

2015

# VBCPS Emission Reduction Plan



Sustainable Schools Committee  
Virginia Beach City Public Schools  
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# Emission Reduction Plan – (4.24.2014)

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In March 2011, Virginia Beach City Public Schools (VBCPS) published its first Greenhouse Gas Inventory. In an effort to understand and reveal the magnitude of various emission sources within the operational control of VBCPS, this inventory catalogued emissions from calendar years 2006-2010, and the Sustainable Schools Committee analyzed it from a variety of perspectives. This Emissions Reduction Plan is the next step in the effort to reduce the Division's emissions to zero.

When the Virginia Beach City Public Schools' Greenhouse Gas Inventory is looked at in the context of building related emissions, transportation related emissions, and all other emissions, it is quickly evident that the Division's building portfolio is the largest contributor to greenhouse gas emissions. In fact, in 2010, although building related energy consumption had been on the decline for at least 5 years, building-related emissions (stationary combustion, purchased electricity, and transmission/distribution losses) still comprised 65% of the Division's total emissions. For that reason, an aggressive plan to continue and accelerate the downward trend in building-related energy use is a necessary component of this emissions reduction plan. The "Operations and Infrastructure" section of this plan will address building-related energy concerns.

The Division's second largest contributor to greenhouse gas emissions is transportation (direct transportation emissions by fleet vehicles, as well as indirect transportation emissions in the form of faculty/staff and student commuting). Although more difficult to control, faculty/staff and student commuting activities release more than twice the amount of emissions that VBCPS fleet vehicles emit. Accordingly, while VBCPS will have to address internal fleet concerns, additional ingenuity will be in order to address the commuting habits of all those who do not ride the bus to school.

The remaining sources of greenhouse gas emissions (refrigerants/chemicals, solid waste, and wastewater) amount to less than 1% of the Division's overall emissions inventory. To the extent that "low-hanging fruit" is easily within reach, these items will also be addressed. However, the vast majority of emphasis will necessarily be placed on building and transportation related efforts.

Finally, this emissions reduction plan identifies education and outreach initiatives that are aimed at changing behaviors in ways that will ultimately impact overall emissions reduction numbers. Although these numbers can be difficult to quantify, education and outreach still play an important role in this emission reduction plan.

It is intended that these 22 initiatives reduce the Division's greenhouse gas emissions by 70% by 2030 from a 2006 baseline. The Division's greenhouse gas inventory is intended to be updated every other year, in order to provide a solid feedback loop on progress and to allow the Sustainable Schools Committee to adjust course, as necessary.

## Operations and Infrastructure

### **New Construction and Major Renovations**

As the existing inventory of buildings continues to age, new construction and major renovations will continue to play an important role in the Division's building portfolio. In order to reach a zero-emissions status in the future, these projects will have to be designed with very aggressive energy efficiency goals in mind, and with the ability to add renewable energy in the future. The inclusion of renewable energy technologies (photovoltaics, solar thermal hot water, wind power, fuel cells, etc.) will be analyzed on a project-by-project basis and will be included in the design process when technologically and financially feasible.

- 1. Implement a policy that all new facilities shall either: be designed to consume 50% less energy than the then-current Virginia Uniform Statewide Building Code would allow, with a plan for future conversion of that facility to net-zero energy; OR earn the "Designed to Earn the Energy Star" designation during the design process, including being designed with a Target Finder score of 90 or above, with a plan for future conversion of that facility to net-zero energy.**

Design teams should be encouraged to be creative in energy conservation strategies, after including obvious improvements in the design of the thermal envelope, optimizing the use of natural daylighting, and specifying efficient lighting and mechanical equipment. One tool that design teams should use during design is the K-12 Advanced Energy Design Guide (50%) for K12 School Buildings; teams should be aggressive in implementing those strategies that are applicable, feasible and make economic sense for the project. There may be other tools and approaches teams may also want to introduce into a project; each should be considered by the VBCPS Project Manager for applicability.

