Attachment 3

2018

Environmental Action Plan 2030 - Appendix

UPDATE: PHASE 1

CITY OF ALEXANDRIA

Table of Contents

Overview

This Appendix to the Phase 1 Update of the City of Alexandria's Environmental Action Plan 2030 provides support for the Environmental Policy Commission's recommended Goals, Targets, and Short Term Actions in each of the five areas considered in Phase 1: Energy, Climate Change, Green Building, Open Space/Land Use, and Solid Waste.

In the **Justification** section, the Commission provides rationale behind its recommendations, including evidence-based reasons for setting certain goals and actions and reference to the City's prior relevant commitments.

In the **Other Jurisdictions** section, the Commission provides examples of other jurisdictions that have adopted similar goals, targets, and/or action steps.

In some cases, the Commission also recommends specific **Legislative Priorities** for the City to pursue at the state level that could provide greater authority to achieve the recommended goals.

1. Energy

Renewable Energy

Justification:

1. *Climate change presents an existential threat to the future livability of Alexandria and the rest of the planet.* Climate science has confirmed that greenhouse gas emissions must be rapidly eliminated in order to avoid a greater than 2°C increase in global average temperatures.[1]
2. *Existing City goals are not ambitious enough with respect to energy used at City-owned facilities.* The original EAP included a mid- to long-term (2012-2030) action that "at least 50% of the City's energy portfolio will come from renewable and clean energy sources by 2020, and raise that percentage to at least 80% by 2030." In the 2016 Eco-City Progress Report, it was reported that "19% of the City government's electricity use was offset or generated by renewable energy sources."[2]
3. *It is consistent with the City's commitment to addressing climate change and identity as a leader in environmental policy*. By signing onto the Mayor's National Climate Action Agreement (MNCAA) in 2017, Alexandria committed to "intensify efforts to meet [its] current climate goals".3 Accelerating use of renewable energy at City-owned facilities is a means by which the City can follow through meaningfully on this commitment.

What Other Jurisdictions Are Doing:

- More than 50 cities in the U.S. have committed to or are already powered by 100% renewable energy.[4] Many of these cities will be or are currently relying on renewable energy generated onsite and others, including Ithaca, NY and Burlington, VT, are partly relying on REC purchases to meet this commitment.[5]
- Some cities are going even further. Rochester, MN has committed to achieving 100% renewable energy in the electricity, heating/cooling, and transportation sectors by 2031.[6]
- In November 2017, NVRC announced that it had partnered with Customer First Renewables to identify one or more shovel-ready, large scale renewable energy projects to present to NVRC's member governments for a possible virtual PPA.[7]

[1] See image from Figure 14.3 of the Climate Science Special Report: https://science2017.globalchange.gov

[2] 2016 Eco-City Progress Report & Key Environmental Indicators, p. 5 (2017)

[3] 382 US Climate Mayors commit to adopt, honor and uphold Paris Climate Agreement goals. http://climatemayors.org/actions/paris-climate-agreement/

[4] https://www.sierraclub.org/ready-for-100/commitments.

[5] https://cityofithaca.org/DocumentCenter/View/1650

[6] https://www.rochestermn.gov/Home/ShowDocument?id=9421

[7] NVRC Meeting Minutes, p. 1 (Jan. 25, 2018); https://powerforthepeopleva.com/2017/11/17/northern-virginia-governments-look-at-major-renewable-energy-energy-purchase/.

Legislative Priorities

- Support the expansion of net metering to local governments so renewable energy generated by the City could be sold back to the utility. A bill (HB1253) currently stalled would accomplish this and the City should support it.[8]
- Support the expanded availability of PPAs statewide. A bill (SB83) currently stalled would accomplish this and the City should support it.[9]

[8] http://lis.virginia.gov/cgi-bin/legp604.exe?181+sum+HB1253.

[9] https://lis.virginia.gov/cgi-bin/legp604.exe?181+sum+SB83.

Energy Efficiency

Justification:

1. *Existing City goals are piecemeal and lack a hard target for reducing energy use within the City.* The original EAP included a short-term action to "limit the projected growth in all sectors of citywide energy use to 4% by 2011 [and] … evaluate consistency with MWCOG Energy Strategic Plan." In 2017, MWCOG set a target to reduce total energy consumption 5 percent from 2015 to 2020, so the EAP goal is out of date.[10]
2. *It is consistent with the City's commitment to addressing climate change*. By signing onto the Mayor's National Climate Action Agreement (MNCAA) in 2017, Alexandria committed to "intensify efforts to meet [its] current climate goals".[11] Implementing energy efficiency measures is a means by which the City can follow through meaningfully on this commitment.
3. *It makes economic sense.* Improving energy efficiency in the City buildings and infrastructure improves the City's economic competitiveness in the region, creates new jobs, and supports economic growth.[12]

