INTRODUCED: March 14, 2016

A RESOLUTION No. 2016-R020

As Amended

To request the Chief Administrative Officer to develop a loan program for clean energy projects for the purpose of creating a financing tool for property owners to invest in clean energy projects.

Patron – Mr. Agelasto

Approved as to form and legality
by the City Attorney

PUBLIC HEARING: MAR 28 2016 AT 6 P.M.

WHEREAS, the Council believes that the city of Richmond is a city with older, mixed housing and commercial stock that could significantly benefit from energy efficiency improvements; and

WHEREAS, a property assessed clean energy loan program is a mechanism through which the loans may be provided to free and willing property owners to acquire and install renewable energy production and distribution facilities, energy usage efficiency improvements, or water usage efficiency improvements; and

AYES:	9	NOES:	0	ABSTAIN:	
ADOPTED:	MAR 28 2016	REJECTED:		STRICKEN:	

WHEREAS, section 15.2-958.3 of the Code of Virginia (1950), as amended, authorizes localities to establish property assessed clean energy loan programs for the purpose of assisting entities, organizations and individuals with loans as a means to finance the high upfront costs associated with improving energy efficiency and installing renewable energy systems in homes and businesses; and

WHEREAS, the Council of the City of Richmond believes that it would be in the best interest of the citizens of the City of Richmond to adopt an ordinance establishing a property assessed clean energy loan program for the purpose of providing loans to free and willing property owners to finance the acquisition and installation of renewable energy production and distribution facilities, energy usage efficiency improvements, and water usage efficiency improvements as authorized by section 15.2-958.3 of the Code of Virginia (1950), as amended;

NOW, THEREFORE,

BE IT RESOLVED BY THE COUNCIL OF THE CITY OF RICHMOND:

That the Chief Administrative Officer hereby is requested to cause the preparation and submission to the Council of a [~~proposed ordinance~~] proposal, including a fiscal impact study, that contains the Chief Administrative Officer's recommendations for the implementation of a property assessed clean energy loan program for the City of Richmond addressing the sorts of facilities and improvements that the program will finance, the funding sources proposed to be used to make the loans, the terms and conditions applicable to the loans, and any other matters required to be addressed pursuant to section 15.2-958.3 of the Code of Virginia (1950), as amended, or recommended to be addressed in any financial underwriting guidelines developed by the Virginia Department of Mines, Minerals and Energy pursuant to clause 2 of Chapters 389 and 427 of the 2015 Acts of Assembly of Virginia by no later than January 31, 2017.

3-14

Richmond City Council

The Voice of the People — Richmond, Virginia

Office of the Council Chief of Staff

Ordinance/Resolution Request

RECEIVED
MAR 04 2016
OFFICE OF CITY ATTORNEY

TO **Allen Jackson, Richmond City Attorney**
Richmond Office of the City Attorney

THROUGH Lou Brown Ali
Council Chief of Staff

FROM Meghan Brown, Council Budget Analyst MKB

COPY Mr. Parker C. Agelasto, 5th District Council Member
Haskell Brown, Deputy City Attorney
Vincent Jones, Deputy Council Chief of Staff V. Jones
Ida I. Jones, 5th District Liaison

DATE March 4, 2016

PAGE/s 1 of 2

TITLE **Requesting the Administration to Develop a PACE Program**

This is a request for the drafting of an **Ordinance** ☐ **Resolution** ☒

REQUESTING COUNCILMEMBER/PATRON
Councilman Agelasto

SUGGESTED STANDING COMMITTEE
Finance and Economic Development

ORDINANCE/RESOLUTION SUMMARY
The patron has asked for a resolution to request that the Chief Administrative Officer or designee develop a Property Assessed Clean Energy (PACE) Program.

BACKGROUND
Code of Virginia §15.2-958.3 grants localities the authority to develop a Property Assessed Clean Energy (PACE) Loan Program. A PACE program is a financing tool for local governments to encourage investment in clean energy projects. The PACE Loan Program is a program developed by localities to finance energy and water efficiency and renewable energy projects for residential and commercial buildings. The concept of a PACE program is that local governments provide loans to public entities, private organizations or individuals to invest in energy and water efficiency and renewable energy projects on their respective property. Those entities, organizations and individuals who borrowed the funding repay the loans back to the localities through a repayment method the localities choose, such as, property tax assessments, extra charges on water and sewer bills, or other billing methods. When developing a PACE program the locality must determine which improvement projects are allowed, establish a funding source for the loans, determine the terms of the loans, including interest rates and repayment terms and methods.

