**REPORT OF THE VIRGINIA**
**DEPARMTENT OF ENVIRONMENTAL QUALITY**

# Recycling in Virginia: An Evaluation of Recycling Rates and Recommendations (Chapter 615, 2018 Acts of Assembly)

**TO THE GENERAL ASSEMBLY OF VIRGINIA**

# SENATE DOCUMENT NO. 7

**COMMONWEALTH OF VIRGINIA**
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# RECYCLING IN VIRGINIA

## An Evaluation of Recycling Rates and Recommendations

A report to the Virginia General Assembly

Virginia Department of Environmental Quality

November 2019

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# EXECUTIVE SUMMARY

The Department of Environmental Quality (DEQ) was directed to conduct an evaluation of recycling rates in Virginia and to provide a set of recommendations for improving the reliability of the supply of recycled materials during the next 10 years in order to provide for beneficial use pursuant to Chapter 615 of the 2018 Acts of Assembly (herein referred to as "Senate Bill 218").

SB 218 provides that the assessment include:

(i) an evaluation of Virginia's recycling rates

(ii) a set of recommendations for improving the reliability of the supply of recycled materials during the next 10 years in order to provide for beneficial use

(iii) incentive-based strategies, including the granting of economic development incentives for the construction of recycling centers and beneficiation facilities that have the potential to increase beneficial use of glass, plastic, metal, and fiber, and

(iv) the effect of the operation of mixed-waste material recycling facilities on the quality and quantity of recyclable materials available for beneficial use.

To develop this report, DEQ engaged in outreach with localities, solid waste planning units, industry, and other stakeholders, including utilizing a written survey as well as conducting follow-up meetings. DEQ staff researched the current status of recycling nationally as well as recycling programs in other states.

The following provides an overview of recycling nationally and in Virginia as well as recommendations based on the research gathered and stakeholder feedback provided throughout this process, including economic incentives, additional opportunities for engagement and other opportunities.

# INTRODUCTION

This report is being submitted pursuant to Senate Bill 218 which provides:

> That the Virginia Department of Environmental Quality (the Department) shall provide to the General Assembly, not later than November 1, 2019, an evaluation of Virginia's solid waste recycling rates and a set of recommendations for improving the reliability of the supply of recycled materials during the next 10 years in order to provide for beneficial use, as defined in § 10.1-1414 of the Code of Virginia, as amended by this act, by industry. The evaluation shall consider incentive-based strategies, including the granting of economic development incentives for the construction of recycling centers and beneficiation facilities that have the potential to increase beneficial use of glass, plastic, metal, and fiber. The evaluation shall also investigate the effect of the operation of mixed-waste material recycling facilities on the quality and quantity of recyclable materials available for beneficial use.

In response to Senate Bill 218, the Department of Environmental Quality evaluated the recycling rates, conducted a survey, and staff met with stakeholders at the regional level.

DEQ sent letters to solid waste organizations, industry representatives, and all 71 local and regional solid waste planning units. DEQ requested data and feedback on current recycling conditions, potential incentives and recommendations to improve or increase recycling, and the impact of mixed waste facilities on the recycling stream. DEQ received approximately 30 responses to the survey. DEQ followed-up with face to face meetings or discussions with various regional solid waste planning units and organizations. DEQ also engaged with other agencies including the Virginia Department of Transportation.

The feedback DEQ received identified market conditions, including the impact of China's policy on recyclables importation from the United States and the increasing costs for localities to recycle as challenges for local programs. The feedback DEQ received also noted that the current economics of the recycling market have shifted such that localities in particular are having to pay more for their recycling programs. The primary commodity of concern is glass, with most responses identifying this material as having the greatest economic impact on recycling programs.

Of the materials identified specifically in Senate Bill 218, responses focused on traditional recycling materials such as paper, glass, aluminum and plastics. Although fiber is specifically identified in SB 218, fiber recycling discussed by the stakeholder responses to the survey and in this report primarily focuses on paper fiber and traditional cardboard recycling as this stream is managed similar to others. DEQ does receive data from reporting localities and solid waste planning units on textiles recycled. However, DEQ did not receive feedback regarding other types of fiber recycling, particularly textiles in response to its outreach for this report. Thus, a specific discussion of fiber recycling is limited, however it is important to note that the recommendations identified in the feedback received and in this report for recycling may be broadly applicable to most recycled commodities.

# RECYCLING IN VIRGINIA

Virginia Code § 10.1-1414 defines recycling as the process of separating a given waste material from the waste stream and processing it so that it may be used again as a raw material for a product which may or may not be

similar to the original product. Virginia's policy specifically promotes recycling as a part of pollution prevention efforts.[1] Recycling reduces the amount of waste sent to landfills and incinerators and also serves to conserve natural resources such as timber, water and minerals in addition to preventing pollution by reducing the need to collect new raw materials. Recycling also can provide economic benefits by creating jobs and saving energy and conserving resources.[2]

Recycling in Virginia, including locally-available recycling program management and implementation is a function managed by localities and solid waste planning units. There are currently 71 solid waste planning units (SWPUs) in Virginia that consist of towns, cities, counties, or some combination in certain regions. In larger or urban areas, these entities typically offer both curbside or drop-off recycling programs. Smaller or more rural SWPUs and localities tend to rely on drop-off programs. Recycling in all regions may be supplemented by recycling programs from businesses.

In 1989, the Virginia General Assembly adopted legislation that established a 25% recycling rate target for communities, which was modified in 2006 as the General Assembly established a two-tiered recycling mandate of 15% and 25% of the municipal solid waste generated annually. Planning units with population densities of less than 100 persons per square mile, or with unemployment rates 50% above the state's average unemployment rate, qualify for the 15% mandated rate; all others must meet the 25% recycling rate.

Legislation adopted in 2012 eliminated the annual reporting requirement for SWPUs with populations of 100,000 or less after calendar year (CY) 2012. Instead, those SWPUs are required to report every four years beginning CY2016. All SWPUs with populations over 100,000 are required to continue to report annually. Currently, 17 SWPUs fall under the annual reporting category. DEQ encourages SWPUs not required to report annually to report voluntarily. A Recycling Action Plan (RAP) may be a required part of the SWPU's solid waste management plan if the SWPU falls below its mandated recycling rate. Additionally, DEQ receives voluntary recycling information from a few businesses, which have included Wal-mart, Target, Kohl's, Sav-A-Lot, and Best Buy.[3]

DEQ requires permits by rule for materials recovery facilities (MRF)[4] but pursuant to statute, recycling facilities are not required to have a permit. MRFs typically receive solid waste for the processing and recovering of material whereas recycling facilities receive material that has already been sorted and include typical recyclables such as plastics, paper, and metal.[5] DEQ does not receive specific recycling information or notification from recycling

[1] Va. Code § 10.1-1425.11.

[2] Benefits of Recycling. EPA. https://www.epa.gov/recycle/recycling-basics#Benefits

[3] The 2017 and 2018 reports received from business are available at https://www.deq.virginia.gov/Programs/LandProtectionRevitalization/RecyclingandLitterPreventionPrograms.aspx.

[4] "Materials recovery facility" means a solid waste management facility for the collection, processing, and recovery of material such as metals from solid waste or for the production of a fuel from solid waste. 9 Virginia Administrative Code 20-81-10.

[5] *Recycling center" means a facility that (i) accepts recyclable materials that have already been separated at the source from municipal solid waste generated by either residential or commercial producers; (ii) processes source segregated recyclable materials, including mixed-paper fiber materials, metal and plastic postconsumer containers, and glass containers; and (iii) processes and sells recyclable materials according to end-user specifications. "Recycling center" does not include a facility for construction and demolition debris processing, sorting of municipal solid waste, incineration, sorting or processing of industrial waste, composting, or used tire processing.* Virginia Code § 10.1-1414.

centers so an exact number of these facilities is unknown. Currently, there are 53 facilities with associated permitting as a MRF in Virginia.

Based upon existing resources, DEQ's recycling program coordination primarily provides data analysis of reporting, assistance to SWPUs and guidance on recycling requirements, solid waste management plans, and grants submittals. DEQ's recycling program also engages in outreach with SWPUs and solid waste or recycling associations. Other state-wide recycling initiatives and activities include a recycling equipment tax credit, waste tire end-user reimbursements, non-competitive and competitive litter grants for localities, activities undertaken by the DEQ Office of Pollution Prevention, and use of recycling materials in some Virginia Department of Transportation (VDOT) projects.

## Litter Grants

DEQ provides funds for litter prevention and recycling grants to localities under a non-competitive grant program based on population and road miles in conjunction with the recommendations of the Litter Control and Recycling Fund Advisory Board (Fund Board).[6] Since 1980, these grants have been awarded annually to localities for local litter prevention and recycling program implementation, continuation, and/or expansion.[7] Starting in fiscal year 2018, a competitive grant component for localities following discussions by the Fund Board regarding historic use of competitive grants. The amount of funds available for this grant program is approximately 5% of the net resources allocated for the Litter Control and Recycling Fund. All localities currently receiving the DEQ litter prevention and recycling non-competitive grant are eligible to apply for the competitive grant. The competitive grant funds can be used for implementing statewide and regional litter prevention and recycling educational programs and pilot projects. In FY2019, $1.9 million was awarded to localities in non-competitive litter grants and about $106,000 in competitive litter grants. In 2018, localities reported that 44% of funds were used for recycling program activities, while 56% of funds went towards litter prevention program activities.[8]

## Recycling Tax Credits

A state income tax credit is available for the purchase of machinery and equipment for processing recyclable materials. The credit may be claimed for machinery and equipment used predominantly in or on the premises of manufacturing facilities or plant units which manufacture, process, compound or produce items of tangible personal property from recyclable materials within the Commonwealth for sale. The credit is equal to 20% of the original total capitalized cost of the purchase price for machinery and equipment for processing recyclable materials, and the total credit allowed cannot exceed 40% of the Virginia income tax liability in any taxable year. The unused amount of the credit can be carried over for the next ten years. Before an entity is entitled to the tax credit, DEQ certifies that such machinery and equipment is integral to the recycling process. For the 2018 certification year, 44 applications were received from manufacturing and recycling facilities.

[6] Virginia Code §§ 10.1-1414-1425

[7] Additional information on the Litter and Recycling Grant Program can be found at https://www.deq.virginia.gov/Programs/LandProtectionRevitalization/RecyclingandLitterPreventionPrograms/LitterPreventionandRecyclingGrantPrograms.aspx.

[8] Litter and Recycling Grant Program Annual Performance and Accounting Summary Report Fiscal Year 2018, Virginia Department of Environmental Quality § (2018). https://www.deq.virginia.gov/LinkClick.aspx?fileticket=bNzbbA3w24c=&portalid=0.

## State Agency Recycling and Procurement

Since 1989, mandatory state agency recycling programs have grown from programs recycling primarily aluminum cans and office paper to programs utilizing assistance through the Department of General Services (DGS)[9] and individual collection contracts to recycle items such as all paper grades, magazines and books, plastic beverage containers, toner cartridges, and metal. Virginia state agencies historically have reported an average recycling rate of approximately 30 percent.

