure 5, for an analysis of the C&D debris managed in Florida.

In August 2019, DEP requested the 32 large (population over 100,000) counties not reaching the goal to develop a plan to expand current recycling programs to existing commercial and multifamily dwellings. The plans were originally due to DEP on September 15, 2019. However, due to the hurricanes impacting Florida, DEP granted an extension until October 1, 2019. As of November 21st, DEP has received all 32 county recycling plans.

Appendix B contains county recycling plans submitted to DEP. Most of the counties reported plans to increase commercial recycling, as well as, C&D debris recycling. In addition, all wanted to engage their residents through outreach and education. A few of the counties expressed interest in implementing organics recycling and expanding curbside recycling services.

Interim Recycling Goal	40%		50%		60%		70%
	2012	2013	2014	2015	2016	2017	2018
Number of the 36 large Counties NOT Reaching the Goal	14	13	18	17	25	29	32

Disaster Debris

Due to number of hurricanes that impact Florida, there has been discussion about including disaster debris in the numbers used to determine the recycling rate. In 2018, the Florida Panhandle was devastated by Hurricane Michael. Hurricanes create massive amounts of debris. We will not know until 2020, when the counties report to the state, just how much disaster debris was generated.

In 2004, when Hurricanes Charlie, Francis, Jeanne and Ivan all hit the state, only 6% of the 3,677,851 tons of disaster debris reported was recycled. When these storms occur, removing debris as quickly as possible causes contamination. This complicates segregation and creates barriers to economical recycling of the debris.

Disaster debris is considered a waste anomaly and has not been included in the state waste management reports for purposes of calculating the recycling rate. That debris is reported separately to DEP. According to the data submitted in 2004, including hurricane debris in the methodology used to calculate the recycling rate would have had a negative impact on the recycling rate due to the majority of disaster debris having to be landfilled because of time constraints.

DEP is working on the following recycling options:

- Evaluating the implications of shifting from a weight-based recycling goal to sustainable materials management processes.
- Researching the concept of moving from a weight-based recycling goal of 75% by 2020, to market specific goals such as a food diversion goal or an organics recycling goal.
- Requesting that Florida's state universities and the Florida Department of Education review potential K-12 curriculum programs emphasizing waste reduction and recycling practices.
- Continuing to work with state agencies to identify recycling/cost saving measures specific to their operations. For example, exploring opportunities to reduce and recycle food waste within the Florida Department of Corrections or expanding the use of recycled glass as an aggregate replacement in Florida Department of Transportation projects.
- Collaborating with the Hinkley Center for Solid and Hazardous Waste Management to analyze the ongoing recycling of materials to determine areas where assistance is in greatest need.
- Providing counties not achieving the 2018 interim recycling goal with assistance in analyzing, planning and executing opportunities to increase recycling.

Single Stream Curbside Recycling

Many counties and municipalities have instituted single stream curbside recycling programs. Single stream curbside recycling programs allow all accepted recovered materials to be placed in a single, curbside recycling cart, comingling paper, plastic bottles, metal cans and glass containers. Single stream recycling programs have been marginally successful in providing curbside collection efficiency by increasing the amount of material collected and residential participation. While there are many advantages to single stream recycling, it has not consistently yielded positive results for the recycling industry. The unexpected consequence of single stream recycling has been the collection of unwanted materials and poorly sorted recovered materials, resulting in increased contamination originating in the curbside recycling cart.

Contamination hinders processing at recovered materials processing facilities (RMPFs) when unwanted items are placed into recycling carts. For example, many residential customers may not understand that while retail plastic bags are recyclable elsewhere, they are harmful to the automated equipment typically used to process and separate recovered materials from single stream collections. While RMPFs are equipped to handle some non-recyclable materials, excessive contamination can undermine the recycling process resulting in additional sorting, processing, energy consumption, and other increased costs due to equipment downtime, repair or replacement needs. In addition to increased recycling processing costs, contamination also results in poorer quality recovered materials, thus increasing the amount of material that is rejected and sent to landfills. Although some local governments have implemented successful single stream recycling programs with low contamination rates, contamination rates for other programs have continued to rise. Lack of citizen education could be a big part of the contamination problem.

Markets

Background

Future growth of recycling in Florida is dependent on healthy markets for the collected recovered materials. Healthy markets create demand for recyclable materials and economic development through high paying jobs and growth of the existing tax base. According to the Institute of Scrap Recycling Industries, the economic impact of the scrap recycling industry in Florida is \$5 billion; with over \$600 million generated in taxes.



These markets are commodity driven and subject to the ebb and flow of market demands. Over the past few years, the demand has been negatively impacted by increased supply, and a decrease in end markets for collected materials. Most significantly, the export market has slowed substantially as China, India and other smaller Asian countries have closed off many of the previously vibrant markets. The resulting depression of commodities prices has impacted recycling industry profitability and growth.

The reduction in global markets has forced many waste haulers and waste management companies to reduce the amount of contamination, i.e., unwanted items found in recycling bins, being transported and delivered to their processing facilities. The reduction in contamination produces a cleaner commodity to market domestically; increasing the value of the recovered materials. According to Waste Management, Inc., two years ago, the average price for mixed recovered materials that were commonly collected was \$140.00/ton. The average price of mixed recyclables for Quarter 1 of 2019 was \$56.90/ton; resulting in a 70% decrease in the value of mixed recovered materials. Due to this price drop, several counties have been asked to renegotiate their recycling contracts. Many of the contracts have clauses

that stipulate contamination must be below a certain percentage or the city/county will be charged a much higher rate and/or penalized.