***At the end of the design process, the design team should be required to: summarize the energy conservation strategies included in the design; document the required steps for that building to get to net-zero energy consumption; and produce an energy model, verified by a Professional Engineer, showing predicted energy savings and a copy of the EPA's Designed to Earn the Energy Star designation.***

VBCPS oversight provided by: Office of Facilities Planning & Construction

Target date for full implementation: 2015

Implementation timeline: currently being implemented

- 2. Implement a practice to include strategies and features intended to minimize energy consumption by the occupants of the building in the building design.**

Design teams should be encouraged to be thoughtful about the messages that building design sends to building occupants about how the building should be utilized. For example, if a room has a bank of unlabeled light switches at the entrance, it would stand to reason that they are there because they should all be turned on. However, if the switches are either labeled for their intended use or if they are spread throughout the room, then the person encountering those lights will likely be more thoughtful about which ones should be turned on. A beneficial result of the single design decision about light switches can have a long term and profound impact on the energy consumption of that building over time.

Educational outreach strategies, such as a building energy dashboard or a comprehensive signage package, should also be developed during the design process. Feedback about how a building is performing, and why it is performing that way, should lead to behavior modification resulting in lowered energy bills.

***At the end of the design process, design teams should be required to summarize the design strategies intended to influence occupant behavior, especially as related to energy and water conservation.***

VBCPS oversight provided by: Office of Facilities Planning & Construction

Target date for full implementation: 2015

Implementation timeline: currently being implemented

**3. Install sub-metering technology in order to make real-time water and energy consumption, as well as emissions data, available online within the next ten years.**

Sometimes just being aware of new information is all it takes to change behavior. To that end, the installation of sub-metering equipment in all schools could have a big influence in the energy performance of each school. One benefit would be to the facility manager, in that the facility manager could develop a better understanding of when and how energy is used in the school and identify scheduling or equipment inefficiencies that might have been otherwise missed. In addition, if the faculty, staff, and students were also aware of energy consumption patterns, they would be better prepared to modify their own behaviors in an attempt to drive consumption numbers down. Sharing this information in an online format might start a ripple effect throughout nearby school communities, who might want to compare their own energy consumption patterns to those at VBCPS facilities.

***At the end of the design process, the design team shall provide the owner with a list of sub-metering points.***

VBCPS oversight provided by: Office of Facilities Planning and Construction

Target date for full implementation: 2014

Implementation timeline: begin with projects entering design phase in 2014

**Operation of Existing Buildings**

Virginia Beach City Public Schools currently maintains and operates 86 schools, in addition to 5 administrative support facilities, with a total of over 10.6 million square feet of building space. While features like building massing and orientation are already set for these buildings, there are things that can be done to continue to improve the energy performance of these existing buildings:

**4. When planning building modifications and other minor renovations involving building elements that affect energy consumption, include strategies listed in the K-12 Advanced Energy Retrofit Guide (AERG).**

At the beginning of any retrofit project where the potential for energy savings can be realized, the design team should be required to quantify the building's existing energy performance and estimate what percentage of energy savings could be realized through the project. Teams should be

aggressive in implementing those strategies from the K12 AERG that are applicable, feasible and make economic sense for the project. There may be other tools and approaches teams may also want to introduce into a project; each should be considered by the VBCPS Project Manager for applicability.

***At 6, 12 and 24 months after the completion of the project, energy performance should be recorded and compared against pre-renovation numbers to document improvement in energy performance.***

VBCPS oversight provided by: Office of School Plant Services and Office of Facilities Planning & Construction.

Target date for full implementation: 2015

Implementation timeline: currently being implemented in performance contracts, need to expand implementation to all projects

**5. Identify, design and execute energy-efficiency projects for existing facilities and systems, to achieve a 50 percent Division-wide reduction below 2006 levels over the next 10 years.**

Virginia Beach City Public Schools should remain ever vigilant about the potential for energy efficiency improvements in all buildings, and should keep a running list of both completed and upcoming efficiency improvement projects.

Energy efficiency projects may include undertakings such as interior and exterior lighting upgrades, mechanical equipment replacements, energy management system installation and upgrades, addition of energy recovery equipment, or retro-commissioning.