DEQ and DGS work together to provide recycling and surplus property guidance information to state agencies. Such guidance includes market and recycling content information, resource information or referrals, program development and implementation assistance, and related state policies and procedures. All state agencies must revise their procurement procedures and specifications on a continuing basis to encourage the use of goods and products with recycled content and increase the awareness of the benefits of using such products.[10]

## DEQ's Office of Pollution Prevention

The Office of Pollution Prevention within DEQ hosts a number of programs and initiatives that serve as a conduit for non-regulatory assistance to businesses, institutions and communities. These efforts are aimed at motivating Virginia facilities to minimize their environmental footprint though actions that often exceed regulatory requirements while enhancing their bottom line.

Since 2000, DEQ has promoted the non-regulatory Virginia Environmental Excellence Program (VEEP) as a mechanism to encourage "beyond-compliance" environmental results. VEEP encourages facilities to implement programs to reduce their environmental impacts, including programs that reduce waste generation and increase recycling. Annually, members report to DEQ on programs they have implemented. Over the last 3 years, VEEP members have reported recycling 917,207 tons of non-hazardous solid waste. In addition, programs implemented by members have reduced the amount of waste generated by 46,680 tons. As noted by a VEEP member in their annual report, committing to report on non-hazardous waste recycled for annual VEEP reporting serves as an incentive to increase the focus on recycling and the possibility to expand recycling programs to include more materials.

Virginia Green is the Commonwealth's voluntary initiative to promote pollution prevention (P2) practices across all sectors for the tourism industry. Participating tourism businesses and organizations voluntarily commit to engage in P2 practices in the areas of waste reduction, water and energy conservation, and in the support of green events and meetings. Virginia Green partners join through a checklist process that also serves as a learning tool for additional green practices and resources. DEQ's Office of Pollution Prevention oversees development of all programmatic guidance and requirements for the application, while DEQ's partners, the Virginia Green Travel Alliance, the Virginia Tourism Corporation, and the Virginia Restaurant, Lodging and Travel Association, coordinate the application review process, marketing and promotion. Virginia Green takes a double-sided approach to support recycling. It requires all members to have an active recycling program that allows customers access to recycling. In addition, members are required to minimize the impact of disposable food service items by reducing

[9] Information on DGS Recycling Assistance Program can be found at https://dgs.virginia.gov/office-of-surplus-property-management/government-entities/recycling-assistance-program/.

[10] Va. Code §§ 10.1-1425.6, 2.2-4313, 2.2-4323, 2.2-4324 2.2-4326 address state agencies recycling and procurement obligations.

their usage and encouraging the usage of products that are recyclable. Members cannot provide polystyrene containers.

DEQ has implemented its own environmental management system (EMS) with the goal of reducing DEQ's environmental footprint. Through the program, DEQ has expanded its office recycling programs and is currently facing some of the same collection challenges described in other sections of this report. Regional EMS Teams coordinate events for Earth Day in April and America Recycles Day in November each year that often focus on recycling and contamination. In 2018, DEQ also coordinated a recycling awareness and contamination event for the Department of General Services' "OnTheSquare" event lineup to educate state employees on recycling.

### VDOT and Specifications for Recyclable Materials

Currently, the Virginia Department of Transportation (VDOT) has six specifications regarding the use of crushed glass (cullet) in its 2016 Road and Bridge Specifications on Recyclable Materials.[11] The Road and Bridge Specifications are allowable-use specifications and therefore do not require use of materials but establish standards of use. The Road and Bridge Specifications are generally used by localities for their locally administered projects. Examples of uses include cullet as backfill, fill for embankments, or as pipe bedding. VDOT in discussions with DEQ staff noted that in many cases where glass cullet could be used in projects, it competed with cheaper material that was more easily sourced locally. This highlights that the issues that haulers face in curbside recycling programs related to the cost of transporting heavy glass and the difficulty in finding glass beneficiation facilities to crush the material also impact the use of cullet is in VDOT projects. VDOT staff indicated that the best utilization of cullet may occur when the glass can be sourced from a facility extremely close to the project and is already crushed to the specifications needed for the project in order to make its use more financially viable for contractors. There are not many places in the state where these parameters are met, though Fairfax County offers a potential example for localities to follow.

Fairfax County invested $500,000 in 2017 on a glass-recycling machine, locally named "Big Blue." "The plant is capable of crushing 20 tons of glass per hour and pulverizes glass bottles and jars into sand and gravel that can be used for paving, construction, and landscaping. The crushed glass can also be used in different drainage and storm water control applications."[12] Fairfax County has so far used the material locally as bedding material for pipes, consistent with VDOT's Road and Bridge Specifications.

## CHINA BAN (CHINA'S NATIONAL SWORD)

The ability to ship recyclables to foreign markets has played a tremendous role in the amount of recycling conducted nationally. Until recently, the main foreign market was China. However, China has implemented several initiatives that have had a fundamental impact on recycling including recycling in Virginia.

[11] Virginia Department of Transportation, Construction Division. "2016 Road and Bridge Specifications." Accessed September 4, 2019. http://www.virginiadot.org/business/resources/const/VDOT_2016_RB_Specs.pdf.
[12] "Regional Approach to Glass Recycling Leads to Creation of the Purple Can Club." Public Works and Environmental Services. Fairfax County, April 10, 2019. https://www.fairfaxcounty.gov/publicworks/news/regional-approach-glass-

## History

For decades, the United States and other developed countries have exported their recyclable materials to developing countries, mainly China. In the United States, "easy access to export markets fueled recycling's growth, starting on the West Coast. Thanks to the abundance of empty shipping containers that needed to be returned to China, it was cheaper to ship recycling materials from Long Beach, Calif[ornia], to China than to truck them from Long Beach to San Diego…" a report sponsored by Republic Services, a waste and recycling operator, explains. [13]

This system created a profitable market for recyclables in the United States, with municipalities and private businesses earning money from the sale of recyclable material to Chinese businesses that sorted the material for use as cheap feedstock in the manufacture of new consumer goods, which ultimately benefitted the Chinese economy.[14]

The reliance on China as an importer of a large percentage of recyclable material produced in the United States deepened throughout the decades. In 2016 alone, China received 4,000 shipping containers of recyclables from the United States every day, amounting to $5.2 billion worth of commodities.[15] Until the implementation of China's National Sword policy, China was the largest consumer of recyclable materials generated in the United States, taking about 40% of U.S. paper, plastics and other recyclables.[16]

## National Sword Policy

When the National Sword policy was first announced, it was seen as similar to Operation Green Fence, a policy implemented in China in 2013. Operation Green Fence was a campaign of enhanced import inspections by Chinese customs officials focused on incoming loads of scrap material in an attempt to enforce regulations passed in 2006 and 2010 that were generally widely ignored. The campaign lasted 10 months.[17]

In February of 2017, China's General Administration of Customs announced it would launch a one-year campaign targeting "foreign waste, including plastics, industrial waste, electronics, and other household waste materials."[18] The campaign would specifically focus on cracking down on smuggling and illicit activities related to recyclable and waste materials.[19] Many in the industry saw this new campaign as a second Operation Green Fence. A translated article from Xinhua News Agency referred to the campaign as a "Sharp Sword at the Gates of the Country 2017," with some translating the name of the effort to "National Sword 2017."[20]

Separately, in an effort to further restrict the importation of foreign recyclables, on July 18, 2017, China notified the World Trade Association of its intent to ban 24 materials from being imported effective January 1, 2018.

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[13] *Can We Save Recycling?* Governing, 2019. https://www.governing.com/papers/Can-We-Save-Recycling-114139.html.
[14] Rico, Corinne, and Cooper Martin. *Rethinking Recycling: How Cities Can Adapt to Evolving Markets*. National League of Cities, September 17, 2018. https://www.nlc.org/resource/rethinking-recycling-how-cities-can-adapt-to-evolving-markets.
[15] Ibid.
[16] Milman, Oliver. "Moment of Reckoning: US Cities Burn Recyclables after China Bans Imports," February 21, 2019. https://www.theguardian.com/cities/2019/feb/21/philadelphia-covanta-incinerator-recyclables-china-ban-imports.
[17] "From Greenfence to red alert: A China timeline" February 13, 2018. https://resource-recycling.com/recycling/2018/02/13/green-fence-red-alert-china-timeline/.
[18] Paben, Jared. "China Announces 'Sword' Crackdown on Illegal Recyclable Material Imports," July 10, 2017. https://resource-recycling.com/recycling/2017/02/21/china-announces-sword-crackdown-illegal-recyclable-material-imports/.
[19] Ibid.
[20] Ibid.

Further, on March 1, 2018, China implemented another policy, placing stricter limits on contamination levels in imported mixed paper and mixed plastics — 0.5%, a rate those in the industry argue is virtually unattainable.[21] Waste Management, an American waste management company, reports that "the average contamination rate among communities and businesses sits at around 25%. That means that roughly 1 in 4 items placed in a recycling container is actually not recyclable…"[22] In July of 2018, China went another step farther and declared their intent to ban all recyclable material imports by 2020. Key to achieving this goal is China's delay, and sometime outright withholding, of permits required for the import of material. In 2017, when the campaign began, the Chinese government went 5 months without issuing new import permits, when it normally would issue permits twice per month.[23] The trend has continued, with varying levels of access to permits over the past two years.

In its report on this issue, Resource Recycling, Inc. states that "[a]s the import restrictions gain[ed] more media attention across the U.S., the linguistic line between National Sword and the import ban start[ed] to evaporate. Although industry insiders and China experts maintained for months that the actions are separate from each other – one focused on smuggling and customs enforcement, the other on material quality – at this point the policies are described as one. "National Sword" [has] become synonymous with the entire range of policies China has enacted slowing the flow of recyclables into the country."[24]

## Overall Impact

Internationally, the flow of recyclable material did not slow as a result of China's new policies, resulting in the search for new markets willing to accept the material. Other countries in Asia and Southeast Asia, notably Malaysia, Thailand, Vietnam, Indonesia, and India, began to fill the gaps left by China. However, the amount of material quickly overwhelmed existing infrastructure in these countries, resulting in new restrictions placed on imports of recycled material similar to those in China. In the summer of 2018, Malaysia, Thailand, and Vietnam stopped issuing new scrap plastic import licenses. In spring of 2019, Vietnam announced a plan to ban all plastic scrap imports in 2025, and India announced it would also ban scrap plastic imports starting in August 2019. The chart below shows U.S. export reliance on China in 2017, the shift in exports to other countries in 2018, and the sharp decline in exports to the same countries in 2019 when similar restrictive import policies to those in China were enacted.

Available research indicates that China's policies have impacted recycling nationally. In 2017, 64% of recyclables offered a return on investment, but just a year later, only 35% did. One report described demand for some materials as falling by 40% "almost overnight."[25] Across the country, both privately and publicly owned facilities and recycling programs struggle to adapt. Curbside recycling programs are being cut, contracts with waste management providers are being renegotiated, and some recycling programs are being shuttered entirely.

The impact of this shift in markets in the Virginia is discussed in the following sections.