There is very little revenue, if any, generated and returned to municipalities for recovered materials that have been collected and processed. The tipping fees for disposal at landfills are much lower than the cost to recycle and many municipalities are left with the decision of whether to continue curbside recycling at a much higher cost or dispose of this material at a lower cost. Consequently, many programs have decided to drop material types, i.e. glass, from their recycling programs or drop their curbside programs altogether.

DEP continues to support the development of healthy markets for recyclable materials through the following programs:

Recycling Business Assistance Center - In July 2010, the Legislature created the Recycling Business Assistance Center (RBAC) within DEP. RBAC's goal is to assist in the development of markets for recyclable materials to support achievement of the 75% recycling rate by 2020. The core mission of RBAC is to coordinate with state agencies and the private sector to develop new markets and expand existing markets for recyclable materials locally, regionally and globally.

RBAC provides assistance to recycling businesses at all levels of the supply chain, as well as potential partners, the Legislature and the public. RBAC's website, located at <https://floridadep.gov/waste/waste-reduction/content/rbac-business-assistance>, provides guidance to help increase recycling markets, create connections within the industry, and increase awareness of services provided by RBAC and DEP. In the last year, RBAC has continued to consult with businesses and individuals interested in Florida recycling opportunities.

Florida Recycling Loan Program - The Florida Recycling Loan Program was created in 1995 to provide funding for the purchase of equipment and machinery to expand recycling capacity in Florida. The program offers long-term, fixed-rate loans of up to \$200,000 at interest rates up to 2% below Prime. The program is limited to for-profit small businesses that are legally licensed and operating in Florida, creditworthy startup companies or out-of-state firms considering expansion into Florida. Eligible recycling companies must have a net worth of less than \$6 million and less than 100 employees.

Since its inception, the Recycling Loan Program has executed 41 loans to 35 companies totaling over \$5.8 million. The equipment purchased has ranged from extruders and conveyors to optical sorters.

Recycling Recognition Program - The Recycling Recognition Program was created by DEP to encourage private businesses, institutions, schools, public organizations and citizens to increase recycling. DEP monitors and recognizes outstanding recycling efforts around the state. Since its inception in 2012, the Recycling Recognition Program has presented over 45 awards to a variety of large and small businesses, public organizations and individuals.

Southern Waste Information eXchange - Since its inception in 1981, the emphasis of the Southern Waste Information eXchange, Inc. (SWIX) has been on encouraging and facilitating sound environmental and cost-effective alternatives to the landfilling, incineration or treatment of solid waste through direct interaction with waste generators in both the public and private sectors. To facilitate this objective, SWIX maintains a toll-free hotline (1-800-441-SWIX) that is used to assist generators with their waste management needs, with an emphasis on the recycling and reuse of waste materials. SWIX is a resource that can be used directly by the thousands of public and private waste generators in the southeast. The SWIX Online Database (WasteXchange.org) provides up-to-date information on waste materials that are available from as well as wanted by private firms and government agencies.

In addition, WasteXchange.org lists a wide range of waste management services (e.g., recycling services, collection and transportation services) which can be used by waste generators and managers.

SWIX is a free service designed to help businesses, industries and other organizations find markets for materials that have been traditionally discarded. Registered users can post both wanted and available listings, similar to a classified ad section. Available materials can be listed by type, quantity, frequency of availability, geographic location and date. They may also include photos of the materials. Users can also post detailed wanted listings, specifying the type(s) of material they need and the frequency they need them.

Additionally, SWIX facilitates a variety of events that support the collection and dissemination of information useful in the achievement of the 75% goal, such as collection/training events, technical advisory groups and market development workshops.

Actions

In an effort to address specific markets and marketing challenges, DEP has engaged with various stakeholders to advance the discussion on developing and growing markets for recyclable materials.

Residential Mixed Paper Analysis - DEP partnered with the SWIX to examine existing Florida paper mills and examine their potential for use of Residential Mixed Paper (RMP). This project analyzed the products produced in Florida paper mills, examined what would enable the paper mills to use significant quantities of RMP and examined how the state of Florida might assist these mills in using RMP. In order to complete components of this Feasibility Study, SWIX retained Bill Moore with Moore & Associates for assistance. Mr. Moore is one of the country's leading experts as it relates to fiber markets. The report is available on the FDEP website at <https://floridadep.gov/waste/waste-reduction/documents/florida-residential-mixed-paper-report>

Contracting Webinar - DEP hosted a webinar in partnership with Recycle Florida Today to guide local governments and municipalities through the process of negotiating recycling contracts. A copy of this webinar can be found on the DEP website at <https://recyclefloridatoday.org/contracting-for-recycling-professionals-fdep-partnered-webinar/>

Private Sector - DEP has engaged various recycling industry leaders to discuss issues and opportunities relevant to recyclable materials, including current challenges in collection and processing of recyclable materials, business development and growth. Over the past year, DEP has met with, held discussions or exchanged emails with approximately 25 domestic and foreign companies that are looking to locate in areas that provide access to recycled materials. Generally, these companies are inquiring as to the ease of permitting and the availability of incentives. Assistance is typically provided by sharing data concerning the types and amounts of recycled material available for that area along with providing local and district contact information.