What Other Jurisdictions Are Doing:

- Arlington County established a goal that by 2050, non-residential building stock, community-wide, should use 60% less energy on average (per square foot) as compared to 2007 levels of energy use, with an intermediate reduction target of 5% by 2020.[13]
- Rochester, NY established a goal that by 2020, municipal buildings would reduce energy usage by 20%.[14]
- Denver, CO established a goal that by 2020, municipal buildings would reduce energy usage by 20% as compared with 2012 levels.[15]
- Pittsburgh, PA established a goal that by 2030, city-owned facilities, fleet, and infrastructure would reduce energy usage by 50% as compared with 2013 levels.[16]
- Huntington, NY (pop. 203,264) realized an annual costs savings of $151,000 from replacing 2,400 street lights with high efficiency fixtures.[17]

[10] MWCOG, 2017-2020 Regional Climate and Energy Action Plan, p. 9.
[11] 382 US Climate Mayors commit to adopt, honor and uphold Paris Climate Agreement goals. http://climatemayors.org/actions/paris-climate-agreement/
[12] https://www.epa.gov/statelocalenergy/state-energy-efficiency-benefits-and-opportunities; http://www.ase.org/resources/top-5-reasons-be-energy-efficient.
[13] Arlington Community Energy Plan, p. 10.
[14] https://www.nypa.gov/-/media/nypa/documents/document-library/operations/five-cities/2015-01-31-rochesterenergyplan.pdf
[15] https://database.aceee.org/city/denver-co.
[16] https://database.aceee.org/city/pittsburgh-pa.
[17] https://energy.gov/articles/finding-six-figure-roi-energy-efficiency

Legislative Priorities

- Support the appropriation of state funds for cities and counties to accelerate implementation of energy efficiency projects at government facilities.

Community Energy Use

Justification:

1. *City government operations account for only 4% of the GHG emissions generated in Alexandria, so significant effort and resources are necessary to address emissions associated with community energy use.* One part of addressing these emissions is to educate the community of ways to reduce overall energy consumption and incentivize action with direct investments in program that have demonstrated success in other cities.
2. *Existing City goals are not ambitious enough with respect to reducing per capita energy use and would benefit from additional clarity and focus in order to ensure these goals are met.* The original EAP included a target to "reduce the per capita energy use in Alexandria by 15%" by 2015, but did not include goals explicitly tied to achieving this target. Progress towards achieving old target has been inconsistent,[18] so additional and specific focus on this issue is warranted.

What Other Jurisdictions Are Doing:

- Arlington County established a goal that by 2030, residential and non-residential building stock, community-wide, should use 25% less energy on average (per square foot) as compared to 2007 levels of energy use.[19]
- Cleveland's Climate Action Plan calls for a 50% reduction in residential and commercial energy consumption below 2010 levels by 2030 and a 30% reduction in industrial energy consumption below 2010 levels by 2030.[20]

Legislative Priorities

- Support the establishment of a state revolving fund for energy conservation and efficiency projects. A bill currently proposed (HB 560) would establish Virginia Energy Efficiency Revolving Fund to provide no-interest loans to any locality, school division, or public institution of higher education for these projects. This should be supported and expanded to include other segments of the community.[21]

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18 Per capita energy use, as reported in the City's annual Eco-City Progress Report, decreased each year until 2012, followed by a stabilization in 2013 and an increase in 2014. See 2016 Eco-City Progress Report & Key Environmental Indicators, p. 3 (2017). This and earlier reports available at https://www.alexandriava.gov/EnvironmentalPolicyCommission.

19 Arlington Community Energy Plan, p. 10.

20 https://d3n8a8pro7vhmx.cloudfront.net/sustainablecleveland/pages/149/attachments/original/1461798511/Cleveland_Climate_Action_Plan.pdf?1461798511.

21 https://lis.virginia.gov/cgi-bin/legp604.exe?181+sum+HB560.

2. Climate Change

Adaptation

Justification:

1. *Extreme Heat and Sea Level Rise are dire threats to Alexandria residents by the middle of this century even if aggressive carbon emissions reduction is successful.* Risk of death increases by 2.5% for every 1°F increase in heat wave.[22] Even optimistic emissions scenarios are likely to result in a 10% or more increase in risk of death due to heat exposure by 2100, and by 2050 the average summer will have as many extreme-heat days as the worst summer in the historical record.[23]
2. *It is consistent with the City's commitments to addressing climate change*. The short-term actions above match actions in the MWCOG Regional Climate and Energy Action Plan.[24]
3. *With valuable resources along the Potomac waterfront, Alexandria must be a regional leader in flood protection.* Alexandria's class 6 CRS rating places it second behind only Prince George's County in the region.[25] Every step lower in CRS rating provides a corresponding discount in flood insurance for the jurisdiction. Points are awarded towards lowering the CRS rating based on both natural factors (e.g. the slope of the riverfront and the flow of the river) and the built environment (e.g. open space at riverfront, flood-vulnerable infrastructure).