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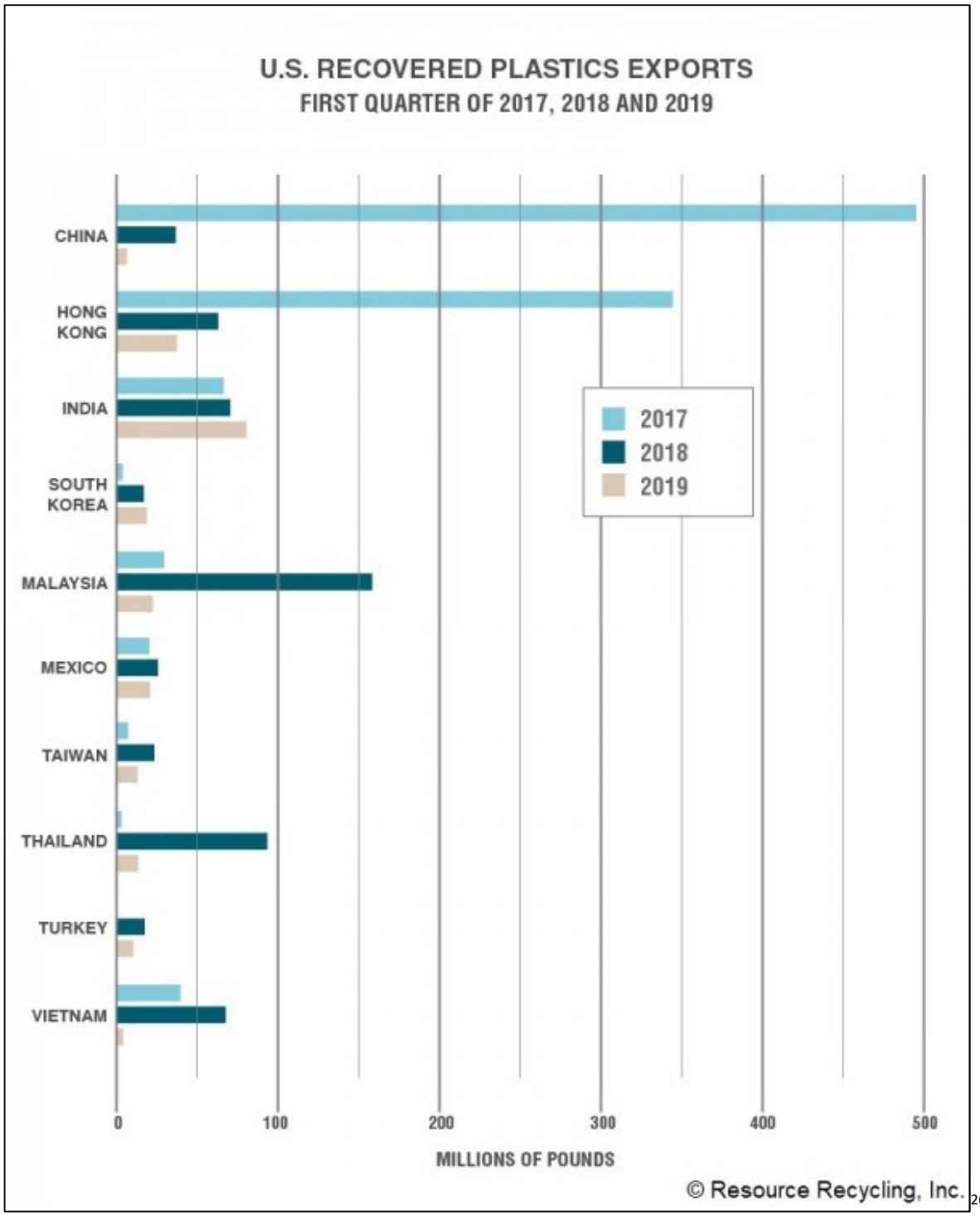
[21] (2019). *Can We Save Recycling?* Governing. https://www.governing.com/papers/Can-We-Save-Recycling-114139.html
[22] Nwaogu, Claudia. "The Battle Against Recycling Contamination Is Everyone's Battle," April 4, 2018. http://mediaroom.wm.com/the-battle-against-recycling-contamination-is-everyones-battle/.
[23] Staub, Colin. "Lack of Import Permits Still Sinking Exporters," Resource Recycling News. Resource Recycling, October 31, 2017. https://resource-recycling.com/recycling/2017/10/31/lack-import-permits-still-sinking-exporters/.
[24] "From Green Fence to Red Alert: A China Timeline." From Green Fence to red alert: A China timeline. Resource Recycling, July 3, 2019. https://resource-recycling.com/recycling/2018/02/13/green-fence-red-alert-china-timeline/.
[25] Staub, Colin. "Paper Exports Stable but Plastics Drop Dramatically." Resource Recycling News. Resource Recycling, May 31, 2019. https://resource-recycling.com/recycling/2019/05/21/paper-exports-stable-but-plastics-drop-dramatically/.



[26]

[26] Rico, Corinne, and Cooper Martin. *Rethinking Recycling: How Cities Can Adapt to Evolving Markets*.

# VIRGINIA TRENDS

## Recycling Rates in Virginia

In 2018, the 17 SWPUs required to report annually contributed to a state calculated recycling rate of 46.1%, with several individual localities achieving rates over 35% (see the appendices for recycling rates for each planning unit). Virginia's calculated recycling rate for CY2018 is 46.1% compared to 19.7% in 1991. This calculated rate was derived from recycling rate data submitted by 17 Virginia Solid Waste Planning Units to DEQ as required by regulations (9VAC-20-130-120 B&C).

The recycling rate calculation is based on the principle recyclable materials recycled compared to municipal solid waste disposed in the planning unit. Thus, the rate compares waste generated to that which is sent for disposal versus recycled. It also includes credits for solid waste reused, non-municipal solid waste (MSW) recycled, recycling residues, and source reduction programs.[27]

The materials with the highest recycled rates in Virginia are metal, paper, yard waste, commingled (single stream collected recyclables), and waste wood. The amount of metal and paper being recycled has increased by 1% and 6% respectively from 2017 to 2018. The amount of waste wood and glass recycled have also both increased by 1% compared to 2017. However, the amount of yard waste, commingled, plastic, and other materials have decreased by 1%, 5%, 3%, and 2% respectively. The total tonnage recycled increased by almost 66,000 tons from 2017 to 2018.

Looking at a five-year trend, the amount of metal recycled has been increasing gradually since 2014. The amount of yard waste and waste wood have remained steady throughout with minor fluctuations. The amount of paper recycled decreased from 2014 to 2017 and increased in 2018. The amount of commingled material recycled since 2014 has decreased. The amount of glass recycled has had a slight increase of about 1%. Plastic recycling had increased from 2014 to 2017 by 3% and then dropped in 2018 by 3%. Overall, the total principal recyclable materials recycled increased by almost 170,000 tons in the last five years. The China Ban appears to contribute to the decrease in the recycling of plastics within the past year.

[27] 9 Virginia Administrative Code 20-130-125 provides the information and formula for calculating recycling rates.