Construction and Demolition Debris Recycling

Background

Construction and demolition (C&D) debris consists of materials that are generated from residential and commercial construction, renovation and various types of demolition. C&D debris materials include wood, metals, brick, concrete, asphalt, wallboard, rocks, soil, tree remains and other vegetative matter. Only those materials that are non-water soluble and non-hazardous can be considered C&D debris. In 2018, C&D debris made up 33.7% of the MSW waste stream (see Appendix A, Figure 2).

C&D debris waste may be disposed of at permitted C&D disposal sites or permitted landfills. C&D disposal sites do not have to meet the more stringent construction and operating requirements of Class I and Class III landfills; therefore, the disposal costs (tip fee) per ton at C&D disposal sites are generally less than at Class I and III landfills. Demographics also play a role in C&D debris recycling efforts. Tip fees at landfills and C&D disposal sites in south Florida are considerably higher than in central and north Florida, creating an incentive for more C&D debris recycling to occur in the southern region. In central and north Florida, it generally costs less to dispose of C&D debris at landfills than to recycle. In addition to low tipping fees, the lack of recycling infrastructure in central and north Florida is another deterrent to recycling. Limited markets for certain materials such as treated wood, sheetrock/drywall, and roofing materials inhibit recycling of those materials.

According to the county recycling reports submitted to DEP for 2018:

- C&D debris constitutes 33.7% of Florida's MSW waste stream or 15.9 million tons (see Appendix A, Figure 2).
- Currently 57% or 9 million tons, of Florida's C&D debris is recycled.

In 2010, the Legislature determined that the recycling of C&D debris was essential to reach the 75% goal. As a result, Section 403.706(2)(b), F.S., was adopted, directing counties to implement a program for recycling C&D debris as part of their efforts to attain the recycling goals. The Legislature also created Section 403.707(9)(g), F.S. requiring that by January 1, 2012, to the extent economically feasible, all C&D debris must be processed prior to disposal.

Since 2012, the C&D debris recycling rate has increased from 40% to 57%. This increase is a direct result of accounting changes made. Materials that had not counted toward the goal in the past are now included. While Florida is doing well in some areas of the state at recycling C&D debris, there are still C&D materials that are not being recycled or counted.

If 75% of the C&D debris collected had been recycled during 2018, it would have increased Florida's overall recycling rate and resulted in realization of the 2018 interim recycling goal.

Figure 2

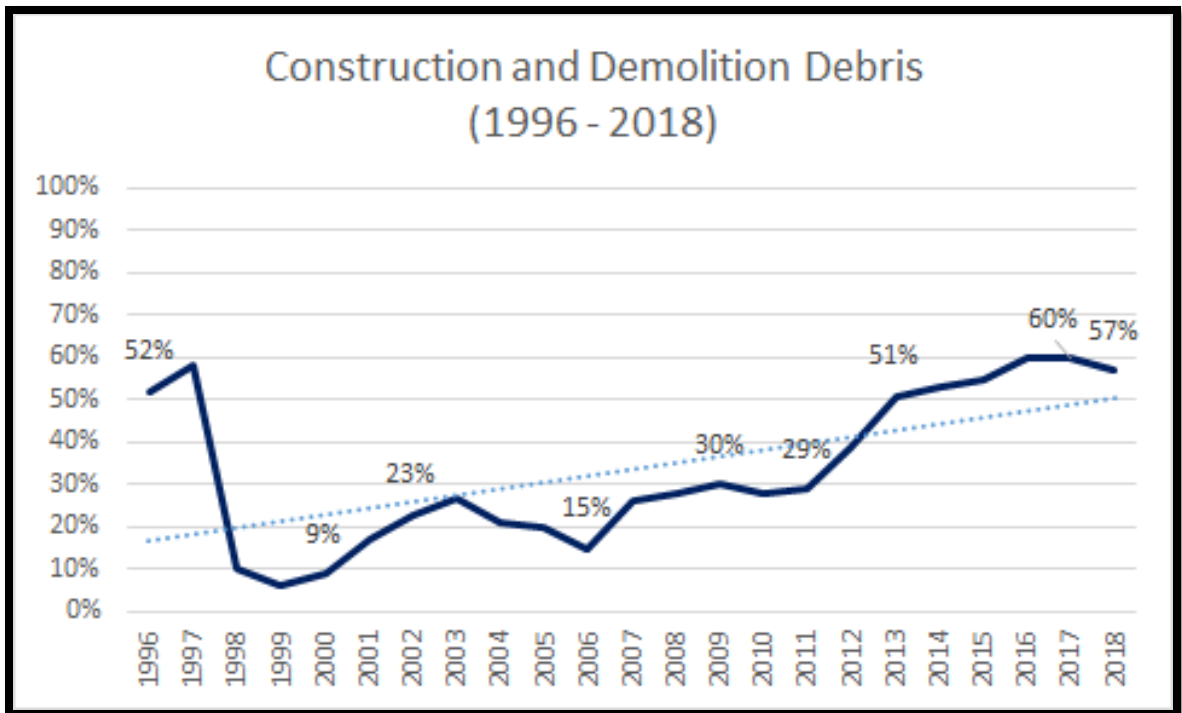


Figure 2 above illustrates how the recycling rate has changed over the years in conjunction with methodology changes as to what can be included in the recycling rate for C&D debris. In 1998, the definition of what could count toward the recycling rate changed to exclude C&D debris used for lake fill and land fill, asphalt and concrete for road construction. In 2012, the excluded items were once again included in calculating the C&D debris recycling rate.