***Virginia Beach City Public Schools should record a building's pre-project and post-project energy consumption in order to document each project's overall role in the Division's emissions reduction accomplishments.***

VBCPS oversight provided by: Office of School Plant Services

Target date for full implementation: 2025

Implementation timeline: 5% per year for next 10 years, for a total Division-wide reduction of 50%

**6. Develop a web based Building Maintenance Plan (BMP) for each facility.**

Preventive maintenance is key to any successful emissions reduction plan. A web based Building Maintenance Plan (BMP) will allow school plant personnel to monitor, and replace, equipment before significant reductions in energy efficiency occur. Web based data allows personnel to identify, develop, and monitor a holistic plan for maintenance and replacement.

***For current and future building projects, elements of the Building Maintenance Plan should be included in the project's scope of work and submitted along with all new construction and major renovation projects. Applicable areas of the Building Maintenance Plan shall be provided to the contractor, by the design team, for inclusion in contractor provided owner training.***

VBCPS oversight provided by: Office of School Plant Services and Office of Facilities Planning & Construction

Target date for full implementation: 2030  
Implementation timeline: ~2 months per building

**7. Develop a retro-commissioning training program for maintenance personnel.**

According to the Department of Energy, “retro-commissioning is the application of the commissioning process to existing buildings. Retro-commissioning is a process that seeks to improve how building equipment and systems function together. Depending on the age of the building, retro-commissioning can often resolve problems that occurred during design or construction, or address problems that have developed throughout the building's life. In all, retro-commissioning improves a building's operations and maintenance (O&M) procedures to enhance overall building performance.”

***School Plant will develop the capability to have a retro-commissioning team, to be trained and active by 2015. Once the team is established and trained, the goal will be to retro-commission each building in the Division's portfolio at least once by 2030. The findings of the retro-commissioning activities will aid in the identification of future energy efficiency projects.***

VBCPS oversight provided by: Office of School Plant Services  
Target date for full implementation: 2030  
Implementation timeline: ~2 months per building

**8. Install sub-metering technology in order to make real-time water and energy consumption, as well as emissions data, available online within the next ten years on all buildings.**

Sometimes just being aware of new information is all it takes to change behavior. To that end, the installation of sub-metering equipment in all schools could have a big influence in the energy performance of each school. One benefit would be to the facility manager, who could develop a better understanding of when and how energy is used in the school and can identify scheduling or equipment inefficiencies that might have been otherwise missed. In addition, if the faculty, staff, and students were also aware of energy consumption patterns, they would be better prepared to modify their own behaviors in an attempt to drive consumption numbers down. Sharing this information in an online format might even start a ripple effect throughout nearby school communities, who might want to compare their own energy consumption patterns to those at VBCPS facilities!

***School Plant shall coordinate sub-metering with corresponding controls vendor at each school.***

VBCPS oversight provided by: Office of School Plant Services  
Target date for full implementation: 2023  
Implementation timeline: inventory metering capabilities in 2014, develop plan for metering upgrades in 2015, deploy new meters from 2016-2023

**9. Obtain a Division-wide average Energy Star score of 80 or higher**

A variety of factors affects the Energy Star scores of the 81 individual schools and four specialty centers within VBCPS. The current Division-wide Energy Star average score is 62, encompassing a range of 8 (worst) to 94 (best). The current Division-wide median Energy Star score is 69.



By identifying the buildings with the largest room for improvement, and then setting very specific performance targets for those buildings, the potential for raising the Division-wide Energy Star score, and for saving on operating expenses, is the greatest.

***School Plant shall establish specific performance targets for low performing schools.***

VBCPS oversight provided by: Office of School Plant Services

Target date for full implementation: 2030

Implementation timeline: inventory buildings on an annual basis; priorities will be set annually as a result of the then-current inventory.

### **Purchasing**

Concurrent with the development of this Emissions Reduction Plan, the Sustainable Schools Committee created and launched a Division-wide Sustainable Procurement Guide. This guide is a set of general best practices, intended to gently integrate life-cycle thinking into procurement decisions across the Division. While addressing energy efficiency considerations in the procurement process, it also addresses many sustainability-related topics that are outside the realm of this emissions reduction plan.