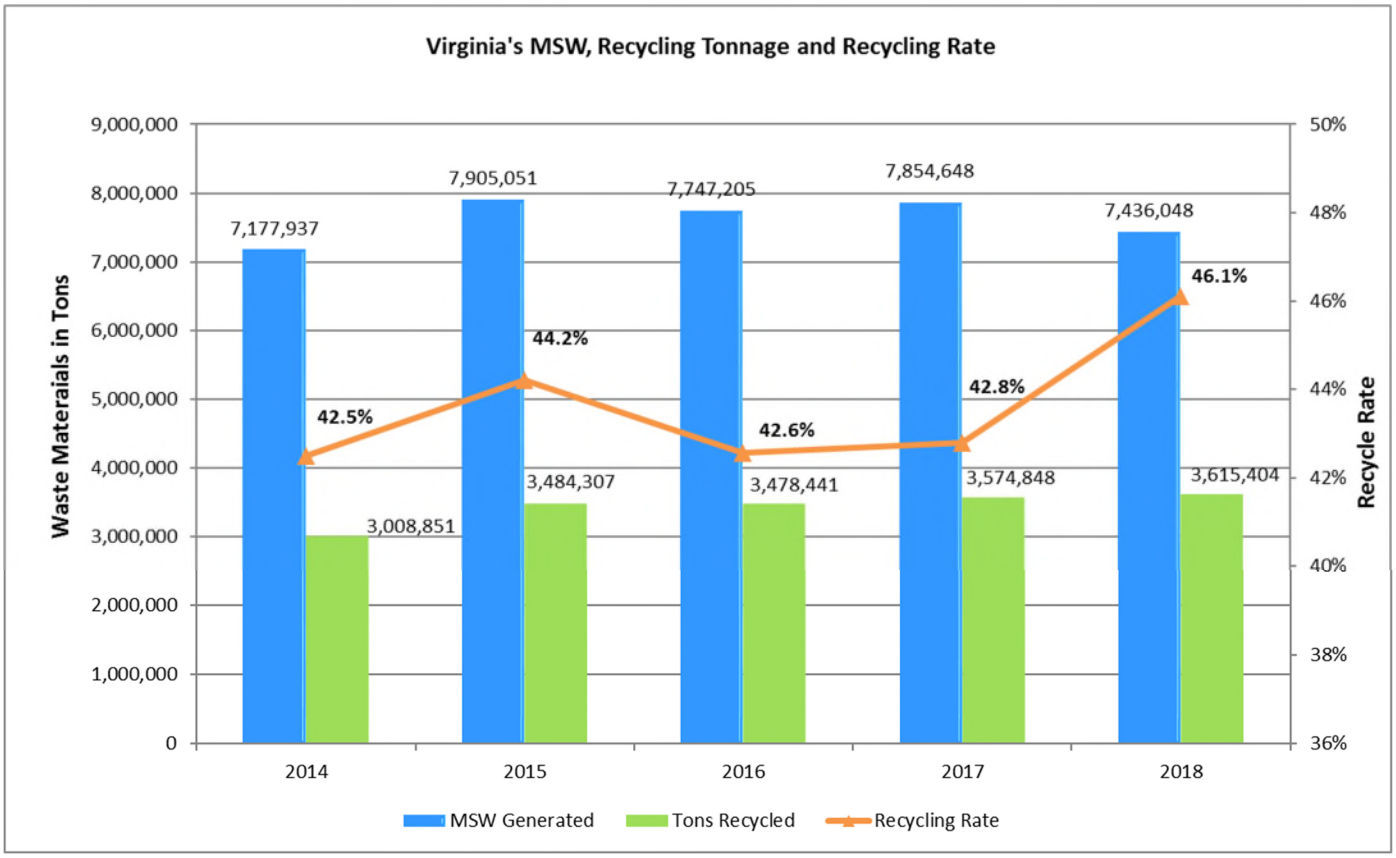



Chart 1: Virginia's MSW Generated, Tons Recycled and Recycling Rate in CY2018

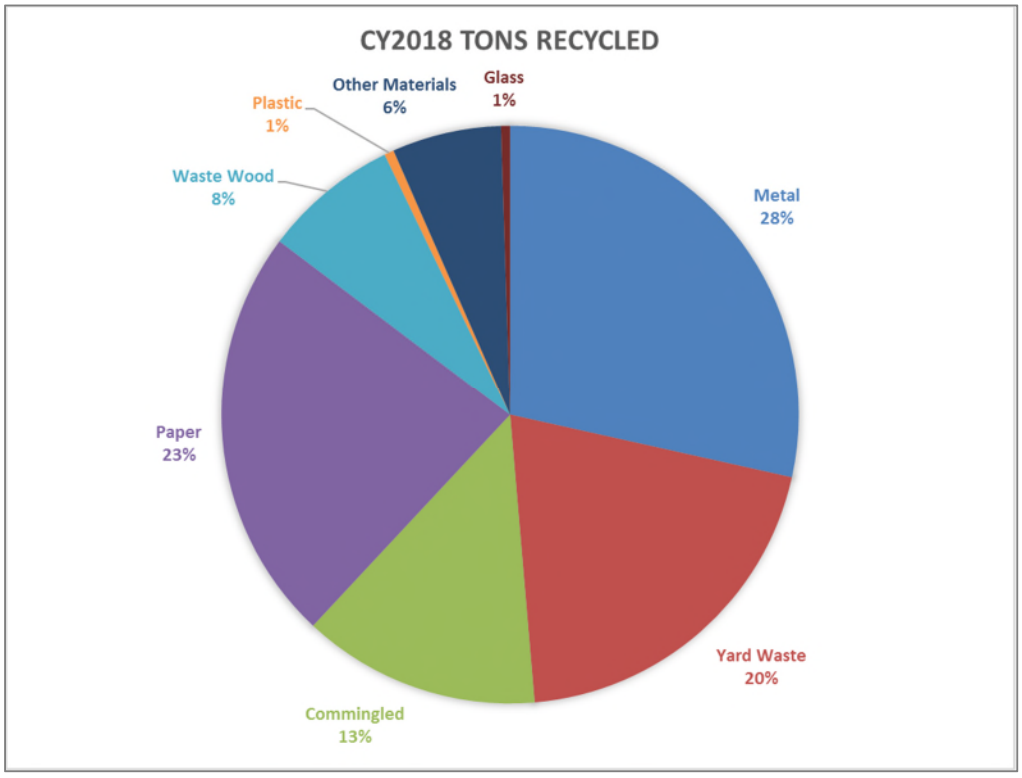



Chart 2: Principal recyclable materials recycled in CY2018 in tons

## Current Recycling Impacts of Changes in the National Recycling Market in Virginia

In Virginia, the impact of China's policies has led to changes across the state and continues to affect recycling programs throughout Virginia. Based on feedback from various stakeholders, specific examples of the impacts in Virginia, include:

- The town of Broadway, Virginia, suspended its recycling program after 22 years of service when the town's contractor proposed a 63% increase in costs for service.[28]
- The abrupt closure of a mixed waste material recovery facility (MRF) resulted in the City of Harrisonburg landfilling material on a temporary basis (March 2018).
- Recycling & Disposal Solutions stopped taking plastics #3-7, affecting residential recycling in the Roanoke and New River Valley regions (May 2018).
- In Staunton, costs to service its drop-off containers increased from $3,000 to $52,000 (August 2018).
- A contractual opt-out clause was exercised by a Norfolk contractor to no longer accept curbside material (November 2018).
- Virginia Tech had to stop accepting plastics #3-7 based on guidance from its Regional Solid Waste Authority (October 2018).
- The town of Dayton ended its curbside program, following the closure of a local MRF (Nov. 2018).
- Washington County discontinued drop-off recycling, and the City of Bristol stopped accepting anything other than cardboard or aluminum, following the closure of a local recycling facility (February 2019).
- The Cities of Staunton and Waynesboro and Augusta County stopped accepting glass and plastic due to a change from their recycling contractor (March 2019).
- Prince William County asked haulers to stop collecting all glass and mixed plastics and instructed residents to no longer place those items in their curbside bins (March 2019).
- Arlington County stopped accepting glass in its curbside recycling program, citing ongoing price issues and a lack of regional end markets (April 2019).[29]

Keep Southwest Virginia Beautiful, a nonprofit organization based in Abingdon with representatives from 13 cities and counties, hosted two regional recycling discussions in 2019 in response to the closure of Tri-Cities Paper, Inc., a Northeast Tennessee based recycler, which was the leading provider of recycling services for paper, glass and plastic in the region. The meeting included county administrators, planners and others faced with discontinued recycling services in their localities, and their conversations highlighted the difficulties faced in reacting to these market changes.

In a letter to DEQ, Executive Director of Keep Southwest Virginia Beautiful, Carol Doss, noted: "It's become clear that in this market, given present resources and budgets, no simple alternative to recover from the loss of Tri-Cities Paper, Inc., is possible. Curbside programs to strengthen recycling rates and related scaling, are seen as too costly to operate in even in the most heavily populated areas in the region."

The letter further states that the region is dependent upon markets eventually rebounding, and that in the future "working more cohesively might be the best way to build more sustainable (cost-effective) recycling programs…" Southwest Virginia's demographics were noted as a difficulty, because as the region is without major cities, more

[28] Semuels, Alana. "Is This the End of Recycling?" The Atlantic. Atlantic Media Company, March 6, 2019. https://www.theatlantic.com/technology/archive/2019/03/china-has-stopped-accepting-our-trash/584131/.

[29] "How Recycling Is Changing in All 50 States." Waste Dive, June 5, 2019. https://www.wastedive.com/news/what-chinese-import-policies-mean-for-all-50-states/510751/.

"research may be needed to understand if/how a collective arrangement might bring some market leverage/advantages into play." The group suggests an investigation into the development of a larger regional waste management authority and associated infrastructure and the possibility that DEQ consider whether "funding consultative service grants to localities could be used to improve and/or design more robust regional recycling programs in Virginia" (See Appendix for referenced letter).

Virginia businesses and municipalities continue to struggle to adapt to a changing market. Teresa Sweeney, chair of the Virginia Recycling Association, says the Association sees the current situation as a "… reality check for product manufacturers to improve their packaging, for the recycling industry to improve their sorting technology, for everyone who works with the public to improve recycling information and for consumers to reduce their waste and recycle responsibly."[30]

The continuation of recycling programs is an essential element for ensuring the reliability of supply of recyclables. The full extent of this impact on recycling programs and rates is not yet reflected in data reported to DEQ given the timeframe for reporting.

# DEQ OUTREACH AND FEEDBACK

In order to gain a better understanding of the current state of recycling in the Commonwealth, DEQ has been engaging with stakeholders on current recycling issues. In the last year, DEQ staff and management have held stakeholder meetings, participated in recycling conferences, and have discussed the challenges in Virginia. In order to collect data for this report, DEQ sent a survey to stakeholders. In this survey, sent out on the October 24, 2018, organizations, localities, industries, and waste planning units were requested to provide data, recommendations, and additional information that could prove beneficial in the assessment of recycling rates and the development of potential mechanisms for improving the quality and reliability of Virginia's recycling streams in years to come. Specific information requested included input regarding current challenges and burdens, perspectives on potential incentives and requirements, and viewpoints on the overall value of single stream recycling. The majority of survey responses came from localities and SWPUs but DEQ did receive some responses from recycling businesses and associations representing business and industry.

## Costs

The overall cost of recycling programs and the current financial state of the recycling market were identified as concerns by many of the responses to the DEQ survey. The lack of recycling management facilities in rural Virginia creates additional burdens and costs by increasing the distance haulers must travel to reach drop off points. Often times, recyclable material must be transported great distances to sorting facilities and curbside collection is not economically viable without public participation. Some localities, like the City of Bristol, must send all of their recycling materials to processing facilities in other states. Many of the localities and SWPUs that responded to DEQ's recycling survey cited cost as a limiting factor. The cost of maintaining recycling programs is relatively high while the supply of recyclable material exceeds the current market demand. Localities and SWPUs have been experiencing difficulty finding buyers for recyclable materials and counties end up paying for many recyclable materials, such as glass, to be accepted by recycling facilities. Central Virginia Waste Management Authority reported that historically its contract price equated to a credit for its recycling which not only offset the cost of

[30] Toto, DeAnne. "Virginia Recycling Association Reminds Residents to Get Back to the Basics." Recycling Today, August 16, 2018. https://www.recyclingtoday.com/article/virginia-recycling-association-seeks-to-reduce-contamination/.

the recycling program but also offset costs for other services. Due to the current market and costs, however, CVWMA is now paying for recycling. Additionally, Arlington County reported a shift in the cost of processing recyclables from $15.73 per ton to $28.62 per ton.[31]

In several rural areas, due to a variety of factors, operation expenses can make recycling cost prohibitive. Factors that influence this include population density, proximity to recycling facilities, and local economics and politics. In Wise County, contamination rates at drop-off centers have led to their dissolution. In Campbell County, challenges maintaining staffing at collection sites led to recycling containers being contaminated with other wastes. As a result, the high cost of separation due to contamination has resulted in many recycling loads being landfilled. Survey responses indicated that in areas where recycling occurs, resource limitations and other factors limit or prohibit much of the material in the recycling stream from being recycled when it is contaminated or not economically feasible.

High transportation costs and lack of infrastructure were identified as economic factors that limit recycling in Virginia. Recycling material is heavy and expensive to transport. Transportation expenses including gas, manpower, and vehicle maintenance were cited as contributing economic burdens. Other operational costs of the recycling process include collection, sorting, and decontamination. Additionally, fees associated with material recovery facilities often exceed landfill fees. Because of the costs, some of the localities and SWPUs that responded to the survey indicated that they do not have curbside recycling programs. This was typically observed in rural areas where curbside collection is made more difficult by the lower population density.

Glass is one of the larger challenges posed to recycling operators and facilities in Virginia for a variety of reasons. When glass in collected in the single-stream collection process, it often breaks and contaminates other recyclable material such as paper, plastic, and aluminum. Second, relative to other recyclables, glass is heavier. Because Material Recovery Facilities (MRFs) charge haulers based on tonnage, and because MRF's have increased their prices in recent years due to market pressures, the inclusion of glass negatively impacts the financials of curbside recycling programs for both localities, SWPUs, and private businesses hauling the material. Additionally, "the nearest glass beneficiation facilities – places that clean and process glass – are in North Carolina and Pennsylvania, which is too far away for recycling companies to haul the material and still make a profit."[32] Arlington County, responded to this challenge by removing glass collection from curbside recycling.

## Contamination

Approximately half of the localities and SWPUs that responded to the survey reported high levels of contamination in recycling streams, resulting in recyclable material ultimately being landfilled rather than recycled. Some responses noted that contamination can be reduced, in part, through outreach programs including education. Responses suggested, however, that resources may be limited to fully implement effective outreach programs and recommended that a public education or training program as part of the solution to challenges facing recycling in Virginia. The Central Virginia Waste Management Authority (CVWMA) on behalf of Richmond and twelve

[31] Airey. "County's Recycling Costs Continue to Rise, Glass Future Still Uncertain" ARL Now. https://www.arlnow.com/2019/03/20/countys-recycling-costs-continue-to-rise-glasss-future-still-uncertain/

[32] Palermo, Jill. "Recycling Glass a Thing of the Past?" Prince William Times, March 26, 2019. https://www.princewilliamtimes.com/news/recycling-glass-a-thing-of-the-past/article_e8cffb72-3f7c-11e9-a171-b7bb301ee8c5.html.

neighboring localities has suggested that more public education about recycling would reduce contamination and increase recycling rates, but that current budgeting is not sufficient to sustain such programs.