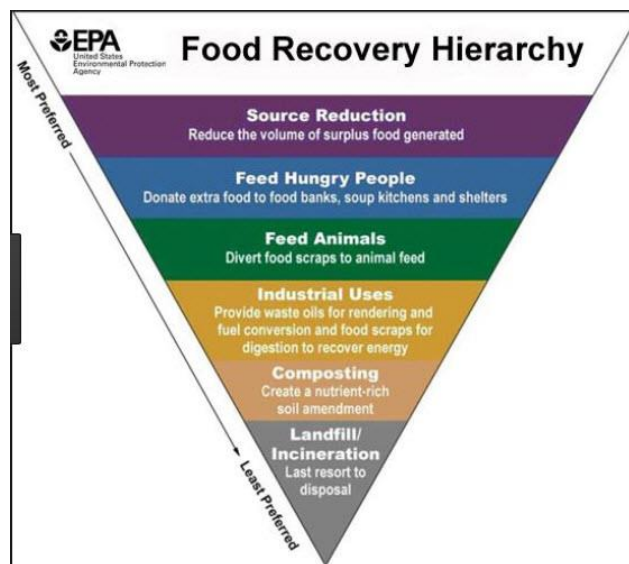
There was a significant drop in the amount of south Florida C&D debris recycled in 2018. The drop in C&D recycling was the main cause of the state recycling rate dropping from 52% in 2017 to 49% in 2018.

Organics Recycling

Background

Reducing organics in the waste stream is vital for the state to reach its 75% recycling goal by 2020. Organics, which includes food waste, yard trash and paper, are one of the largest fractions of waste, by weight, generated in the state. Of the 47 million tons of MSW generated in 2018 (see Appendix A, Figure 1), organics accounted for 33% of Florida's waste stream. A breakdown of organics management in Florida can be found in Appendix A, Figure 3.

Proper management of organics is essential if Florida is to reach its full potential for increasing the state's recycling rate. In the past, the focus for diverting organics has been on composting, however, the reduction and diversion of wasted food should also be considered when developing strategies to reduce organic waste. EPA estimates that more food waste reaches landfills and incinerators in America than any other single material in our everyday trash. Harvard Law School Food Law and Policy Clinic estimates that approximately 40% of food produced in the United States each year is never consumed resulting in 62.5 million tons of food going to landfills. In addition, EPA states that by keeping wholesome and nutritious food in our communities and out of our landfills, we can also begin to help the 48 million Americans that live in food insecure households. EPA and the U.S. Department of Agriculture have established a national goal to reduce food waste by 50% by 2030.



The focus of Florida organics recycling has been on the production and use of compost made from solid waste and materials handled in source-separated organic processing facilities (SOPFs). The materials in SOPFs include yard trash, manure, animal byproducts and biosolids. In 2018, Florida had approximately 290 SOPFs processing over 3.5 million tons of organics that were diverted for beneficial use. The majority of these facilities managed yard

waste only. The definitions for compost and compost related processes and materials can be found in Rule 62-709.201, F.A.C.

Organics recycling has many environmental benefits including diverting organics waste from incineration and landfilling, treatment of pathogenic organisms, and stabilization of nutrients and organic compounds. With 15 million tons of organic waste generated in Florida, properly managing organics is essential to increasing the state’s overall recycling rate. Figure 3 shows the various management methods and practices for organic waste materials.

Figure 3*

Solid Waste Management Hierarchy	Organic Materials Management Practices
Reduce	<ul style="list-style-type: none"> • Landscaping to eliminate yard trimmings • No-bag grass mowing • Eliminate food waste
Reuse	<ul style="list-style-type: none"> • Leftovers to food banks • Leftovers to animal feed
Recycle	<ul style="list-style-type: none"> • Home composting • Centralized composting • Anaerobic digestion
Energy Recovery	<ul style="list-style-type: none"> • Anaerobic digestion • Waste to energy • Alternative technologies (pyrolysis & gasification)
Disposal	<ul style="list-style-type: none"> • Landfill

*Kessler Consulting

Following the hierarchy above, many states have developed food strategy plans that focus on the reduction of wasted food. These plans research the sources of wasted food and often set food reduction goals. States include donation, composting and energy recovery as secondary options to reduction.

Actions

DEP has been working in partnership with federal, state and local governments, industry and Non-Governmental Organizations (NGOs) to identify potential strategies to reduce the organics waste stream. These stakeholders are committed to seeing organics recycling reach its full potential in Florida. However, many of these NGOs work in a vacuum without resources and support, which has a direct impact on their success. While these challenges are ongoing, each remains focused on achieving the goal of reducing waste. The purpose of these partnerships is to develop actionable items, policies and programs based on the feedback and discussion with the organics industry of Florida.

- DEP has initiated a Food Recovery Group that meets monthly via teleconference. This group is comprised of representatives from local and state government, NGOs and industry. The goal is to develop food recovery strategies that can be implemented at the local level and, if successful, reproduced throughout Florida.

- DEP contracts with Kessler Consulting to continue the Florida Organics Recycling Center for Excellence (FORCE) website. FORCE provides a framework and clearinghouse to promote organics recycling, food diversion and research in a statewide effort to streamline compost processing, research, demonstration, marketing and education in Florida. It also provides a map of Florida composting facility locations. Resource pages have also been added specifically for FDOT for the use of compost, schools for the reduction of food waste and retailers for purchasing and disposing of bio-based products. The website can be found at <http://www.floridaforce.org/>.
- DEP, with assistance from SWIX, conducted a Food Recovery and Donation Workshop in December 2018. The workshop covered the status of organics recycling in Florida including, incentives and opportunities, food donation programs and resources, field gleaning and school share tables. A similar workshop is scheduled for south Florida during the first quarter of 2020. Downloads of the presentations from the Workshop can be found on the SWIX website at <http://southernwasteinformationexchange.com/food-recovery-and-donation-workshop-proceedings/>.
- DEP is revising Chapter 62-709, F.A.C. to add and change definitions and clarify current language to assist the organics processing facilities that are composting and mulching in Florida.