What Other Jurisdictions Are Doing:

- *Chicago, Illinois*, both recognizing the impacts of climate change and having suffered through an infamous and deadly heat wave in 1995, has instituted a multifaceted plan to enhance extreme heat resilience in the city. This includes identifying and mapping vulnerable populations, building green infrastructure including tree canopy to reduce heat islands, and dedicating resources for emergency response including cooling stations to lower heat stress.[26]

[22] G. Brooke Anderson and Michelle L. Bell, "Heat Waves in the United States: Mortality Risk During Heat Waves and Effect Modification by Heat Wave Characteristics in 43 U.S. Communities," Environmental Research Letters 119, no. 2 (February 2011): 210-218, doi:10.1289/ehp.1002313.

[23] See extreme heat local projections at https://toolkit.climate.gov/tools/climate-explorer

[24] MWCOG, *Regional Climate and Energy Action Plan*, p.24. goo.gl/GmDkzh

[25] See FEMA's Community Ratings: https://goo.gl/QCqx5b

[26] See *Chicago, IL Adapts to Improve Extreme Heat Preparedness*: https://www.epa.gov/arc-x/chicago-il-adapts-improve-extreme-heat-preparedness

Mitigation

Justification:

1. *80% GHG emissions reduction by 2050 is necessary to uphold our stated commitments*[27] *and live up to our identity as an environmental policy leader.* GHG emissions must be rapidly reduced to avoid a greater than 2°C increase in global average temperatures.[28]
2. *The City's existing action plan does not include proposals and recommendations sufficient to meet Alexandria's greenhouse gas emissions reduction responsibilities.*
3. *City staff and the Environmental Policy Commission do not currently have the capacity to study emissions reductions in necessary detail.* Quantifying how city actions impact community emissions would necessitate the EPC largely abandoning its role in advising the City regarding water treatment, solid waste, air quality, and other vital issues. The City of Alexandria Energy and Climate Change Action Plan explicitly states, after identifying emissions reductions actions, "Sufficient resources, information and protocols are not available to quantify the emission reductions and costs/savings associated with all of the measures identified…"[29] In order to meet the target milestones, such resources, information, and protocols are necessary.

What Other Jurisdictions Are Doing:

- **Washington, DC** has developed a clean energy plan to reduce D.C. residents' greenhouse gas emissions by 50% below 2006 levels by 2032. The plan (at https://doee.dc.gov/cleanenergydc) delineates a detailed, concrete set of actions in each of three areas: dramatically improving energy efficiency for both new and existing buildings; increasing the supply of clean and renewable energy; and reducing transportation emissions by reducing vehicle miles traveled, and transitioning passenger vehicles from conventional petroleum-powered vehicles to zero-emission drivetrains.

[27] 382 US Climate Mayors commit to adopt, honor and uphold Paris Climate Agreement goals. http://climatemayors.org/actions/paris-climate-agreement/

[28] See climate change mitigation pathways in Chapter 14 of the *Climate Science Special Report*: https://science2017.globalchange.gov

[29] *The City of Alexandria Energy and Climate Action Plan*, p.25. https://www.alexandriava.gov/uploadedFiles/tes/eco-city/DraftEnergyClimateActionPlan03.14.2011.pdf

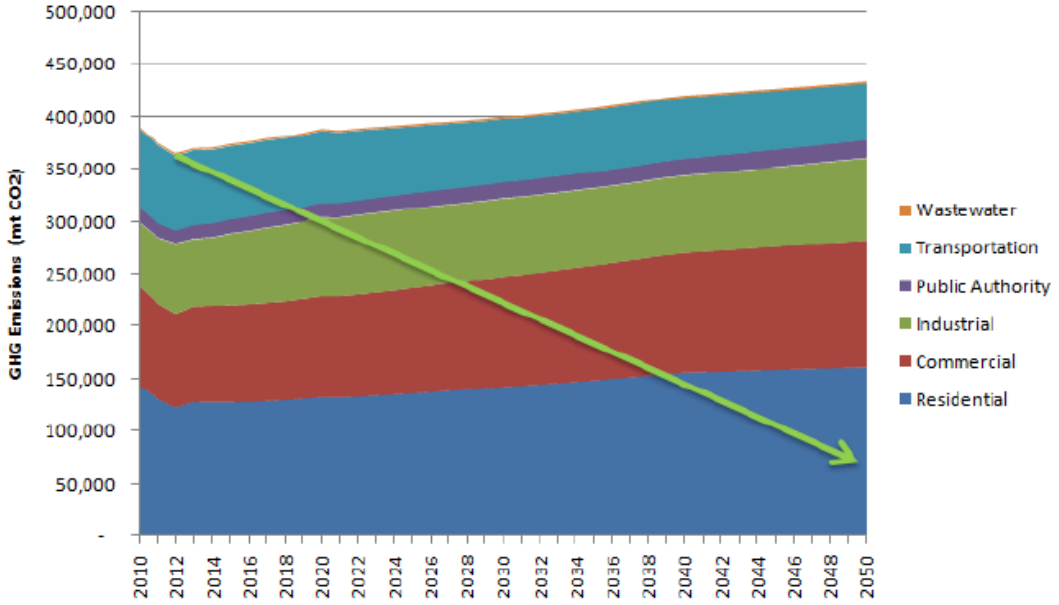
"Clean Energy DC" summary of GHG reduction action wedges