## Education

Generally, SWPUs and localities reported that challenges to recycling in Virginia at present include a lack of public education and participation, cost prohibitive operation expenses, and a diminished market demand for recycled materials. One of the most frequently cited challenges to recycling was the lack of public understanding about what can be recycled and how to successfully recycle. Single stream recycling compounds this issue, increasing what those in the industry call "wish-cycling," or putting everything in the recycling bin with the mindset that one is doing good by recycling everything, when in reality this causes challenges for haulers and sorters and often leads to contamination of the recycling stream.

The Town of Abingdon provided feedback on success regarding increasing education and outreach through events coordinated by Sustain Abingdon. Sustain Abingdon is a committee, comprised of town employees and community volunteers, that coordinates several town-sponsored outreach and education events annually. Two of the more notable of these events include the annual Earth Day event in the spring and the "America Recycles Day" event in the fall. In its responses to the DEQ survey, Abingdon noted that each event held collects between five and ten tons of e-waste and paper documents for shredding. In addition to this, Abingdon keeps three trailers in two locations for source-separated collection of plastics, aluminum, and paper/cardboard. Because of these outreach efforts, the Town has noted an acceleration of collection rates for these categories of recyclables. The challenges Abingdon now faces are with higher resource demands for staffing and finding facilities that are willing to take source-separated recyclables.

## Source-Separated v. Single Stream Recycling

In recent years, several localities and SWPUs have moved from the dual stream or source-separated collection system to a single-stream collection process. Single-stream recycling is the collection of all recyclable waste (paper, cardboard, plastic, glass, and metal) together, whereas source-separated recycling is when the consumer separates all the recyclable materials before putting them into separate recycling bins. In basic terms, source-separation means consumers sort their own recyclables and single-stream means recyclables do not have to be sorted.

Those that have made the switch to the single-stream collection process have seen a significant increase in public participation rates due to the ease of recycling and less confusion regarding sorting recycling. Consumers are able to put recyclables into a single container, which is then taken to a recycling facility to be sorted. The collection process for waste haulers or collectors has become more streamlined as it is easier and cheaper to operate single-compartment trucks that can be emptied in one trip rather than making multiple trips to the recycling facility. Conversely, the quality of recyclables has plummeted and the contamination rates have significantly increased leading to a decrease in market value of the materials. According to some localities and SWPUs, plastic bags and plastic film are among the primary culprits of contamination of the recycling stream. Glass, plastic, and aluminum can also cross-contaminate other materials in the same recycling bin. Contamination also effects the ability of the recycler to produce quality end products. Overall, while collection costs are lower, processing and contamination removal costs are significantly higher with single-stream collection.

In localities such as Bedford County, where source-separated recycling services are used, contamination levels are lower. Source-separation is an example of a method that has been used to mitigate the effects of excess contamination. However, this solution has its disadvantages and the effect of source-separated recycling is not always a positive one. The drawback that Bedford County found with regard to this method has been an economic one, as source-separated recycling services are more expensive due to increased amount of collection and handling to maintain than single-stream recycling services. Additionally, source separation is unsuccessful when citizens continue to comingle recyclables despite the separate containers provided.

In localities and SWPUs where source-separation recycling is prevalent, consumers are involved in the beginning stages of recycling and therefore, end up producing quality recyclables with low contamination rates that are ready for immediate processing by the recycling facility. Effective source-separation supports the highest and best use of materials and cleaner feedstock for producing recycled materials because there is less contamination. It also provides the cleanest materials with the highest revenue when made available for sale in the recycling markets. Source-separation may also raise awareness, leading generators and consumers to think about reducing waste and adjusting buying and usage practices. However, since more effort is required by consumers, it is an on-going challenge for localities and SWPUs to engage citizens and get them to participate in the program.

### Mixed-Waste Facilities

Overall, DEQ received limited feedback on the impact of mixed waste facilities on the quality and quantity of recyclable materials. Mixed waste facilities are facilities that accept loads of solid waste to then sort out recycling versus recycling centers which take recyclables that have been sorted out and separated from other solid waste prior to arriving at the recycling center. The limited feedback DEQ received is likely due to the fact that currently there are no mixed waste facilities operating in Virginia. Additionally, given the greater impact that contamination is having on the recycling market, the primary focus of recycling is on reducing contamination even that generated at traditional recycling or single stream facilities. Thus, mixed-waste recycling facilities may have an even greater challenge to producing recyclables that can be introduced into the recycling market. Other opportunities from mixed waste processing do exist outside the traditional sorting of recycling materials such as using waste for new product development.[33]

## OTHER STATES' RECYCLING INCENTIVES AND PROGRAMS

All states have some sort of program or emphasis regarding recycling, which may utilize a variety tools including education, outreach, economic incentives and mandated actions.

### North Carolina Grant Program

One consistent recommendation in the feedback DEQ received from SWPUs and localities was to examine North Carolina's recycling program particularly with respect to that program's economic incentives. North Carolina's domestic recycling industry, which in 2017 supported 18,061 jobs in the recycling industry through its 674 recycling businesses, as compared to Virginia's 8,669 jobs, has continually been supported by the state's Recycling

[33] Martz, Michael. "Virginia Showcases New Israeli Technology for Transforming Waste and Hopes Economic Investment Follows." Richmond Times-Dispatch, August 28, 2019. https://www.richmond.com/news/virginia/government-politics/virginia-showcases-new-israeli-technology-for-transforming-waste-and-hopes/article_eae724a3-89be-54fa-8361-9cee8825a9c4.html.

Business Assistance Center. [3435] The RBAC is a partnership of the North Carolina Department of Environmental Quality's Division of Pollution Prevention and Environmental Assistance and the North Carolina Department of Commerce. Its mission is to promote environmentally sound economic development through the reuse and remanufacture of recyclable materials. According to North Carolina Department of Environmental Quality, although these grants were originally funded through a special funding source, these grants are now funded through general revenues.

The RBAC has supported private sector and nonprofit market development through its Recycling Business Development Grant (RBDG) program, issuing grants since 1996. [36] Each year, RBAC awards as much as $40,000 per company to North Carolina recycling businesses that are pursuing projects to expand their processing and manufacturing capacities.[37]

In FY 2017-18, North Carolina focused a large portion of its grant cycle on projects that prioritized materials affected by China's import ban. While #1 and #2 plastics have largely maintained their demand in international markets, demand for mixed paper, #3-7 plastics, bulky rigid plastics, and agricultural plastics, has been drastically reduced. As a result, 11 of the 21 grants awarded by the RBDG program seek to expand domestic markets in North Carolina for these specific materials.[38] A report by North Carolina's Department of Environmental Quality highlights the importance of the grant programs, saying that "amid a year of challenging global market conditions, RBDG awards continued to play a key, strategic role in expanding private recycling infrastructure and strengthening the domestic marketplace to ensure a resilient, effective and efficient statewide recycling system in North Carolina."[39]

North Carolina also supports its localities through grant assistance with its Community Waste Reduction and Recycling (CWRAR) Grant Program, which "provides funding to public recycling programs for projects that help communities build lasting capacity to divert materials from the waste stream and / or increase public awareness of recycling," and also its Regional Recycling Infrastructure Grant Program, which "is available to develop new infrastructure or upgrade a material recovery facility (MRF) or recycling transfer station that will serve more than one local government residential recycling program across multiple counties."[40]

The RBAC delivers technical assistance to businesses by coordinating with private loan agencies that specialize in loans to businesses in the recycling industry. It also hosts the North Carolina Recycling Markets Directory, "a continuously updated, fully searchable online directory [… that] lists recycling companies that collect, transport,

[34] "State Environmental Officials Urge Residents to Continue to Recycle amid Changing Market Conditions." North Carolina Department of Environmental Quality, May 20, 2019. https://deq.nc.gov/news/press-releases/2019/05/20/state-environmental-officials-urge-residents-continue-recycle-amid.
[35] "Economic Impact Study: U.S.- Based Scrap Recycling Industry Prepared for the Institute for Scrap Recycling Industries, Inc. 2017." Institute of Scrap Recycling Industries, Inc, 2017. https://www.isri.org/docs/default-source/recycling-analysis-(reports-studies)/economic-impact-2017_updatedfinal.pdf?sfvrsn=4&sfvrsn=4.
[36] "The NC Grants Program as Job Creator", The North Carolina Recycling Business Assistance Center § (2013). https://www.serdc.org/Resources/Documents/TN Symposium/presentation/NCDENR MattEwadinger.pdf.
[37]Worley, Wendy, Sandy Skolochenko, and Timothy Shober. "Market Development in Action." Resource Recycling News, October 31, 2018. https://resource-recycling.com/recycling/2018/10/29/market-development-in-action/.
[38] "Annual Report to the North Carolina General Assembly." North Carolina Department of Environmental Quality Division of Waste Management, January 2019. https://files.nc.gov/ncdeq/DWM/DEQ-Consolidated-Solid-Waste-2019-01-15-FINAL.pdf.
[39] Ibid.
[40] Grants for Local Governments. North Carolina Department of Environmental Quality. Accessed September 4, 2019. https://deq.nc.gov/conservation/recycling/programs-offered/grants-local-governments#RegionalGrant

broker, process or remanufacture recovered materials in North Carolina. This tool provides essential links between businesses, industries and local governments searching for markets for recyclables and the companies that accept the materials for reprocessing and reuse."[41]

Additional actions by the state regarding recycling include a law prohibiting the disposal of recyclable plastic bottles in landfills, and initiatives for public education on recycling issues.[42]

## Other States' Economic Incentives

The support that North Carolina offers private industry through the RBAC is generally more robust than what other states in the region offer. Amongst regional neighbors, only Massachusetts offers a grant program for private businesses similar in size to that of North Carolina. Massachusetts' Department of Environmental Protection (DEP) offers grants for "recycling processors and manufacturers [to] create sustainable markets for eligible materials. Selected applicants receive grant awards of between $50,000 and $400,000."[43]

Massachusetts also offers financing through its Recycling Loan Fund, funded by its DEP and administered by the Business Development Corporation, a private economic development company. "Loans range from $50,000 to $500,000, and are used to help Massachusetts businesses active in recycling-related activities obtain the capital needed for any reasonable business purpose."[44]

West Virginia and Delaware offer recycling grants to businesses as well, but these grants are also open to municipalities and non-profits. Additionally, Florida has its own Recycling Business Assistance Center that offers technical assistance and access to its Florida Recycling Loan Program (FRLP) for small businesses that have a net worth less than $6 million and have fewer than 100 employees.[45]

It is worth noting that many states have grants and loan assistance programs through economic development agencies or other initiatives for which recycling businesses would meet the eligibility requirements, but they are not exclusive to the industry.