Commercial Recycling

Background

Florida's commercial sector generates 68% of MSW, twice the amount generated by the single-family residential sector. This offers one of the greatest potentials for expanding recycling in Florida. The commercial sector currently has a recycling rate of 49%. The 2018 data suggests that even if the residential sector were to recycle 100% of the MSW generated, the 75% recycling goal could not be achieved without increasing recycling from the commercial sector.

The focus of recycling programs implemented by local governments over the last two decades has been primarily on the residential sector with very few municipalities and counties mandating commercial recycling. Enforcement and technical assistance vary greatly among those jurisdictions, from none to very active, which is reflected in their commercial sector recycling rates.

Actions

DEP has been working to engage public and private stakeholders by providing education and information on the benefits of recycling and recognizing entities that have met the current recycling goal of 70%.

- Pursuant to Section 403.7032, F.S., DEP developed the Recycling Recognition Program to encourage private businesses, institutions, schools, public organizations and citizens to increase recycling. Organizations and individuals that meet or exceed the current recycling goal of 70% are recognized for their outstanding recycling efforts.
- Pursuant to Section 403.7032(3), F.S., DEP established the Public Sector Recycling Reporting Program. Each state agency, community college and state university, including all buildings that are occupied by municipal, county, or state employees and entities occupying buildings managed by DMS, must at a minimum, annually report all recycled materials to the county using DEP's designated reporting format.

Education and Outreach

Background

Educating the public about recycling is the most important component to all successful recycling programs. In a state as large and diverse as Florida, education most effectively occurs at the local level. Recycling programs are county/city specific and vary greatly across the state. The type of service available, collection methods and materials accepted often differ from county to county and in some cases, differ from county to city. Public education should to be tailored to the local recycling programs. In recent years, both an increase in contamination and downward trend in markets for recyclable material, have presented unique challenges in statewide recycling education and outreach.

Actions

DEP has been working to increase recycling rates through grant programs, educational opportunities and the development of a statewide outreach campaign.

- In 2017, DEP initiated a public/private partnership with waste industry groups to address rising single stream contamination rates and boost residential participation in curbside recycling statewide. DEP has begun development of a comprehensive statewide education and outreach campaign with our industry partners titled “Rethink. Reset. Recycle.”



- In 2018, DEP partnered with the American Chemistry Council (ACC) to institute a statewide pilot program to promote retail takeback of plastic film. A total of 11 counties (Alachua, Collier, Escambia, Indian River, Leon, Miami-Dade, Orange, Palm Beach, Seminole, St. Lucie, and Wakulla) and 1 municipality (Jacksonville) participated.



As DEP approaches 2020 and the evaluation of efforts to improve recycling participation statewide, a focus on increasing recycling opportunities to visitors and away from home recycling for our residents offers our agency the opportunity to lead by example.

- In 2018, DEP Waste Reduction & Recycling performed an assessment of recycling opportunities in state parks in and around the Big Bend Area as well as Welcome Centers and Rest Areas along the I-10 stretch between Panama City and Tallahassee. The assessment provided valuable insights into existing recycling infrastructure and opportunities for improvement.
- In 2019, DEP began an initiative to update state park recycling infrastructure and develop consistent messaging throughout all state parks.

Top Strategies for Reaching the 75% Weight-Based Recycling Goal

Recommendations provided by recycling industry, local and state government are summarized in Table 1 - Summary of Options, presented at the end of this report. This section illustrates possible changes by type, including statutory, policy, regulatory and local level decisions, as well as recommendations for new or additional programs. Based on the research, interviews, and meetings used to develop this report, DEP believes that the potential to significantly improve the state's recycling rate should focus on three strategies:

To move the recycling rate significantly, there are three strategies in which the focus should be placed by DEP and the Legislature: 1) Recycling Materials Market Development, 2) Recycling Education and Outreach and 3) Local Government Recycling Assistance.

Recycling Materials Market Development - There must be markets for finished goods that are manufactured from recycled materials for the recycling industry to operate efficiently and provide for reasonable returns on investments. When the markets for these finished goods increase the demand for recycled materials will increase, driving up participant profitability, and sparking increased investments in the collection, sorting and processing, and manufacturing sectors.

Funding should be provided for the development of a Recycled Materials Market Development Program in the DEP Division of Waste Management. Funds would be utilized to stimulate markets that are produced using materials recovered from the waste stream as recycled materials. This program will encourage the consumption of recycled materials and stimulate improvements in collection and sorting activities to yield clean and consistent materials. These funds would be utilized for new end users, processor and manufacturer activities, such as:

- Tax incentives for usage of recycled materials as feed stocks in manufacturing processes.
- Tax incentives and credits to support materials recovery plant upgrades.
- Public/Private partnerships to invest in new processing technologies.
- Investments in expansion of Recycling Business Assistance Center activities.
- End-user purchase rebate for Florida Certified Compost.

Recycling Education and Outreach - Educating and training the public in recycling is one of the most important components to all successful recycling programs. Recycling programs are city/county specific and vary greatly across the State. The types of services available, how materials are collected, and what materials are accepted often differ from county to county and, in some cases, differ from county to city. Public education should be tailored to the local recycling programs.