A significant challenge to homeowners or businesses for improving energy efficiency or installing renewable energy systems is the high up-front costs. A PACE Loan Program allows for entities, organizations and individuals to get 100% upfront funding to complete the project and realize the benefits or the improvements immediately. A PACE program has many benefits some of which include:

- Promotes energy efficiency
- Reduces energy costs for residents and businesses
- Helps to create jobs and spurs local economic development
- Reducing the City's carbon footprint

The patron believes a PACE Loan Program needs to be developed for the City of Richmond and is requesting the Administration to move forward with developing such a program for the use by individual, entities and organizations throughout the City. The City of Richmond is an older city, with a mixed housing stock that could significantly benefit from energy efficiency improvements and a PACE program is a mechanism that can be used to materialize these benefits for the City of Richmond and its residents.

FISCAL IMPACT STATEMENT

Fiscal Impact Yes ☒ No ☐

Budget Amendment Required Yes ☐ No ☒

Fiscal Summary: There will be a fiscal impact from the development of a PACE Loan Program. Until the specific elements of the program are developed the exact fiscal impact is unknown. A funding source will also have to be identified for the program which will be determined during the development process. The patron encourages the City to seek non-general fund dollars, first, to implement the program.

Attachment/s Yes ☐ No ☒

Richmond City Council Ordinance/Resolution Request Form/updated 10.5.2012 /sis

Proposal for Property Assessed Clean Energy (PACE)

Pursuant to

Resolution No. 2016-R020

Submitted Jan. 31, 2017

Richmond City Council Resolution No. 2016-R020:

Per Resolution No. 2016-R020 (adopted Mar. 28, 2016), the Chief Administrative Officer is requested to cause the preparation and submission to the Council a proposal, including a fiscal impact study, that contains the Chief Administrative Officer's recommendations for the implementation of a property assessed clean energy loan program (PACE) for the City of Richmond addressing:

- the sorts of facilities and improvements that the program will finance,
- the funding sources proposed to be used to make the loans,
- the terms and conditions applicable to the loans,
- and any other matters required to be addressed pursuant to section 15.2-958.3 of the Code of Virginia (1950), as amended,
- or recommended to be addressed in any financial underwriting guidelines developed by the Virginia
  Department of Mines, Minerals and Energy pursuant to clause 2 of Chapters 389 and 427 of the 2015 Acts of Assembly of Virginia

The deadline is no later than January 31, 2017.

Overview of PACE:

- PACE is one of multiple tools that local governments can use to help reduce energy use and carbon emissions within the community. Most localities create a broad energy planning strategy and then evaluate a potential PACE program within the context of the broader energy strategy to determine if PACE is an appropriate tool.
- Before launching a PACE program, localities often conduct feasibility studies to ascertain if a PACE program will succeed.
- PACE is a loan program for commercial, industrial and multi-family property owners to finance energy efficiency and renewable energy measures for their properties such as: chillers, boilers, controls, solar, lighting, & windows.
- PACE financing has features that can help solve barriers to the adoption of energy efficiency and renewable energy investments in buildings:
  - 100% financing requires no up-front cash investment from the participant
  - Long-term financing (up to 20 years) results in immediate positive cash flow
  - Loan is not paid off at sale of property- transfers to new owner (like a tax assessment)
  - PACE assessments can be passed through to tenants if allowed for by the lease
- PACE loans have tax lien status subject to subordination from the existing mortgage holder. A PACE loan is repaid as a special assessment. In VA, commercial and multifamily buildings (except condos) are eligible for PACE loans.
- VA Code Sec. 15.2-958.3 enables localities to create PACE loan programs and hire third party administrators to operate PACE programs and charge fees to PACE borrowers to cover administrative costs.