## Other States' Education Initiatives

Other states often have state-wide education efforts including resources and campaigns. Recently, these programs have also worked to address the impact of the shift in the recycling market. A common response to the shift in the recycling market has been new education initiatives aimed at citizens, which focus on reducing

[41] Recycling Markets. North Carolina Department of Environmental Quality. Accessed September 4, 2019. https://deq.nc.gov/conservation/recycling-business-assistance/recycling-markets

[42]Defending Recycling: Quick training guide for those defending recycling to elected officials, other governing bodies and the media. N.C. Division of Environmental Assistance and Customer Service §. Accessed September 4, 2019. https://files.nc.gov/ncdeq/Environmental%20Assistance%20and%20Customer%20Service/Education%20and%20Outreach/Recycling_Outreach/Recycling-Basics--Defending-Recycling-Final.pdf

[43] "Apply for a Recycling Business Development Grant." Accessed September 4, 2019. https://www.mass.gov/how-to/apply-for-a-recycling-business-development-grant.

[44] "Massachusetts Recycling Loan Fund: Direct Loans for Businesses Involved in Recycling." BDC Capital Financing Solutions. Accessed September 4, 2019. http://www.bdcnewengland.com/programs/massachusetts-recycling-loan-fund/.

[45] Florida Recycling Loan Program: Program Guidelines, Florida Department of Environmental Protection & Florida First Capital Finance Corporation§ (2015). https://floridadep.gov/sites/default/files/GuidelinesRecycling-RefinancingTemp_30Apr15.pdf.

contamination rates, such as Michigan's $2 million "Know It Before You Throw It" campaign[46], Rhode Island's "Let's Recycle Right!" initiative[47], North Carolina's "#RecycleRight" campaign working with localities, or Massachusetts' state-wide program including funding to localities.[48]

### Other States' Mandates

Other state programs may also include recycling mandates or disposal prohibitions. At least 20 other states have some form of mandatory recycling requirement, from recycling rate minimums to mandatory recycling of certain materials.[49] Examples of disposal bans range from lead-acid battery bans similar to Virginia's (and the most common) to bans on the disposal of aluminum cans and plastics.[50] A few states aim to incentivize recycling through beverage container laws. Ten states including five east coast states – Connecticut, Maine, Massachusetts, New York and Vermont – have some sort of beverage container law requiring deposits to be paid on beverages sold in recyclable bottles and cans as an incentive for increased recycling.[51]

## EVALUATION AND RECOMMENDATIONS

With the shift nationally in the recycling market, the projection of recycling rates cannot be easily predicted. Historically, Virginia's state-wide recycling rate has hovered around 41-42% for a steady period of time. While the long-term implications of the China ban and other factors on recycling markets is difficult to predict, , based on some of the feedback provided by SWPUs and localities, Virginia may see a decline in recycling in the near-term absent additional measures or actions regionally or nationally. Based upon the information received, including discussions with localities and SWPUs and the current status of recycling programs in the Commonwealth, the following recommendations for improving the reliability of the supply of recycled materials and for improving recycling in general have been identified.

In light of the systemic issues facing recycling, it is possible that, in addition to improving the existing recycling system, new paradigms need to be created to manage waste in Virginia and divert waste from landfills.

- Creation of a Waste Diversion and Recycling Task Force. A Waste Diversion and Recycling Task Force could be created to take a broad and deeper look at waste issues across the Commonwealth and develop recommendations for increasing waste diversion and recycling. Recommendations from the Task Force could include several approaches to waste reduction and diversion from landfills, including measures to reduce waste at the source, increase organics recycling and composting, and improve recycling. These recommendations could include consideration as to whether the recycling mandates should be increased,

[46] Eggert, David. "Michigan Wants to Double Recycling Rates with $2M Campaign Kickoff." Detroit Free Press. Associated Press, June 25, 2019. https://www.freep.com/story/news/local/michigan/2019/06/25/michigan-recycling-education-campaign/1558257001/.
[47] Rhode Island Resource Recovery Corporation, April 25, 2019. https://www.rirrc.org/node/644.
[48] Young, Colin A. "State Commits $2.6m for How-to-Recycle Initiative." CommonWealth Magazine, August 22, 2018. https://commonwealthmagazine.org/environment/state-commits-2-6m-for-how-to-recycle-initiative/. /
[49] "Disposal Bans and Mandatory Recycling in the United States." Northeast Recycling Council, May 1, 2017. https://nerc.org/documents/disposal_bans_mandatory_recycling_united_states.pdf.
[50] Ibid.
[51] Other states include: California, Hawaii, Iowa, Michigan, and Oregon. Jennifer Shultz, State Beverage Container Deposit Laws. http://www.ncsl.org/research/environment-and-natural-resources/state-beverage-container-laws.aspx

whether landfills should have a role in organics management and increasing recycling, and other options to increase recycling and reduce the amount of material that enters the waste stream.

Economic incentives such as additional funding or resources could be utilized in different ways. These include:

- Direct economic funding to recycling and beneficiation facilities. While both Virginia and North Carolina have similar tax incentive programs for recycling, with various tax credits and tax exemptions for purchases of pollution prevention and recycling equipment, Virginia does not have a similar program to North Carolina's Recycling Business Development Grant. With the identification of additional resources, creating an opportunity to provide direct funding to support the recycling market could both increase recycling and address some of the recycling cost impacts of the current market, particularly related to transportation cost. Additionally, increased tax credits particularly for recycling equipment for businesses and recycling facilities in Virginia would assist in providing a local market for recycling and help to offset other costs such as transportation.
- Increase resources for local recycling programs and recycling efforts. As identified in the feedback received from SWPUs and localities, localities' costs associated with recycling programs have increased. Additionally, some localities, like Fairfax County, have taken individual actions to identify means to directly recycle material locally. Increasing grant funding or other resources to allow other regions of Virginia to undertake similar actions could both increase the reliability of the supply and recycling rates in general. Additionally, increased funding to localities and SWPUs for education and outreach initiatives could both increase supply and help to address problems associated with contamination of the recycling stream.
- Resources to support recycling initiatives at the state level. Additional resources at the state level could be used to support and help coordinate education and outreach initiatives with localities, improve and increase data reporting on recycling, including business recycling efforts and assist with connecting recycling market end-users with localities and others. Additional state incentives could also be directed to increase the amount of recyclable materials that contractors elect to use in VDOT projects, particularly addressing the transportation and cost comparison considerations in using recyclable materials.

Based on the information developed through this study, DEQ expects to continue to move forward with the following recommendations consistent with available resources:

- Work with VDOT to increase the awareness of the availability and use specifications for VDOT and local administered projects.
- Engage with the Virginia Economic Development Partnership (VEDP) to encourage the establishment of recycling and beneficiation facilities in Virginia, including development and exchange of information regarding existing available grants, credits, and other incentives and information.
- Identify ways that DEQ may engage with business and recyclers to collect additional data and share with localities and SWPUs.

# APPENDIX

## Letter Sent to DEQ from Keep Southwest Virginia Beautiful


P.O. Box 1112
Abingdon, Virginia 24212


August 21, 2019

Ms. Beckwith,

Keep Southwest Virginia Beautiful, based in Abingdon, hosted two regional recycling discussions this year with county administrators, planners and others now faced with discontinuing recycling services in their localities. I hope this update on our efforts may still be of value to DEQ's planned recycling evaluation for the Virginia General Assembly.

The Southwest Virginia towns and counties below had representatives at two meetings in March and August in response to the closing of Tri-Cities Paper, Inc., a Northeast Tennessee based recycler, which was essentially the sole provider of such services for paper, glass and plastic in this region.

Current market conditions and prospects for services from recyclers outside the region were investigated by the group. It's become clear that in this market, given present resources and budgets, no simple alternative to recover from the loss of Tri-Cities Paper, Inc., is possible. Curbside programs to strengthen recycling rates and related scaling, are seen as too costly to operate in even in the most heavily populated areas in the region.

The group heard that markets will rebound eventually, and discussed at length if working more cohesively might be the best way to build more sustainable (cost-effective) recycling programs over our previous programs. We feel that with Southwest Virginia's demographics (without major cities) research may be needed to understand if/how a collective arrangement might bring some market leverage/advantages into play. Perhaps, the development of a larger regional waste management authority, and associated infrastructure, is a worthwhile goal, but without a proper investigation (done in some degree of detail) such regional involvement is thought to be premature.

We feel DEQ should consider for the Recycling Study whether funding consultative service grants to localities could be used to improve and/or design more robust regional recycling programs in Virginia.

Sincerely,

Carol W. Doss

Carol W. Doss, Executive Director

## Summary Table of Stakeholder Responses to DEQ Survey

| Locality/Association/ Business Name | Data/information regarding recycling including challenges/burdens | Feedback on incentives that may increase recycling and the availability of source materials | Data/information/feedback on single source versus separated recycling | Feedback/proposals on recommendations that should be considered by DEQ as part of this evaluation |
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| **Bedford County** | 1. Difficult to obtain recycling information from businesses. Is there a way for recycling processors to report this data to DEQ or the localities?<br><br>2. Provide marketing tools for localities and businesses (DEQ used to provide years ago) | 1. Obtain more information on plastics recycling plants from NC and use as a model for VA in order to create new markets<br><br>2. Incentives for household recycling at a locality level | 1. County currently provides source separated services<br><br>2. Collecting/baling items from source separated program is more expensive but end product is cleaner - less contamination and less separating | 1. Look into incentives for new recycling processors in VA. Partnership with Economic Development<br><br>2. Mandatory data reporting to localities from recycling processors<br><br>3. Printable posters/media for localities and businesses |
| **Buckingham County** | 1. Recycling is expensive for small localities as a lot of recycled goods have to be sent to bigger cities<br><br>2. Difficult including business recycling numbers into recycling rate reports. | 1. Incentives from General Assembly for businesses in the smaller localities so as to create a closer place to haul recyclables to | | |

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| **Campbell County** | 1. Recycling is expensive to facilitate. County pays a lot of money to haul it to a recycling facility<br><br>2. Difficulty in finding someone to chip their brush due to lack of market and difficulty finding somewhere to take it<br><br>3. Difficulty maintaining staff at collection sites to ensure that containers do not get contaminated with mixing materials<br><br>4. Contamination of material causes high costs to separate or entire load ends up going to the landfill<br><br>5. Limited outlets for sale of recycling material | | | |
| **Charles City County** | 1. Don't have county wide recycling due to being a rural locality<br><br>2. Difficulty having a curbside recycling program due to lack of waste vehicles to collect them. | | | 1. Need to increase recycling locations in the county |

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| **City of Bristol** | 1. Local recycling center went out of business. Closest facility is located in TN. Transportation costs for taking recyclables to that facility are cost prohibitive<br><br>2. Lack of glass recycling facilities<br><br>3. Lack of budget for providing public education and training programs on recycling. Public participation can only be maintained if participation is mandated through ordinance<br><br>4. No curbside recycling due to lack of public participation | | | 1. DEQ assistance is identifying potential recycling partners<br><br>2. Identification of glass recyclers<br><br>3. Provide municipalities with assistance in educating the public on the dos and don'ts of recycling - DEQ training or monetary assistance to localities participating in VEEP. |
| **City of Manassas** | 1. No consistent requirement for businesses to provide recycling data to SWPU. Larger businesses centralize their data and only offer an approximation of the volume of recycling generated locally<br><br>2. Recycling centers for organics, HHW, textiles, and glass are not easily accessible | 1. Linking incentives to product stewardship | | 1. General Assembly to develop clear, consistent and coherent regulations and policies regarding commercial recycling in VA - easier to pass local ordinances to govern commercial recycling and reporting<br><br>2. Landfill bans on recyclable materials<br><br>3. Bottle Bill to reduce litter, increase recycling and provide incentives for businesses and citizens<br><br>4. Work with Economic Development to spread the word that recycling can help reduce solid waste costs<br><br>5. Provide clear, consistent, and unambiguous guidance, information and legislation for recycling and enforcement of non-compliance that covers all of VA |