GHG Reduction Wedge	GHGs Reduced from 2032 BAU (tCO_2e)	Percent GHGs Reduced from Total 2032 BAU*
CAFE Standard	473,000	5.8%
Mode Share Change	528,000	6.4%
Electric Vehicle Adoption	34,000	0.4%
New Construction Actions	430,000	5.2%
Existing Building Actions	544,000	6.6%
Neighborhood-Scale Energy	44,000	0.5%
PPA for Standard Offer Service	543,000	6.6%
Renewable Portfolio Standard	581,000**	7.1%**
RPS Local Solar Requirement	87,000**	1.2%**
Total GHGs Avoided vs. 2032 BAU	3,277,000	39.8%
Total GHGs Reduced vs. 2006 Baseline	5,664,000	51%

Source: Clean Energy DC, p. 44.

- **Blacksburg, Virginia**, has developed a comprehensive climate action plan (http://www.blacksburg.gov/departments/departments-l-z/sustainability/climate-protection/climate-action-plan-and-supporting-documents) to reduce community-wide greenhouse gas emissions 80% below 1990 levels by 2050. The plan encompasses initiatives to reduce greenhouse gas emissions associated with energy use in residential and commercial properties, private transportation, food consumption, waste and recycling, and land use. The plan includes proposals to increase renewable energy production and procurement, as well as recommendations for actions residents can take to reduce their personal emissions.

City of Blacksburg GHG Emission Projections by Sector with Emissions Reduction target



Source: Blacksburg Climate Action Plan technical report, p. 14.

3. Green Buildings

Public and Private Buildings

Justification:

1. *Buildings are responsible for an enormous amount of global energy use, resource consumption and greenhouse gas emissions*. As the demand for more sustainable building options increases, green construction is becoming increasingly profitable and desirable within the international construction market.
2. *In the United States alone, buildings account for almost 40% of national CO_2 emissions and out-consume both the industrial and transportation sectors, but certified green buildings have 34% lower CO_2 emissions, consume 25% less energy and 11% less water, and have diverted more than 80 million tons of waste from landfills*.
3. *Upfront investment in green building makes properties more valuable, with an average expected increase in value of 4%*. By virtue of lowered maintenance and energy costs the return on investment from green building is rapid: green retrofit projects are generally expected to pay for itself in just seven years. Green buildings reduce day-to-day costs year-over-year.

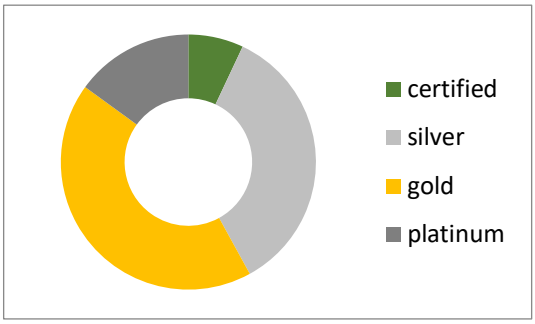
What Other Jurisdictions Are Doing:

Green building policies that utilize third party certification programs and incentives have been widely adopted across the country. While Alexandria is somewhat unique in that it cannot compel private development to take certain actions, the incentive structure proposed in these recommendations effectively leverages voluntary programs that are a proven strategy to deliver the desired outcome of greener buildings. A policy brief on other green building programs nationally is available for download here: https://www.usgbc.org/resources/policy-brief-guiding-green-building-policy.

There are more than 2,100 third party certified green buildings in the Washington, DC Metropolitan Statistical Area (MSA). Of the buildings in the DC MSA that have achieved LEED certification, almost 50% of them achieve gold or higher.