***The Office of Purchasing Services shall provide access to the Sustainable Procurement Guide for all schools and departments.***

VBCPS oversight provided by: Office of Purchasing Services

Target date for full implementation: 2015

Implementation timeline: guideline is in place

## **Transportation**

### **Grounds and Fleet**

Virginia Beach City Public Schools currently has 735 active school buses and 314 vehicles in its fleet. The VBCPS bus fleet is comprised of buses with model years from 1996 through 2013 (note that although the replacement cycle for buses is 15 years, VBCPS does have buses in service that are at 17 years old). The VBCPS vehicle fleet is comprised of vehicles with model years from 1989 through 2011 (note that fleet vehicles are assessed on age, condition, mileage and cost of needed repairs before determining whether replacement is appropriate). While VBCPS does not have direct control over the commuting decisions of faculty, staff, and students who drive (or are driven) to school, the district can control the emissions profile of its own fleet. To that end, the following actions should be taken:

#### **10. Shift to less greenhouse-gas-intensive vehicles for all fleet vehicles (including buses) through use of updates to the vehicle procurement policy.**

The shift to a carbon neutral vehicle fleet will take multiple steps, starting with policy updates clearly articulating the emissions limits for new additions to the fleet. These limits should be aggressive, while being based on whatever technologies are available at the time of purchase.

***The Office of Transportation Services shall identify emission limits for all new purchases.***



VBCPS oversight provided by: Office of Transportation Services

Target date for full implementation: TBD

Implementation timeline: policy updates by 2014, less greenhouse-gas-intensive fleet purchases are currently being implemented

**11. Create a Return-On-Investment (ROI) analysis that compares existing fuel consumption levels with comparable replacement fuel efficient vehicles and buses.**

*Utilize the Department of Energy website [www.fueleconomy.gov](http://www.fueleconomy.gov) to develop comparative analysis between various makes and models.*

VBCPS oversight provided by: Office of Transportation Services

Target date for full implementation: 2015

Implementation timeline: establish parameters of analysis in 2014

**12. Shift to less greenhouse-gas-intensive fleet vehicles and achieve an average of 50% reduction in fuel consumption for the entire vehicle fleet below 2006 levels by 2030.**

There are a number of ways to address the fuel consumption of fleet vehicles, each of which can contribute to the overall reduction in greenhouse gas emissions from VBCPS operations.

First, an analysis of the trips of current fleet vehicles should be conducted to determine cause and destination of fleet vehicle trips. This analysis should also include vehicle type, to identify whether an appropriate vehicle is being used for each trip.

Once a complete understanding of the travel patterns of fleet vehicles is established, then a plan for matching vehicle type to travel need can be created (with an associated policy regarding what circumstances would necessitate the use of a larger, less fuel efficient vehicle).

If the travel pattern analysis reveals that VBCPS would be well served by modifying the makeup of fleet vehicles to include a greater number of “low-emitting and fuel-efficient” (LE/FE) vehicles, then recommendations can be made and implemented accordingly.

It will be important to keep in mind that LE/FE vehicles may include compact internal combustion engine cars, some hybrid vehicles, electric vehicles (which would require the installation of electric car charging stations), or vehicles that run on biofuels (which may require the installation of associated refueling stations). Identification of LE/FE vehicles is done via [www.greencars.org](http://www.greencars.org).

***The Office of Transportation Services shall conduct an analysis of fleet vehicle use vs. type and document recommendations accordingly.***

VBCPS oversight provided by: Office of Transportation Services

Target date for full implementation: 2030

Implementation timeline: currently being implemented

**13. Shift to less greenhouse-gas-intensive bus fleet and achieve a 30% reduction in fuel consumption for buses below 2006 levels by 2030.**

Continue the no idle policy which has been in effect since 2008.