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| **City of Newport News** | 1. Recycling commodities not clean enough for buyers. Recycling contamination is an ongoing challenge.<br><br>2. Supply exceeds demand for many recyclable commodities<br><br>3. Lack of enforcement for recycling contamination<br><br>4. Recycling processing fees are higher than landfill fees<br><br>5. Inconsistent container materials making describing recyclables to the public extremely difficult | 1. Create a circular economy within Virginia by determining needs and creating the means. Provide incentives to companies that work on the entire process of the chain for a "Circular Economy" within the Commonwealth.<br><br>3. Incentivize new recycling efforts and report as "Innovative Programs/Initiatives<br><br>4. Provide incentives for communities that have audits of residential and or municipal recycling programs in place.<br><br>5. Incentivize glass recyclers to build a processing plant in Virginia.<br><br>5. Incentivize glass collection from bars and restaurants.<br><br>7. Perhaps mandate recycling and allow localities to fine for nonconformance/contamination (including commercial entities too). | 1. Single stream recycling increased participation rates but decreased the quality of some of the commodities<br><br>2. Many MRF operators do not want to collect glass in single stream due to the heaviness, difficulty to sort, and expensive recycling costs | 1. Develop a Five Year Strategic Plan for Recycling in the Commonwealth and publish the plan. Create measurable goals that are attainable and realistic<br><br>2. ALL recycling should be allowable in the Recycling Rate Report (RRR) to accurately portray the State's recycling rate. This should include all recycling from commercial and industrial sources<br><br>3. Require all companies that collect and/or process recyclable materials to report to DEQ and their municipality on one simple form that uses zip codes to identify where the material is coming from<br><br>4. For consistency and continuity, require all communities to report on an annual basis rather than some reporting every 4 years based on population.<br><br>5. Add paint as a recyclable commodity to RRR (include clear definition of paint recycling) |

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| **City of Virginia Beach** | 1. High contamination percentages for curbside recycling and drop off centers<br><br>2. Challenges with educating the residents on contamination<br><br>3. No enforcement of contamination<br><br>4. Consistency between states on what is and is not recyclable | 1. Incentives for localities on educating residents<br><br>2.Provide incentives to encourage producer responsibility | 1. Single source recycling currently in place at the City | 1. Provide pricing trends on commodity markets and provide training on recycling markets to localities<br><br>2. Aiding in legislation that will assist localities in enforcing bans on single use plastics which contributes to contamination<br><br>3. Extending tax credits for businesses who eliminate single use items such as plastics<br><br>4. Acknowledgement, promotion and tracking of waste minimization/zero waste initiatives |
| **County Waste of Virginia** | 1. Contamination in recycling loads<br><br>2. Lack of effective public education and participation<br><br>3. Yard waste and debris are easily recyclable but end up in landfills most of the time. | | 1. Single steam recycling increased recycling participation in the last 10-15 years. Also increased productivity and ease of collecting recyclables.<br><br>2. The major problem with single stream recycling is contamination.<br><br>3. VPPSA has the cleanest single stream recycling material due to its effective public education program | 1. Educate the people on what is truly recyclable and what is not in order to minimize contamination<br><br>2. Ban yard waste and debris from disposal in landfills |

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| **CVWMA** | 1. Assurance of reliable markets for various commodities<br><br>2. High cost of education and combating contamination<br><br>3. Increasing recycling costs on local governments<br><br>4. Overall support/engagement from the State level to increase recycling efforts | 1. Need a recycling champion in the legislature<br><br>2. More engagement and focus on recycling from State<br><br>3. Allow glass or other commodities that receive recycling credit for beneficial use in a landfill without having to apply for a beneficial use permit<br><br>4. Incentives to attract manufacturers to use the supply as feedstock - market and economic development<br><br>5. Cost benefit to recycling needs to be greater than landfilling or incineration | 1. Single stream - easy and convenient for consumers/businesses/residents. Cost of processing are higher, quality of material is reduced, glass is the biggest issue<br><br>2. Source separated - more work for consumers/residents/businesses. Cleaner material, higher value, and difficult to get the public to go back to source separation | 1. Increase emphasis on waste reduction, reuse and recycling before landfilling/incineration<br><br>2. Assist localities both financially by establishing a separate funding source for grants and in-kind assistance in meeting recycling mandates and improving recycling initiative and education<br><br>3. Require recycling processors and businesses to report annual recycling information<br><br>4. Collaborate with surrounding states - VA participation in SERDC for best practices and keeping current on global recycling markets<br><br>5. Empower, support, and collaborate with the Virginia Recycling Association |
| **Gloucester County** | 1. Confusion with what can be recycled and what cannot - leading to contamination<br><br>2. Need for convenience center staff support for recycling<br><br>3. Lack of clear and consistent signage at drop-off centers<br><br>4. Frustration factor that consumers and companies are no longer making the effort to recycling or find it too cost prohibitive | | Waste Management reports higher recycling rates with co-mix. Citizen comments (limited in number) indicate higher satisfaction with separation of recyclables | 1. Efforts to make recycling consistent and convenient across localities in VA<br><br>2. Support efforts of return to basics approach to recycling similar to the priority of HRGreen through the HRPDC for 2019<br><br>3. DEQ to assist in offsetting loss of some recyclables with programs to recover high volume items<br><br>4. Measure success of recycling program by metric other than weight |

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| **Greene County** | 1. Finding vendors to buy product<br><br>2. Cost and equipment to bale product<br><br>3. Having adequate space to store product<br><br>4. Recycling being contaminated or not being recycled correctly | 1. Supplying the county residents with reusable shopping bags<br><br>2. Having a customer appreciation date for residents that recycling<br><br>3. Supplying recycling containers | Single source recycling is more contaminated than source separated recycling | Consider giving vendors who buy these products a tax credit |
| **Henry County** | 1. More education on recycling and the proper way to recycle<br><br>2. Need a more cost effective way of recycling glass | Many localities that have a higher tip rate for businesses that want to recycle and therefore, businesses choose not to. | 1. Source separated is the cleanest and safest way to recycle<br><br>2. Difficult to get people to work at facilities when materials are no co-mingled and a higher turnover rate at single stream facilities | 1. No market for recycled glass. County has looked into the idea of crushing glass and using in asphalt (as many west coast states do) but initial cost of equipment is not in the locality's budget.<br><br>2. DEQ to encourage VDOT and other asphalt companies to utilize crushed glass into their asphalt in order to provide a market for localities to sell their crushed glass |
| **Louisa County** | 1. The market for recyclables is decreasing<br><br>2. Costs to recycling are increasing | 1. Mandated recycling percentages which would allow the collection of materials but would still leave the market place untouched<br><br>2. Tax breaks for companies that use recycled materials<br><br>3.Tax breaks for recycling companies for operational and capital costs<br><br>4. Sales tax elimination for products that use a certain percentage of recycled material | More contamination with single source recycling | 1. Create a market for the end product<br><br>2. Direct incentives to increase the use of recycled materials in product<br><br>3. Creating a larger domestic market place to help create a more stable market, along with local jobs |

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| **Nelson County** | 1. Biggest challenge is not recycling glass products<br><br>2. Operating costs - cost of manpower, cost of vehicle maintenance, vehicle fuel to transport to facility, County to pay for facility to accept glass | | | |
| **Northern Virginia Waste Management Board** | 1. Creating capacity and transportation pressures on regional waste infrastructure<br><br>2. Understanding and collecting data on the processing and reuse of recyclables offers challenges and critical information<br><br>3. Recycled materials have value but need to be sustainability designed, produced, and integrated to ensure minimal waste and maximum opportunities for reuse | | | 1. Reduce contamination and sure system-wide responsibility<br><br>2. Provide better management of both commonly used and difficult to dispose of materials<br><br>3. Reduce costs on residents and engage more businesses in the State<br><br>4. Domestic opportunities and models for sustainable materials recovery to create jobs, reduce costs and increase resiliency |
| **Rivanna Solid Waste Authority** | 1. Better examination at how localities report recycling rate and recycling data<br><br>2. Fight wish-cycling, which destroys the quality of recyclables collected. Need citizens to recycle better so as to avoid contamination<br><br>3. More public education on what is recyclable and what is not.<br><br>4. Transportation costs | | | 1. Ban the most toxic plastics from single-use disposable applications for food and product packaging<br><br>2. Expand container deposit programs in order to assist in processing the clean streams of aluminum, glass and plastics - also, reduces litter |

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| **STEPS, Inc** | 1. Finding markets for the sale of processed recyclable materials<br><br>2. Small physical plant space. No way to build a more efficient processing facility due to narrow profit margins. Funding to upgrade facilities would be critical<br><br>3. Cheaper to landfill than to recycle due to associated costs | | Single stream recycling reduces collection and hauling costs | 1. Incentives/tax breaks to localities to promote recycling initiatives<br><br>2. Encourage public-private partnerships like the one STEPS has with the Town of Farmville and Prince Edward County<br><br>3. Possibly fund recycling facility upgrades<br><br>4. Provide access to grant/low interest loans to entities who are interested in enhancing their current operations<br><br>5. Incentivize end users to purchase products that contain at least 50% recycled materials |
| **TFC Recycling** | The recycling equipment tax credit is capped every year and if the application exceed the amount available, less than 100% of the credit is given. Companies invest in recycling equipment without knowing if all or part of the credit is available | | | 1. Providing the recycling tax credit encourages a much needed investment in new technology and equipment to meet new quality standards set by China and other countries<br><br>2. Increase the amount available for reimbursement in order to create jobs, improve the supply of recycled materials for manufacturing |
| **Town of Abingdon** | 1. Staffing challenges in order to maintain the recycling collection trailers and recycling locations<br><br>2. Lack of availability of collection facilities that can process single stream collection | | Current curbside recycling service is single stream collection. Recycling facility shut down and the other facility only takes source separated materials | |

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| **Town of Farmville** | 1. Operating expenses<br><br>2. Lack of participation from residents<br><br>3. Need more public education for those who do not participate | | | 1. Need to find more and better markets for recyclable materials especially glass<br><br>2. DEQ needs to add incentives for the markets |
| **Town of Scottsville** | 1. Lack of outreach effort to promote subscription to recycling services of private haulers<br><br>2. Regional issues with data collection, capital planning and operational efforts<br><br>3. Lack of recycling by residents overall | DEQ funding support for the costs of convenience centers serving multiple localities | | 1. DEQ programs and grants could help achieve economies of scale and better reach underserved areas<br><br>2. A state incentive program for multijurisdictional recycling centers<br><br>3. Provide small-scale grants. Economic development programs for green business should be scalable for small composting shops as well as large smelting facilities |
| **Town of Wise** | 1. Discontinued curbside recycling programs due to high operational costs<br><br>2. High contamination rates at drop-off centers lead to shut down<br><br>3. Financial resources are insufficient to subsidize a recycling program due to a large percentage of households relying on government assistance<br><br>4. Issues faced by rural communities - Long distance to market, high cost of transportation and low prices of recyclables | | | 1. General Assembly and DEQ must account for the real limitations of rural communities when considering broad standards that are not practical or feasible to implement in rural settings. |