LEED CERTIFICATION ACTIVITY – DC MSA

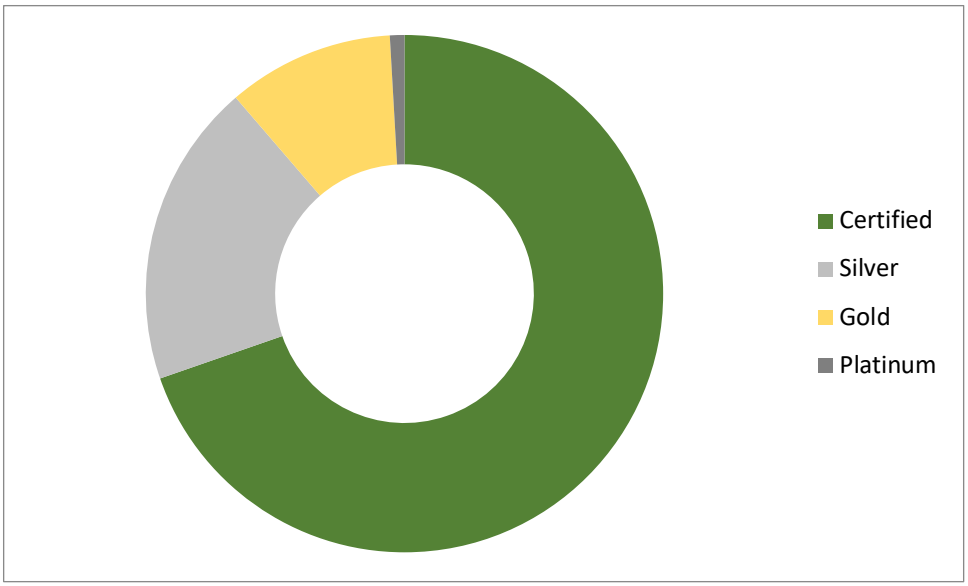
2,126 LEED certified buildings
342.2 M LEED certified square feet



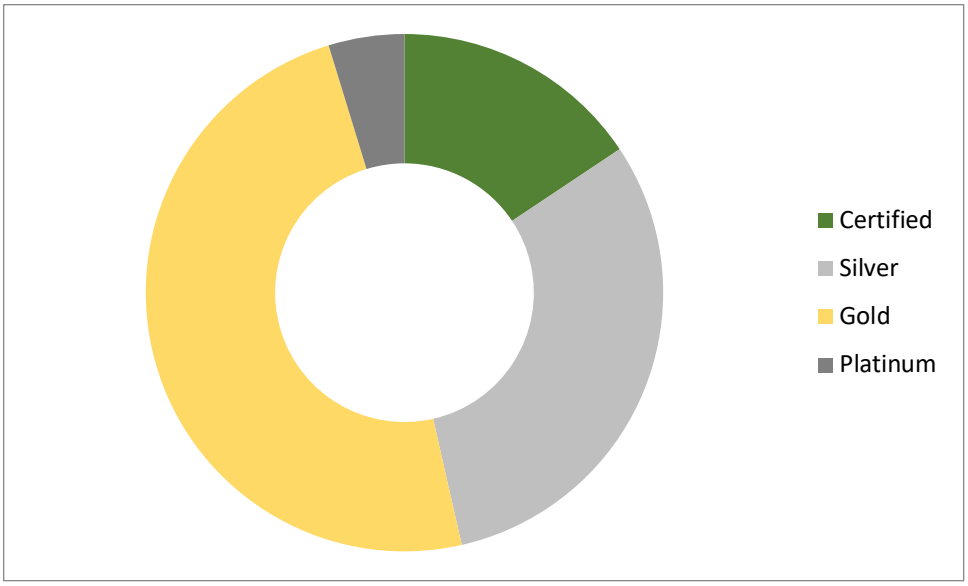
The individual strategies proposed to be required for public projects and encouraged for private development fall well within the norm for a mid-level LEED project. For example:

- 98% of all U.S. LEED projects achieve energy savings beyond code requirements. The average LEED certified project achieves approximately 30% performance improvement in energy compared to baseline code requirements. The proposed change to the green building policy encourages a modest increase of 40% and 50% improvement in energy for private and public development respectively.
- 87% of all U.S. LEED projects achieve reductions in potable water use. The average LEED project achieves greater than 35% savings in potable water use. The proposed change to the green building policy encourages a modest increase of 30% and 40% improvement in water consumption for private and public development respectively.
- 64% of U.S. LEED projects enact strategies to control rainwater discharge from site. Strategies around Low Impact Development and rainwater are routinely implemented by LEED certified projects at or above thresholds proposed for private and public projects.

For the City of Alexandria, there are 425 LEED registered and certified projects (commercial and residential). Certification breakdown for City of Alexandria:



For contrast and comparison, Arlington County has 460 LEED registered and certified projects (commercial and residential). Certification breakdown for Arlington County:



The EPC proposed changes follow in the successful footsteps of the implementation of the City's existing Green Building Policy. It is hoped that by incorporating references and requirements around specific strategies to be incorporated by project teams, the success of the green building program can be fine tuned to better deliver on outcomes deemed as local priorities in the EAP.