As a next step in the effort to reduce the school bus fleet's contributions to VBCPS's carbon footprint, a shift to less greenhouse-gas intensive buses will be necessary. According to the EPA (<http://epa.gov/cleandiesel/sector-programs/replacement.htm>):

*More than half of today's school buses have been in service for over a decade. These older buses lack today's pollution control and safety features, and emit nearly twice as much pollution per mile as a semi-truck. School buses built to meet EPA's 2010 standards emit 95 percent less pollution than pre-2007 vehicles and are 60 times cleaner than pre-1991 buses!*

Any bus manufactured prior to 1998 should be considered as a high priority for replacement. If these buses cannot be replaced, they should be scheduled for shorter bus runs and emergency backup only.

Buses manufactured between 1998-2003, buses manufactured between 2004-2006, and buses manufactured between 2007-2010 should also be considered for replacement (prioritized in those manufacture-year groupings). If these buses cannot be replaced, retrofitting them with emission control technologies or replacing their engines with newer diesel or alternative-fuel engines should be considered. The use of biodiesel or compressed natural gas (CNG) fuels should also be evaluated.

A list of grant opportunities for the replacement of older, polluting school buses can be found at: <http://epa.gov/cleandiesel/grantfund.htm>.

***The Office of Transportation Services shall conduct an age audit of the bus fleet, and then create a priority list of buses that should be replaced. This audit should include the following information, at a minimum:***

- Age of bus (or year manufactured)***
- Bus manufacturer***
- Engine model***
- General description of bus condition***

VBCPS oversight provided by: Office of Transportation Services

Target date for full implementation: 2030

Implementation timeline: fleet audit by 2014, next steps determined based on findings of audit

**Commuting**

**14. Create incentives for alternate transportation options for students and staff.**

Although faculty/staff and student commuting is a scope 3 emission source (meaning that these are emissions that are related to VBCPS operations, but for which VBCPS does not have financial or operational control), it is important to understand the role that VBCPS plays in the creation of these emissions and to attempt to influence commuting behavior in a way so as to reduce these emissions.

The first step in creating these incentives is truly understanding what the faculty/staff and student commuting patterns are, and understanding why current patterns exist. The values in the March 2011 Greenhouse Gas Inventory are informed estimates, but a GIS study coupled with a commuter survey (capturing data such as vehicle year/make/model, number of occupants in vehicle, and reason for choosing automobile commute) would provide additional insights into the actual emissions that come from commuting.

Strategies that may be considered to reduce student commutes in automobiles include updating the school bus fleet to be more appealing to students, and restriping student parking lots to reduce the number parking spaces available to students. In lieu of restriping, some schools may also consider converting select parking areas to green space (in the form of sports fields or outdoor classrooms). Of course, the emissions benefits of this option would have to be carefully balanced with parking needs for athletics and other special events.

Additional strategies for consideration and implementation at appropriate locations could include the development of a telecommuting policy, the addition of preferred parking for low-emitting and fuel efficient (LE/FE) vehicles, preferred parking for faculty/staff carpools (and preferred lanes for parent dropoff of multiple students), carpool connection boards for faculty and staff, and financial incentives for faculty and staff who commute via public transportation. Due to student safety concerns, VBCPS does not promote carpooling with student drivers.

***The Sustainable Schools Committee shall develop a Division-wide commuter survey.***

VBCPS oversight provided by: Sustainable Schools Committee

Target date for full implementation: 2015

Implementation timeline: develop suggested strategies in 2014

**15. Create an analysis of existing schools using the National Center for Safe Routes to Schools “Safe Routes Toolbox”.**

According to the National Center for Safe Routes to School,

*In July 2005, Congress passed federal legislation that established a National Safe Routes to School program to improve safety on walking and bicycling routes to school and to encourage children and families to travel between home and school using these modes... The federal SRTS program is federally funded, but managed and administered by each state Department of Transportation. It is each state’s responsibility to appoint a full-time SRTS coordinator, develop a state SRTS program, and disperse funds to local programs in accordance with state and federal policies and laws.*

The Virginia Safe Routes to School website can be found at

[http://www.vdot.virginia.gov/programs/ted\\_Rt2\\_school\\_pro.asp](http://www.vdot.virginia.gov/programs/ted_Rt2_school_pro.asp)

The Virginia Safe Routes to School Program Coordinator could be a good resource for VBCPS as the school division analyzes the Division’s current building portfolio

In addition, pedestrian and bicycle access should be added to the evaluation criteria for new school sites within the school division.