Funding should be provided for the Recycling Education and Outreach to be managed by the DEP Division of Waste Management. Funds could be utilized for education and outreach activities to encourage participation in current recycling programs and increase awareness in

the correct materials that residents should be recycling in their curbside carts. Funding could be used to contract for the purchase of mobile and website application software that provides recycling information and education to residents through computers, tablets, phones and smart home devices. This approach would improve access to recycling information by making it searchable and available through any device. Funding could also be used to update the K-12 recycling education curriculum and resource guides.

Local Government Recycling Assistance - The Solid Waste Management Act (SWMA) of 1988 was created to address the growing costs and environmental problems associated with solid waste disposal in Florida. The act required counties to initiate recycling programs and set forth specific types of solid waste to be recycled. To assist counties to start recycling, the Legislature established the Recycling and Education Grant Program. This program was intended to provide money to counties for establishing required programs. Counties were awarded grants for initial capital costs, operations, recycling education, market development, and special projects. The Recycling and Educations grants program sunset in 2001.

Beginning in Fiscal Year 1997-98, the Legislature initiated a competitive, Innovative Grant Program. The Innovative Grant Program was funded annually with 10% of the Solid Waste Management Trust Fund. Grants were awarded to local government programs that demonstrated effective expansion, efficient operations and advancement of technologies within their programs. The Innovative Grant Program continued through 2008.

Funding should be provided for local government recycling assistance to be administered by the DEP Division of Waste Management. Funds could be utilized to create a grants program that allows local government to receive funds for recycling and education. Grants would be available to counties that have a minimum population of 110,000. Local governments would be encouraged to use the grants for the following: 1) purchasing updated equipment, in partnership with the private sector or non-governmental agencies, to be used in Material Recovery Facilities (MRFs) to maximize capacity while reducing contamination by unwanted materials; 2) purchasing equipment for organics processing, composting, anaerobic digestion and food donation; 3) developing a food diversion or food waste education campaign; 4) enhancing recycling education; including information about proper recycling and the impacts of contamination by unwanted materials and/or 5) incorporating new or innovative technologies for the development or implementation of efficient recycling efforts.

Sustainable Materials Management

Alternative approaches that recognize the differences among waste components with respect to environmental and resource outcomes are referred to as Sustainable Materials Management (SMM). SMM is a systematic approach to using and reusing materials more productively over their life cycles. SMM has become critical due to recent EPA reports showing both an increased global demand for finite resources and an overall shift in production toward countries unable to sustain this effort without further harming their environment. By advancing SMM initiatives in Florida, we ensure the availability of resources and more efficient use of energy, water and materials, as well as, a reduction in the volume and toxicity of waste.

Florida's recycling industry, EPA and DEP have been conducting research and holding discussions about the achievability of weight-based goals, such as Florida's 75% Recycling Goal, and the practicality of implementing SMM goals in Florida. The state's recycling goal has helped propel Florida's recycling rate forward; however, it only accounts for one area of environmental protection. No one single goal can measure the full environmental impact of the materials used from cradle to grave. Multiple goals can be set, depending upon the environmental attribute(s) that are most important to the state, such as maximizing landfill capacity, minimizing toxicity or improving water quality protection.

Dr. Tim Townsend, a professor with the University of Florida, has been conducting research on SMM and Florida's recycling goal using grant funding provided by the Hinkley Center for Solid and Hazardous Waste. He is conducting a detailed analysis of the environmental impacts of the materials that are being recycled and the effects that these materials have on the environment through the end of life. Below is a summary of Dr. Townsend's research to date that has support of representatives from the recycling industry and DEP. The full report, *The State of the State of Waste Management in Florida* can be found at <https://www.essie.ufl.edu/home/townsend/research/florida-solid-waste-issues/hc16/>

FLORIDA SOLID WASTE MANAGEMENT: STATE OF THE STATE¹

In 2017, Florida's residents, visitors, businesses and institutions produced 45.2 million tons of municipal solid waste (MSW). Florida's MSW is currently managed using an integrated approach of recycling, waste-to-energy and landfilling. In an effort to meet the State's goal of recycling 75% of generated MSW by 2020, a variety of strategies have been promoted, including educational efforts and collection strategies to increase recycling of residential and commercial recyclable materials, emphasizing the recycling of construction & demolition (C&D) debris and yard trash, and promoting alternative treatment technologies like composting of food waste. Obstacles such as changing global recycling markets and increasing contamination in the recycled stream, however, have motivated the Florida solid waste community to reexamine the policies and practices for managing the State's waste stream as well as the best methods for setting goals and tracking progress. As part of a project funded by the Hinkley Center for Solid and Hazardous Waste Management, researchers from the University of Florida worked with stakeholders from the Florida solid waste community to characterize the state of solid waste in Florida, explore the economic and environmental implications of Florida's current solid waste management practices, and assess the potential for implementing principles from the US EPA's sustainable materials management (SMM) model. A complete description of this project, summary results and recommendations are provided in the reference below.