4. Land Use and Open Space

Open Space

Justification:

1. *The City has long recognized the value of open space and detailed the benefits of open space in its 2003 Open Space Plan and subsequent updates*. Professionals and practitioners are recognizing, however, that the quality of open space is as critical as the quantity. As the City's population grows, it will need to ensure that the quality of open space matches the needs of its citizens and Eco-City goals (e.g., sufficient passive recreation areas, high-quality wildlife and plant habitat, pervious surfaces, etc.)
2. *Attracting and retaining a competitive workforce*. The City must maintain and create high quality open spaces and healthy natural environment in order to relieve the impact of dense development, maintain Alexandria's high quality of life for existing residents and workforce, and to attract new workers needed to grow our local economy.[30]
3. *The City has already publicly committed to 7.3 per 1,000 target.* Following the 2003 Open Space Plan, the City successfully achieved—and exceeded-- its target of 100 acres. However, once that target was met the City did not articulate a new acreage goal and is at risk of falling behind relative to population growth and increasing demand and the associated challenges to the high Quality of Life Alexandrians expect and that makes the City such an attractive location in which to live, work and visit.
4. *Current Small Area Plans provide for 7.3/1,000.* The City of Alexandria is currently very dependent on the public open space planned for and committed in its Small Area Plans—approximately 293 acres—if the 7.3 acres per 1,000 residents is to be maintained. Even with these additional acres, there will soon be a time where the goal of 7.3 acres is unattainable. Maintaining the acreage promised in the Small Area Plans is vital. If the City lets the promised acreage slip, the year that the 7.3/1,000 ratio becomes unattainable could be as soon as 2025.[31]
5. *Zoning Ordinance Open Space requirements*: The Alexandria zoning ordinance divides land use into more than a dozen zoning designations that generally require that multifamily uses set aside a minimum of 40% of the lot area as open space, and further specifies that, "the purpose of open and usable space is to provide areas of trees, shrubs, lawns, pathways and other natural and man-made amenities which function for the use and enjoyment of residents, visitors and other persons." Yet

[30] https://urbanland.uli.org/economy-markets-trends/uli-member-outlook-attracting-retaining-creative-class/

[31] See, Open Space Plan Update 2017, pages 9-14. https://www.alexandriava.gov/uploadedFiles/recreation/parks/021017x%20Alex%20OS%202017%20Implem%20Strat%20Exec%20Sum%20Reduced%20Size.pdf

residential development projects are being approved and constructed with no or very little ground level open space that would meet the definition and intent of the zoning ordinance.[32] Additionally, if solely commercial buildings are constructed, while not currently required by zoning, such projects should provide open space as has been done in numerous 1960s-1990s urban renewal projects including the City Courthouse, Tavern Square, The Atrium, Canal Center and the former Sheet Metal Workers Union site recently converted to the residential Oronoco. The City should examine and consider a zoning revision to require open space in commercial projects which would support current open space needs and environmental and community health while providing long-term flexibility including facilitating possible future conversions to residential and mixed uses that would meet residential open space requirements and needs.

6. Securing partnerships from third-party funding and organizational sources such as the Northern Virginia Conservation Trust will be paramount to meeting open space targets in tight budget years. Notably, the City has an MOU with the Trust specific to outreach opportunities. This will enable the City to be far more proactive, rather than reactive in acting on open space opportunities. In addition to maintaining a strong ratio of open space per population, the City should continually assess and report appropriate metrics that continue to provide high-quality open space across all categories of use. As part of this analysis, the City should amend the zoning regulations to reflect a definition of open space that reflects a variety of active and passive uses and environmental quality and benefits.
7. *Re-instating the Open Space Fund and Steering Committee.* First initiated in 2003, the Fund was created through a set aside that allocated $.01 from every $100 of the City's real estate assessment for the purchase of open-space land and conservation easements (realizing approximately $2 million annually). Highly successful, the set-aside ended once the 2012 open space target was met. However, the need for quality open space has only continued to grow and the City must not only set new targets but reinstate a Fund to support growing demand. With or without a dedicated open space fund, the Open Space Steering Committee should be reinstated for purposes of identifying, prioritizing and maintaining a list of properties that could also be preserved and/or provided public access through easements, development conditions and other mechanisms other than outright purchase.