***The Office of Safety and Loss Control shall develop a “Safe Routes to School” analysis of all schools sites. The Sustainable Schools Committee will work on strategies to implement the educational component of a full Safe Routes to School program.***

VBCPS oversight provided by: Office of Safety and Loss Control and Office of Facilities Planning & Construction; education addressed by Sustainable Schools Committee  
Target date for full implementation: all schools to be analyzed by 2020  
Implementation timeline: analyses to begin in 2014

## Consumption and Waste Disposal

### Consumption

#### **16. Develop a more sustainable food system to increase local food procurement by 30% by 2030 when compared to 2009 levels.**

During the 2009-2010 school year, VBCPS Office of Food Services began mapping the point of harvest for all produce purchased within 400 miles. VBCPS cafeterias developed a poster to illustrate where the food served in the cafeteria originated. This program could be expanded to track the dollars spent on “local” (harvested within 400 miles) food, as compared to non-local food with the intent of showing a strong shift in favor of local food each year. This is the sort of data tracking activity that could be incorporated into academic pursuits by students.

***The Office Of Food Services shall develop a spreadsheet identifying cost associated with local vs. non-local food purchases.***

VBCPS oversight provided by: Office of Food Services  
Target date for full implementation: 2030  
Implementation timeline: already being implemented

#### **17. Evaluate administrative processes (including staff meetings and cafeteria usage) to eliminate unnecessary waste (e.g., disposable water bottles and Styrofoam cups) and increase reuse where possible (e.g.: silverware, trays, and composting).**

Solid waste is considered a scope 3 emission because a portion of landfill emissions are related to VBCPS operations, but VBCPS does not have financial or operational control over how the landfill handles solid waste. However, VBCPS does have control over how much solid waste the Division sends to the landfill. Food service is one area where looking at how much food is prepared, how food is served, and what sorts of options for disposal are given to cafeteria patrons can all make a big difference.

A waste audit should be carried out at each school within the Division in order to determine how much food waste leaves each school building, and what the nature of that waste is (examples include: food past expiration date in storage; food prepared but not served; food purchased but not eaten; food brought from home but not eaten; packaging materials that could be recycled; packaging materials that must be landfilled; beverage containers brought by faculty/staff; packaging for catered meetings). Each of these waste streams can be addressed, albeit in different ways.

It would be informative for students to be made aware of the amount of waste that leaves the cafeteria on the average school day or over the average school week, and then solicit feedback from those students about how they can take ownership of reducing that waste.

Once the nature of the waste stream is established, as well as the magnitude of the waste stream, a customized waste reduction plan for each school can be created with realistic targets at each school. The plan will also need to include a measurement and verification component, so that it is clear over time whether waste volumes are increasing or decreasing. Standardizing the metrics across the school division will help in comparing schools, and in learning which strategies seem to be effective and which do not.

***The Sustainable Schools Committee shall develop a waste audit form and guidelines.***

VBCPS oversight provided by: Sustainable Schools Committee

Target date for full implementation: 2020

Implementation timeline: school audits begin in 2014

#### **18. Continue to replace paper documents with electronic wherever possible.**

Although paper usage data was not reported in the March 2011 Greenhouse Gas Inventory (because pounds of paper with various recycled contents is not tracked within the VBCPS accounting systems), paper consumption in any school division is a potential target for reduction. These reductions can be targeted at both administrative and central office areas, within the classroom, and at communications between the schools and parents (school flyers, PTA flyers, other).

Within the arena of office paper use (both in administrative areas at each school, and also at the central office), current policies regarding paper use will need to be reviewed and updated with an emphasis on the appropriate use of electronic forms of communication. Because all paper use isn't currently tracked, an audit of administrative paper consumption should also be conducted to provide a baseline against which to compare future improvements. A feedback loop should be provided to let administrative staff know whether paper reduction efforts are effective, or if other strategies should be implemented. Visual (signs and notes) and verbal (at meetings, for example) reminders may help some individuals break old habits related to reliance on paper.