PROJECT RESULTS

Results from the data gathering and research, as well as discussions with the stakeholder working group, include the following:

- Florida's recycling rate grew from 29% in 2008 to 42% in 2016, and when including renewable energy credits, the State's recycling rate stands at 56%.
- Recycling rates for residential solid waste correspond to 41%, while nonresidential waste, yard trash, and C&D debris reached 78%, 63%, and 55%, respectively.
- The largest components by mass collected were C&D debris and yard trash, and these were also the largest components recycled by mass.
- Florida's 2016 waste management practices resulted in a net offset of greenhouse gas emissions and energy use primarily a result of recycling. When recovered wastes are recycled into new products, the need for virgin materials is reduced, and in many cases less GHG emissions result and energy demands decrease. The net environmental benefit resulting from recycling in Florida corresponds to a reduction of GHG emissions from 4.7 million passenger vehicles each year and the annual electricity usage of 3.3 million homes.
- The 2016 costs of solid waste management for the state was estimated as \$3.20 billion, including the cost of collecting, recycling, combusting, and landfilling.
- An examination of technology and policy changes needed to increase Florida's recycling rate to 75% found that a multi-faceted approach involving a massive investment in new waste management infrastructure would be required. At the current trajectory and under current economic, social and political constraints, the goal will not be reached by 2020.
- A methodology was developed and demonstrated that incorporates life cycle thinking into goal and priority setting in solid waste management. Benefits of this approach include the ability to track and reward efforts to reduce waste generation (source reduction, waste prevention) and the capacity to quantify the unique environmental benefits associated with different materials.

RECOMMENDATIONS

Recommendations based on project outcomes and stakeholder feedback include:

- Although the State's 75% recycling goal will not be reached by 2020, the progress achieved since the statute was enacted should continue by developing a new and refocused set of materials management goal.
- Future materials management goals should integrate metrics beyond simply tracking tons (which do not correspond to environmental benefit) and should include other measures of sustainability such as energy use, water consumption, jobs produced, and carbon footprint.
- Existing tools used by FDEP and local governments to record and track recycling and disposal of their waste stream should be expanded to also estimate sustainability metrics.
 - Policies should shift focus from a single-minded approach on maximizing tons of materials recycled to those that encourage recycling of materials that have the most environmental benefit and have viable end markets, reducing contamination or non-recyclables in the inbound recycling stream, reward source reduction, and focus on the net sustainable benefit across the entire materials management stream
 - An effective recycling education programming and materials would also be needed to make the project successful
 - Florida should develop a revised (5 or 10-year time frame) solid waste management and recycling plan

¹ *Florida Solid Waste Management: State of the State*. | A project completed for the Hinkley Center for Solid and Hazardous Waste Management | Townsend, T, Laux, S, Anshassi, M. | 2018 | Department of Environmental Engineering Sciences | University of Florida | <https://www.essie.ufl.edu/home/townsend/research/florida-solid-waste-issues/hc16/>

Dr. Townsend's research highlights the need to take a closer look at the current recycling goal and the possibility of refocusing the state's efforts. DEP has conducted meetings with Florida's recycling industry focusing on the question of whether to continue pursuing the 75% weight-based recycling goal until 2020 or consider the possibility of changing to a SMM goal. As noted, this would be the second shift in methodology since the 75% goal was adopted in 2008. Most stakeholders who have been involved in discussions believe that the goal or the methodology should be refocused; understanding that this type of change will probably not occur quickly. There was no consensus on what the new goal should be; however, most would like to see a transition toward sustainable materials management.

The use of weight-based targets has inherent limitations and is a challenge. While some counties have achieved the interim weight-based goals and are on track to meet or exceed the 75% goal, overall the state did not meet the 2016-60% or 2018-70% weight-based interim goals. To reach the weight-based 75% recycling goal, would require a multi-strategy approach to capture and recycle a larger portion of the waste stream, which would involve funding and statutory mandates, as well as building additional Waste to Energy facilities that are costly to build. A shift toward sustainable materials management would refocus the goal to reduce the life cycle environmental impacts of materials. SMM provides a goal that is focused on the environmental attributes that are most important to protecting Florida's environment, society and economy.

Conclusion

Recycling in Florida has changed vastly over the last 10 years. Many of the challenges have occurred due to changes in collection, shifts in the recycling markets and contamination of recyclables (i.e., collection of unwanted materials). DEP has been working in partnership with the state's local governments and the commercial and institutional sectors to achieve the statutory, weight-based recycling goal of 75% by the year 2020. This goal applies to all counties over 100,000 in population, which covers 95% of the state's population and the associated 45 million tons of MSW generated.

Florida's 2018 recycling rate was 49%, which falls short of the 2018 interim recycling goal of 70%. Florida achieved the interim goals established for 2012 and 2014; however, Florida's recycling rate has continued to decline since 2016. Without significant changes to our current approach, 75% will not be achieved.

Options provided by recycling industry stakeholders are summarized in Table 1 - Summary of Options. The table illustrates possible changes by type, including statutory, policy, regulatory and local level decisions, as well as recommendations for new or additional programs. These options suggest a variety of changes that could lead to improvement in Florida's recycling efforts at the state and local level. Based on the research, interviews, and meetings used to develop this report, DEP believes that the potential to significantly improve the state's weight-based recycling rate should focus on three strategies: 1) Recycling Materials Market Development, 2) Recycling Education and Outreach and 3) Local Government Recycling Assistance. However, based on ongoing discussions with Florida recycling stakeholders, Florida's recycling program for 2020 and beyond could transition to a Sustainable Materials Management approach that would more effectively track environmental benefits.

It is important to note that the weight-based goals, as described in the legislation, are aspirational. Dr. Townsend's research suggests that, even if many of the options presented in Table 1 were implemented, the 75% goal may not be achieved. Further, there is a developing consensus in other states and at the federal level that suggest using a weight-based goal may not result in efficient or effective recycling; rather, incorporation of source reduction and sustainable materials management concepts into a comprehensive statewide recycling program may be needed.