What Other Jurisdictions Are Doing:

- As detailed in the Open Space Plan 2017 Update, Alexandria's combination of high-density in a finite and very compact area is somewhat unique. However, other high-density local jurisdictions Arlington and Baltimore provide an open space ratio of 7.9 acres per 1,000 residents.[33] The 2017 Update Appendix 4 also lists several comparables.[34]

[32] https://www.alexandriava.gov/uploadedFiles/council/info/AlexandriaZoningOrdinance.pdf

[33] https://www.tpl.org/sites/default/files/files_upload/2015-City-Park-Facts-Report.pdf, page 10.

[34] https://www.alexandriava.gov/uploadedFiles/recreation/parks/OSPIS_Appendix_4.pdf

- All surrounding locales, as well as hundreds across the country, have sophisticated Open Space Plans that recognize the fiscal, health and environmental value of well planned, accessible and diverse open space. Many localities utilize Open Space funds.[35] Arlington County (VA) is currently revising its Public Spaces Master Plan.

[35] http://www.co.bergen.nj.us/203/Trust-Fund; in Pennsylvania see for example, Milford Township in Bucks County and Halfmoon Township in Centre County.

Tree Canopy

Justification:

1. *The City has already publicly committed to a 40% target.* While the 40% target has existed for at least a decade, current coverage has increased only to approximately 36%. New and improved short-term actions are necessary for the City to achieve this long-standing goal and once the target is achieved, to prevent backsliding.
2. *An average 40% canopy is the minimum target recommended based on latest research and science from the U.S. Forest Service, American Forests and hundreds of peer reviewed academic journals and NGOs, which recommend 40-60% tree canopy coverage in a naturally forested area such as Alexandria.*[36]
3. *A healthy, robust tree canopy is consistent with, complementary to, and will further the City's objectives related to addressing climate change; improving public health and reducing obesity, stormwater reductions; energy efficiency; livability indices and real estate values*.
4. *To achieve the committed targets, the City must encourage tree protection and preservation on private property to the maximum extent***.** The City has an important role to play in supporting education and providing technical guidance. As demonstrated by grassroots initiatives such as the North Ridge Home Owners Association tree planting effort in 2017, there is grassroots appetite.

What Other Jurisdictions Are Doing:

- In 2015 New York City completed its MillionTreesNYC, a public-private partnership to plant one million trees in the City.[37]
- Pittsburgh has 42% tree canopy coverage and recently launched an initiative to plant 20,000 additional trees.[38]
- As a 35-year Arbor Day Foundation recognized Tree City[39] and an Eco-city, Alexandria must lead regionally. Locally, Arlington County's tree canopy target of 40% has been achieved exclusive of the airport and DoD land. Notably, in just 2008, coverage was 43%, underscoring the need to be vigilant and leading Arlington to track tree canopy in detail by neighborhood.[40] Washington, DC has achieved approximately 40%. Based on compiled data, Alexandria is within the median of other Virginia municipal targets, but as noted above, Alexandria should lead by example. Virginia communities including Richmond, Fredericksburg, Lexington exceed 40% tree canopy coverage.[41]

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[36] See, e.g., http://www.americanforests.org/blog/no-longer-recommend-40-percent-urban-tree-canopy-goal/;

[37] http://www.milliontreesnyc.org/

[38] https://www.nationalgeographic.com/news-features/urban-tree-canopy/

[39] https://www.arborday.org/programs/treecityusa/directory.cfm

[40] https://arlingtonva.s3.dualstack.us-east-1.amazonaws.com/wp-content/uploads/sites/13/2018/01/Arlington-County-Tree-Canopy-Report-2016-.pdf

[41] http://gep.frec.vt.edu/va_utc.html

- Investing in trees is fiscally prudent. Many studies demonstrate the value of healthy trees.[42] As one example, the City of Pittsburgh's award-winning tree preservation initiative demonstrated that for every $1 invested, there was a return of $2.94. In 2011, Pittsburgh achieved 40% tree canopy coverage and has set a 20 year goal of 60% by 2031.[43]

[42] https://www.treepittsburgh.org/resource/benefits-of-trees/

[43] http://www.itreetools.org/resources/content/Sustainable_Urban_Forest_Guide_14Nov2016.pdf

5. Solid Waste

Recycling

Justification:

1. *Glass is currently picked up by recycling contractors in Alexandria who—due to technological constraints on recycling—deliver the glass to be used as landfill layering.* Current policy adds unnecessary carbon emissions through redundant transportation of glass to landfill by City recycling contractor. This redundancy also wastes budget resources by paying for two servicers to ultimately deliver glass to landfills. Glass is also often shattered or contaminated during the course of the existing single-stream recycling pickup process.
2. *TC Williams recycling rates are lower than those of the general population.* Recycling rate at TC Williams high school dropped from 24% to 10% in 2017. Training educators in solid waste best practices, hosting rich online materials and inviting outreach from local solid-waste disposal providers and environmental groups would improve school recycling rates and expose Alexandria students to essential environmental education.
3. *Several common recycling practices among Alexandria citizens lead to contamination of recyclables.* Organizing recyclables in plastic bags, mixing food waste in with recyclables, and other undesirable practices greatly impede the sorting and processing of recyclables and contaminate output. Education coupled with updating the existing ordinance are necessary to ensure that Alexandria can generate high quality recyclables output that will not end up as trash due to contamination.
4. *The City's current recycling ordinance requires businesses to recycle the top two categories of recyclable waste they generate*. Municipalities across the US have passed more aggressive ordinances that require businesses to compost organic waste. Alexandria also needs to explore more aggressive waste reduction policies to update the existing ordinance for businesses.
5. *Several market factors limit the demand for Alexandria's recyclables*. On a global level, China has severely restricted their market for American recyclables. Technologically, it is not feasible to sort out contaminating plastics from recyclables, and low quality output is difficult to sell as recyclable material.[44]

What Other Jurisdictions Are Doing:

- Fairfax County has recently invested in a state-of-the art glass crusher that is able to convert glass waste into raw material for sand, gravel, and concrete.

[44] http://www.cleanfairfax.org/2017/09/07/china-and-recycling-in-fairfax-county/

Fairfax actively solicits Alexandria to funnel glass waste to their crusher to fully leverage this recent acquisition.[45]

- Two jurisdictions in Georgia are actively rejecting recycling loads that contain glass (Cobb County) or simply not requiring the recycling hailer to collect it (Decatur)
- In a waste characterization study performed in 2010, Arlington, VA, glass was found to make up approximately 22% of the recyclables stream, and if glass was eliminated from the recycling stream, the recycling rate would likely fall by 10-12% to below 40%.

[45] https://www.facebook.com/fairfaxcountyenvironment/photos/pb.115223075220205.-2207520000.1505368755./1421835114558988/?type=3

Reduce

Justification:

1. *Although plastic bags are flimsy and do not to weigh enough to tip the scales of waste reduction, these bags negatively impact our local and global waterways and contaminate our recycling stream*. Many States and municipalities—including the District of Columbia—have successfully implemented some version of a plastic bag ban and/or tax. Takeaway containers, plastic cutlery, and plastic straws also fall in the category of single use plastic items whose use should be discouraged through outreach and improved practices by local businesses.
2. *Many City residents have expressed their desire for more opportunities for composting within the City.* The Department of Recreation, Parks and Cultural Activities (RPCA) established the Community Matching Fund (Fund) in 2016. A compost processing center project grant was awarded to Compost Alex for 2018.[46] This project will construct pilot processing sites that can process food waste material locally. These sites also act as a demonstration of the community's ability to properly compost food waste. This project can provide a model for improved local composting, and if successful the City should continue to expand and promote these opportunities.
3. *Variable-rate pricing programs generally work to reduce overall waste by charging residents more to use larger waste receptacles; these programs are sometimes called "pay as you throw" or "bag-n-tag".* The City should explore variable rate pricing systems that incorporate all residential waste streams – municipal solid waste (MSW); yard waste and composting; and recycling. Allowing residents to select the level of service they need for their household may produce efficiencies in waste collection across the City.

What Other Jurisdictions Are Doing:

- Plastic bag taxes and bans have been effectively instituted in Cities throughout the country; the five cent plastic bag tax in Washington, DC instituted in 2009 is widely considered to have significantly reduced plastic bag waste in the District.[47]
- California has instituted aggressive measures to ensure that businesses move towards routing organic waste to mulching and composting.[48]
- Communities with variable rate waste removal pricing programs in place have reported reductions in waste amounts ranging from 25 to 35 percent, on average.[49]

[46] https://www.alexandriava.gov/PARKnerships

[47] https://www.gwhatchet.com/2018/02/07/district-tax-leads-to-sharp-decrease-in-plastic-bag-use/

[48] http://www.calrecycle.ca.gov/recycle/commercial/organics/

[49] https://archive.epa.gov/wastes/conserve/tools/payt/web/html/success.html

Legislative Priority: The decision for a locality in Virginia to adopt a plastic-bag tax depends on support by elected officials in the State legislature. Every year we seem to get closer to being able to pursue this opportunity, however every year legislation fails to pass. In 2017 a proposal was authored by Sen. Petersen of Fairfax which could have "brought in $10 million or more annually to help restore the Chesapeake Bay watershed. But the main goal, he said, was to encourage the increased use of reusable and environmentally friendly cloth bags by shoppers."[50] Even though it seems encouraging that a plastic bag tax may pass at the State level eventually, the City must remain vigilant in actively supporting this measure that would benefit residents as well as our local waters and help us meet our waste reduction goals.

[50] https://wtop.com/virginia/2017/01/va-senate-committee-kills-proposed-bag-tax/