Within the arena of classroom paper use, a shift towards electronic media should be considered, and periodic audits of classroom recycling rates should happen at each school.

And within the arena of school communication to parents, a definitive shift towards phone messaging, email, web pages, and social media for updates can also help reduce the amount of paper sent home with students.

***The Sustainable School Committee will develop strategies for paper use reduction.***

VBCPS oversight provided by: Sustainable Schools Committee

Target date for full implementation: ongoing

Implementation timeline: policy developed by 2015, paper consumption tracking defined and implemented by 2015

## **19. Develop food waste composting programs.**

Cafeteria waste is a significant portion of a school's waste stream, one which students can directly influence with their own actions, and one which can be incorporated into the curriculum in a variety of ways.

Waste that is not generated in the first place does not need to be disposed of, and does not generate emissions. By reducing food waste, in accordance with objective 17, VBCPS is already making an important contribution to carbon emission reductions. Of the remaining waste stream that is generated at each school, separating out organic wastes (both in the form of food waste and potentially in the form of paper waste) and composting them, either on site or in a centralized location, can further reduce the school division's carbon footprint and save money for the Division because fertilizer purchases could be reduced.

This program could run either independently from the existing grounds-keeping composting program for lawn and landscape debris, or perhaps could add to that already established program.

Keeping track of waste stream volumes feeding the composting program, as well as the volume of finished compost, will be a beneficial metric over time.

***Currently there is no avenue for food waste compost collection in Virginia Beach. The Office of Food Services shall continue to monitor the feasibility of a food waste composting program based on cost and availability. Landscape Management Division will continue mulching landscape waste for re-use.***

VBCPS oversight provided by: Landscape Management Division for grounds waste, Office of Food Services for cafeteria waste

Target date for full implementation: TBD

Implementation timeline: TBD

## **Waste Disposal**

The decomposition of waste materials in landfills results in the emissions of both carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>). Perhaps the most effective way to reduce landfill-generated carbon emissions is to reduce the amount of waste being sent to the landfill in the first place. Solid waste is not a major contributor to VBCPS's carbon footprint, but addressing solid waste allows many "teachable moments" within the school district and can instill in students lessons about "throwing away" that they will bring with them into their adult lives.

For these objectives to be met, it will be imperative that there is a recycle bin in every classroom and that custodial and school staff training completed on an annual basis. It will also be imperative that VBCPS develops a method to measure and report the amount of each waste stream (recycling, landfill, compost, other) generated at each school site.

## **20. Increase the diversion rate of recyclables from the waste stream by 50% compared to a 2014 baseline by 2030.**

Data for the amount of recyclables leaving each school has been collected since September 2008, but the amount of landfill-bound waste streams has not historically been recorded. In order to get a better understanding of the waste stream at all VBCPS facilities, landfill-bound waste will need to be tracked. This can currently be done via the scales installed on each trash truck, but VBCPS will need to identify a responsible party to collect this data from the contracted hauling company and to report it to the larger VBCPS community. Armed with a complete data set, individual schools can set their paths towards additional waste reductions and increased recycling rates of the remaining waste.

***The Sustainable Schools Committee shall coordinate a method of tracking trash collection with the City of Virginia Beach waste management staff.***

VBCPS oversight provided by: Sustainable Schools Committee

Target date for full implementation: 2030

Implementation timeline: recycling data is already being collected; implement data collection for trash in 2014

## School Grounds

### **21. Increase meadow-management program at school sites by 10% overall compared to 2006 levels over the next 10 years.**

In an effort to sequester carbon while also providing enhanced levels of rainwater management, protecting wildlife, increasing biodiversity, and reducing both labor and emissions associated with landscape maintenance, Virginia Beach City Public Schools will continue to increase meadow zones in appropriate areas on school grounds.

On an annual basis, existing meadow areas will be evaluated for biological health and diversity, and additional potential meadow zones will be identified. An inventory of meadow location and size will be kept by Landscape Management Division.