The Legislature should consider laws that allow for the transition to a methodology that incorporates alternative life-cycle metrics; i.e., sustainable materials management goals into Florida's recycling efforts. While no one single goal can measure the full environmental impact of the materials used from cradle to grave, multiple goals can be set, based upon the environmental attribute(s) that are most important to the state.

Table 1 - Summary of Options

Categories of Options	Statutory Actions				Additional Programs
	Statutory Changes	Policy Changes	Regulatory	Local Level Decisions	
Single Stream Recycling					
Create a Recycling Equipment Grants Program	X				X
Create a Recycling Equipment Grants Program that allows local governments to purchase infrastructure for initiation or expansion of commercial recycling efforts	X				X
FDEO to increase recycling market development	X				X
Research Projects (Glass)					X
Markets					
Identify specific goals/milestones for recycling market development in the state's economic development agencies	X				
Implement program to increase procurement of recycled content products in state/local government and colleges & universities				X	X
Fund new technology grant or loan programs for targeted materials	X				X
Partner with FDMS to establish a state term contract for end of life management of electronics			X		
Investments in expansion of Recycling Business Assistance Center activities	X	X			

Categories of Options	Statutory Actions				Additional Programs
	Statutory Changes	Policy Changes	Regulatory	Local Level Decisions	
Offer tax incentives for usage of recycled materials as feed stocks in manufacturing processes	X				X
Offer tax incentives and credits to support materials recovery plant upgrades	X				X
Offer tax incentives for recycling businesses to relocate to FL	X				X
Create Public/Private partnerships to invest in new processing technologies	X				X
Engage with state personnel appointed to serve as economic development liaisons (section 288.021, F.S.)		X			
C&D Debris Recycling					
Require registration of concrete processors	X		X		
Implement a statewide landfill ban for specific materials	X		X		
Remove “economically feasible” language from Section, 403.707(9)(g), F.S.	X		X		
Mandate C&D debris processing prior to disposal	X		X	X	
Create sales tax exemption for purchase of recycled C&D materials	X				X
Extend sales tax exemptions (section 403.715, F.S.) to the private sector for resource recovery equipment	X		X		
Create a disposal surcharge/rebate program	X		X		

Categories of Options	Statutory Actions				Additional Programs
	Statutory Changes	Policy Changes	Regulatory	Local Level Decisions	
Organics Recycling					
FDACs could prepare a biennial report to DEP identifying compost markets (section 403.714(2), F.S.)	X				
All state agencies and local governments and their contractors could provide DEP with an annual report detailing the amount of compost procured	X			X	
Provide funding for FDACs and FDOT to fulfill the statutory requirement in section 403.714(4), F.S.	X				X
Provide tax incentives, such as tax deductions or credits, for farms and businesses that make food donations	X				X
Provide economic incentives, such as low interest loans, tax deductions or credits, for composting equipment to expand composting infrastructure and increase composting capacity	X				X
Create an Organics Diversion Grants Program	X				X
Provide funding for FORCE to become more than a clearinghouse website for organics diversion and recycling		X			X

Categories of Options	Statutory Actions				Additional Programs
	Statutory Changes	Policy Changes	Regulatory	Local Level Decisions	
Provide funding to the FDOH, in consultation with DEP for the development of a statewide education and outreach campaign on food donation and liability to be promoted by health inspectors when working with restaurants and hotels throughout Florida	X				X
Provide funding or grants to county extension offices or local governments to develop and provide a community composting training program	X			X	X
End-user purchase rebate for Florida Certified Compost	X	X			X
Provide funding for DEP, in cooperation with Florida Universities, for the development of a K-12 Composting Curriculum	X			X	X
Require the FDEO and Enterprise Florida, in cooperation with DEP, to support recycling market development and offer incentives for corporations using recycled material, such as compost, in the products that are being sold in Florida	X				X
Consider adding a Class I and WTE disposal surcharge to aid in funding state market development efforts for organics recycling	X			X	

Categories of Options	Statutory Actions				Additional Programs
	Statutory Changes	Policy Changes	Regulatory	Local Level Decisions	
Research and evaluate the environmental and financial efficacy of the collection of organics at the curbside for recycling		X			X
Research the requirement to use organic compost in Brownfield Remediation/Redevelopment, new construction, landscaping, spring watersheds or other sensitive ecosystems		X			X
Evaluate and determine the composting capacity and collection and processing infrastructure needed in order to expand the composting markets in Florida		X			X
Research the idea of moving from a mass based recycling goal of 75% by 2020 to a markets specific goal, such as a food diversion goal or an organics recycling goal		X			X
Evaluate the effectiveness of mandatory recycling or a ban on disposal of commercial organic wastes by businesses and institutions that dispose of a large amount (to be determined) of organic waste		X			X

Categories of Options	Statutory Actions				Additional Programs
	Statutory Changes	Policy Changes	Regulatory	Local Level Decisions	
Commercial Recycling					
Require local government to mandate commercial recycling	X		X	X	
Education and Outreach					
Funding for the purchase of mobile and website application software that provides recycling information and education to residents through computers, tablets, phones and smart home devices					X
Create a Recycling Education Grants Program that supports the continued efforts of local governments to enhance education about recycling and contamination to their residents		X			X
Additional Program and Statutory Changes					
Amend Section 403.706(2)(a), F.S., to also apply the recycling goal to cities with a population greater than 50,000	X				
Shift from a weight- based recycling goal towards a sustainable materials management focus	X				