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| **VPPSA** | 1. Lack of markets for certain materials<br><br>2. Increasing costs associated with collection and processing of materials<br><br>3. Lack of additional funding in City/County budgets to account for increasing costs<br><br>4. Businesses not sharing recycling information either due to proprietary reasons or lack of record keeping | 1. Low landfill tipping fees are making recycling programs easily eliminated by communities if the cost of landfilling is less or same as recycling<br><br>2. Bottle bill to get glass out of the single stream mix. Create a financial incentive for the public to turn in their bottles for a rebate - increase recycling and availability of good glass source materials | 1. Single source/single stream recycling encourages public to recycling because it is easy and convenient. Downside is the low quality of recoverable materials and high contamination.<br><br>2. Source separated/multi-stream recycling is harder for the public as it required more effort. However, better quality of material recovered and materials are more marketable. | 1. A state-wide education initiative on bringing citizens up to date on current recycling practices<br><br>2. A stronger program or incentive to encourage business recycling |
| **Virginia Manufacturing Association** | 1. Glass factories are importing quality glass cullet from out-of-state because there is no local beneficiation facility<br><br>2. Landfills are recycling glass cullet for landfill cover which competes against recycling glass for beneficial use in glass factories<br><br>3. Recycling Centers and Beneficiation Facilities have difficulty investing in technology due to their operational costs, tax liabilities and regulatory structure<br><br>4. Virginia's litter laws have not been changed in over two decades – there is a link between littering, public perceptions and recycling<br><br>5. Recycling services are not available to all citizens. It is | | Single-stream recycling often contaminates recyclable materials, thus, generating more landfill material<br>and less quality recyclable materials for beneficial use. | 1. Regulatory change to reflect "chemical recycling" and "waste to plastics" as beneficial use<br><br>2. Specific set of beneficiation goals established that further refine the recycling goals of each solid waste planning unit<br><br>3. Regualtory change to reflect thatthat using glass cullet for landfill cover does not qualify as recycling.<br><br>4. Statutory change to promote "chemical recycling"<br><br>5. Reduce reduce all tax and fee liabilities for Recycling Centers, |

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| | unknown how many Virginians do not have convenient access to recycling drop-off sites.<br><br>6. Plastic bags and plastic film recycling are essentially non-existent except for select retailers and manufacturers that collaborate on bag collection sites at retail stores.<br><br>7. Composting of recyclable materials and polystyrene recycling are underdeveloped market opportunities. | | | MRFs, and Beneficiation Centers<br><br>6. Incentivize a substantial increase in recycling sites at retail and government sites.<br><br>7. Public policy should reflect that landfilling recyclable materials is not environmentally sustainable and, further, recycling for beneficial use may not be "free" for the consumer until there is better balance in the supply-demand drivers in the economy. |
| **Virginia Recycling Association (VRA)** | 1. High transportation costs and lack of processing infrastructure<br><br>2. Hard to recycling difficult/complex materials<br><br>3. High amounts of contamination in the recycling stream | MRFS and other recycling facilities are not required to report types or amounts of material they collect, process, recycle and landfill. Difficult to gauge the state of the recycling in VA or what infrastructure investments need to be made to increase recycling costs | | VA needs to develop a database cataloguing manufacturers who use recycled material in their manufacturing process, the location of these manufacturers, and what types and amounts of recycled feedstock they utilize. Then, targeted and strategic policy initiatives can be implemented |

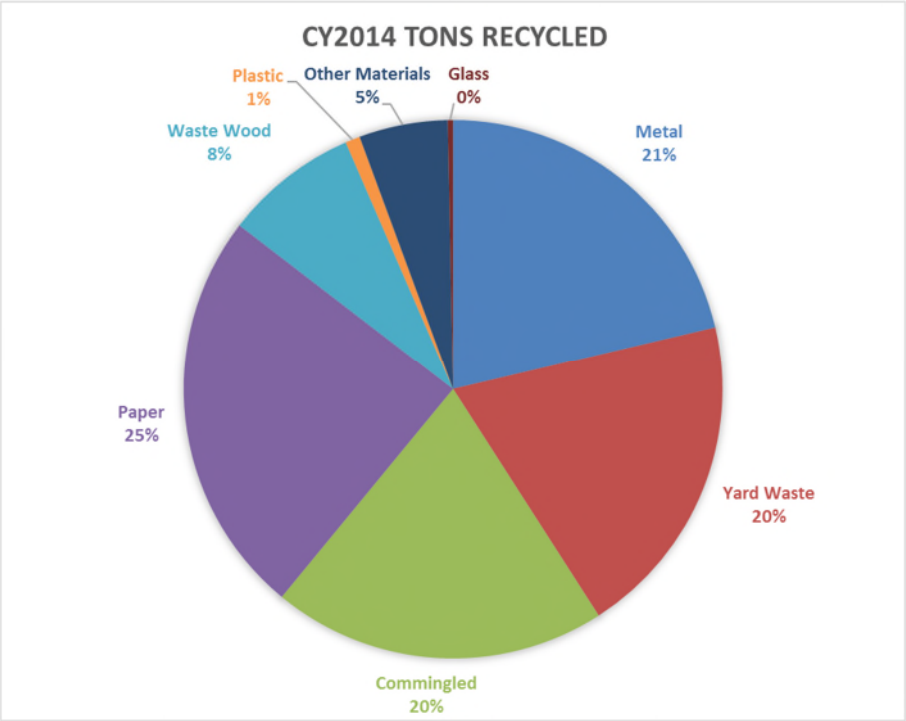


Chart 3: Principal recyclable materials recycled in CY2014 in tons

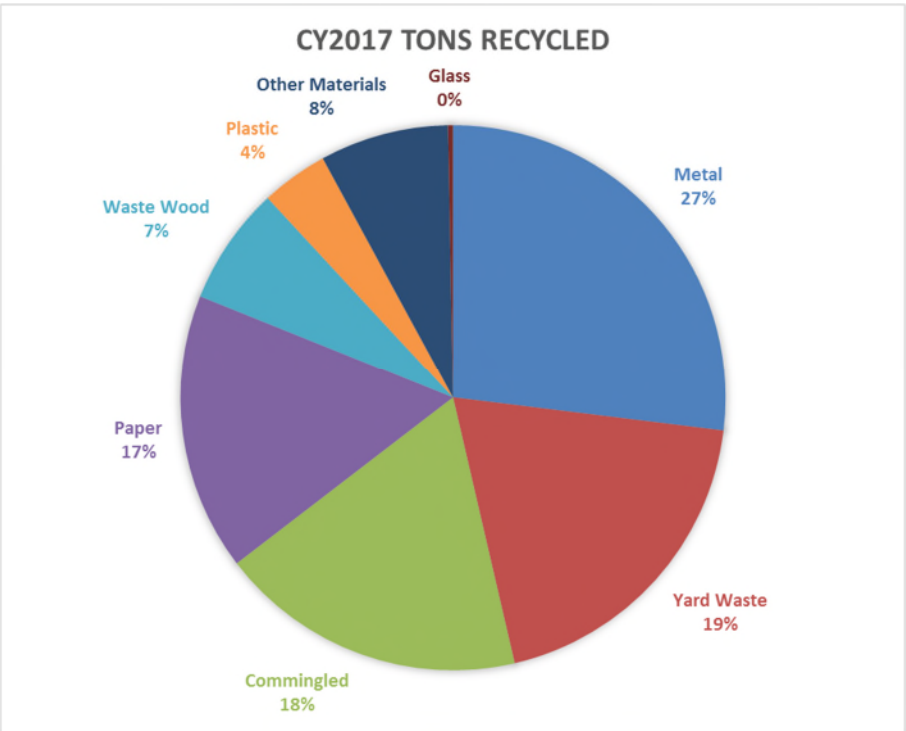


Chart 4: Principal recyclable materials recycled in CY2017 in tons

## CY2018 Recycling Rates for Solid Waste Planning Units Reporting Annually

| REPORTING ENTITY (17 Solid Waste Planning Units required to report annually) | 2018 Recycling Rate | 2018 Total Recycled Tons (PRMs + Credits) | 2018 Total MSW Generation Tons (PRMs + Credits + MSW disposed) |
|---|---|---|---|
| Alexandria (City) SWPU | 47.9% | 86,680 | 166,709 |
| Arlington County SWPU | 50.2% | 105,836 | 207,854 |
| Augusta-Staunton-Waynesboro SWPU | 34.0% | 54,151 | 153,403 |
| Central Virginia Waste Management Authority SWPU (Counties of Charles City, Chesterfield, Goochland, Hanover, Henrico, New Kent, Powhatan and Prince George; Cities of Richmond, Hopewell, Colonial Heights and Petersburg) | 58.7% | 651,132 | 1,105,494 |
| Fairfax County SWPU | 49.5% | 583,887 | 1,199,781 |
| Loudoun County SWPU | 34.1% | 184,648 | 457,222 |
| Montgomery Regional Solid Waste Authority SWPU (Montgomery County, Towns of Blacksburg and Christiansburg) | 33.5% | 31,469 | 92,552 |
| Mount Rogers PDC SWPU (Counties of Bland, Smyth, Washington and Wythe) | 19.6% | 15,139 | 77,082 |
| Newport News (City) SWPU | 57.0% | 271,116 | 386,625 |
| Northern Shenandoah Valley Regional Commission SWPU (Counties of Clarke, Frederick, Shenandoah, Warren and Page; City of Winchester) | 49.4% | 159,962 | 323,970 |
| Prince William County SWPU | 35.3% | 239,506 | 577,694 |
| Rappahannock Regional Solid Waste Management Board SWPU (Stafford County and City of Fredericksburg) | 39.2% | 86,848 | 216,110 |
| Region 2000 (Counties of Nelson, Appomattox and Campbell; City of Lynchburg) | 38.0% | 121,124 | 318,795 |
| Southeastern Public Service Authority SWPU (Counties of Isle of Wight and Southampton; Cities of Chesapeake, Franklin, Norfolk, Portsmouth, Suffolk and Virginia Beach) | 49.9% | 703,987 | 1,322,297 |
| Spotsylvania County SWPU | 33.2% | 68,773 | 191,099 |
| Thomas Jefferson PDC SWPU (Counties of Albemarle, Fluvanna and Greene; City of Charlottesville) | 36.6% | 127,966 | 248,619 |
| Virginia Peninsulas Public Service Authority SWPU (Counties of Essex, James City, King and Queen, Mathews, Middlesex and York; Cities of Hampton, Poquoson and Williamsburg) | 29.3% | 123,181 | 390,743 |
| **State Totals** | **46.1%** | **3,615,404** | **7,436,048** |