When meadow maintenance requires mowing, the meadow will be mowed to no lower than six inches. Preferred mow time is February or March, in order to minimize disturbance to fauna living and reproducing in these meadows. Students may enhance meadows with wildflower seeding activities, when approved by Landscape Management Division.

***Landscape Management Division shall develop an inventory of existing meadow size and location on all VBCPS sites.***

VBCPS oversight provided by: Landscape Management Division

Target date for full implementation: 2030

Implementation timeline: ongoing

### **22. Increase tree canopy at school sites by 13%, compared to the 2008 LiDAR Tree Canopy Study, over the next 20 years**



In 2008, the City of Virginia Beach participated in a study of the urban tree canopy area within the city's limits. This study found that tree canopy covers approximately 36% of the City, while a healthy target for urban tree canopy is 40-50%. Subsequent to the study, in November 2013, the City of Virginia Beach published an Urban Forest Management Plan (which is a component of the City of Virginia Beach Comprehensive Plan) that set a target of 45% tree canopy cover within 20 years (by 2033). Within the Urban Forest Management Plan, management areas were further defined by land use type (transportation corridors, public facilities and parks, and schools).

The schools management area encompasses 1,774 acres of land, only 210 of which contain tree canopy. This coverage rate equates to a current tree canopy of only 12%. The Urban Forest Management Plan sets a target for schools of 25% tree canopy by 2033, which is a 13% increase over the next 20 years. The Urban Forest Management Plan states:

*The Virginia Beach school system has implemented green building technologies into all new buildings. The expansion of that practice out into the landscape provides a unique opportunity to enhance the city's urban forest and educate the city's youth about the importance of trees.*

The Plan also explores the potential of using Project Learning Tree resources to engage students in the expansion of their school's forest canopy.

Because the 2008 study also summarized urban tree canopy coverage by watershed, it may be possible to identify which schools are located in watersheds that have very low tree canopy and develop intensive programs at those school sites first.

Any tree canopy expansion projects at school sites should involve all students by engaging them in inventories, plantings, and observation activities appropriate to their grade level. Many of these activities can be connected to, and reinforce, required SOLs.

***Landscape Management Division will work with the Sustainable School Committee to develop Tree Canopy curriculum for elementary, middle and high school students.***

VBCPS oversight provided by: Landscape Management Division  
Target date for full implementation: 2033  
Implementation timeline: ongoing

In addition to the list of items above, there are a number of action items focused on sustainability-infused curriculum that will lead to students having a more complete understanding of their relationship with the natural world so that they will be equipped to tackle environmental issues throughout their adult lives and in their future careers. These items, while indirectly contributing to emissions reductions through encouraging responsible behavior, have little chance of contributing *verifiable* emissions reductions for VBCPS. For the items below to be truly successful, they must involve students to the greatest extent practicable.

## Curriculum and Research

### Curriculum Expansion and Enhancement

23. Develop and promote new courses relevant to sustainability issues.
24. Offer more community-based learning courses that meet community-defined needs and pay particular attention to sustainable, adaptable course assignments and community partnerships.
25. Encourage the use of collaborative, case-based, and other experiential assignments through the development of a resource database of sustainability initiatives
26. Work with teachers and the Department of Teaching & Learning to incorporate sustainability topics, including building energy and water usage, into student coursework consistent with Virginia's Standards of Learning.
27. Provide opportunities for students to connect/reflect on extracurricular experiences (volunteer, internship, leadership) in the context of sustainability.
28. Develop and implement sustainability competency criteria.
29. Develop a Sustainability Science Fair for students of all levels to compete with their ideas for long-term, sustainable projects

## Student and Staff Outreach

### Interactive Web Tools

30. Write a Sustainability Pledge to which students can commit online.
31. Create a "sustainability handbook" with sustainable living tips and information about VBCPS sustainability programs and projects.
32. Create an interactive sustainability campus map highlighting programs and projects that VBCPS has implemented.
33. Develop an online library of educational and instructional videos about sustainability.

### Educational Programs and Behavioral Change

34. Investigate a system of prompts and rewards for sustainable behavior.
35. As implemented, incorporate enclosed objectives as updates to School Board Policy 3-67 throughout the implementation process.