Progress Update:

- In 2015, a Virginia Community Capital (VCC) study on the implementation of PACE in Virginia received input from 35 localities including Richmond. Top conclusions revealed:
    - Interest in a centralized/statewide "plug and play" PACE program
    - Preference for seeing how other jurisdictions adopted PACE before doing so
    - A need for significant education to local government staff to explain PACE
- Despite the preference voiced by localities for a statewide program administrator, the VCC study concluded that because there was no funding to support that option, the Virginia Energy Efficiency Council (VAEEC) should take a leading role to advance PACE in Virginia by educating localities about PACE and building a grass roots effort to compel localities to create PACE programs.
- The VCC study also noted that Arlington County was the first locality in VA forging ahead with developing a PACE program. Given the lack of funding for a statewide program, Arlington's model was the most feasible to advance PACE in Virginia and it could be replicated by other localities.
- On Mar. 28, 2016, City Council adopted Resolution No. 2016-R020. At that time, city administration clearly conveyed its concern with the impact (fiscal, staffing, resources, etc.) that developing a PACE program could have on city government and that it would be critical to learn from Arlington after its program was implemented.
- In April 2016, the City's Sustainability Manager started preparations to convene a PACE Work Group. Preparations took place from April-July and included: identifying and meeting with potential members, researching and information gathering, discussions with Arlington, making arrangements with VCU for a Masters in Urban and Regional Planning Student to assist the Work Group, etc.
- In August 2016, the PACE Work Group convened for the first time and members agreed:
    - that the first task would be to conduct a Feasibility Analysis for a Richmond PACE Program, i.e. determine if a Richmond PACE program was feasible.
    - to enlist VCU Masters Candidate Mr. Michael DePaola to conduct the feasibility analysis with assistance from Dr. Damian Pitt. *Michael would use this work as his Professional Plan required for his Masters degree.*
    - that it was important for the City of Richmond to follow the progress of Arlington's program and learn whatever it could
    - that the Work Group would assist in developing the proposal and fiscal impact study requested by Resolution No. 2016-R020
- From Aug.-early Dec. 2016, Mr. DePaola conducted the Feasibility Analysis with the assistance of the PACE Work Group and the City's Sustainability Manager. The Analysis was completed in early Dec. 2016.

History of Request to Extend Deadline:

- In adopting Resolution No. 2016-R020, City Council agreed to set the Jan. 31, 2017, submittal deadline recognizing how important it was to provide time for city administration to follow the progress of Arlington's program.
- As Arlington was the first locality to undertake a PACE program, the forward progress of its program fell behind projected timelines due to lengthy delays in the competitive procurement process to secure a third party PACE Program Administrator.
- In Sept. 2016, the City's Sustainability Manager discovered Arlington's process was delayed. She provided Councilman Agelasto (sponsor of Res. No. 2016-R020) a written update on the PACE Work Group's activities and requested to extend to July 31, 2017, the CAO's deadline for submitting a PACE proposal and fiscal impact study to City Council.
- In Dec. 2016, the City's Sustainability Manager discovered Arlington's process would be further delayed. Ms. Zatcoff provided Councilman Agelasto another written update on the PACE Work Group's activities and requested to extend to Jan. 31, 2018, the CAO's deadline for submitting a PACE proposal and fiscal impact study to City Council.
- Councilman Agelasto did not respond to either request.
- City administration is submitting this document to meet the Jan. 31, 2017 deadline.
- As of late Jan. 2017, Arlington has secured a PACE Administrator and anticipates an additional 6 months to launch its PACE Program as it will require:
    - a new city code provision
    - creating new billing and collection mechanisms, processes and procedures via real estate assessment
    - heavy education among city staff
    - heavy handholding and education of potential PACE customers

Recommendations for a PACE Program for the City of Richmond:

- Secure funding to develop a holistic energy planning strategy for the City of Richmond and continue to evaluate a potential PACE program within the context of the broader energy strategy to determine if PACE is the most appropriate tool to prioritize for implementation given limited personnel and resources.
- Continue to follow the development of Arlington's PACE program and use the information to inform a potential PACE program for the City of Richmond.
- Continue the PACE Work Group efforts to help city administration develop recommendations for a PACE program per Resolution No. 2016-R020.
- Per initial research into other PACE programs, to implement a PACE program in Richmond would require:
    - two new FTEs
        - 1 FTE ($75,000 annually + benefits)-competitive procurement, program development and implementation, city code development, inter-agency coordination, etc.
        - 1 FTE ($55,000 annually + benefits)-educate city staff, educate and work with potential PACE customers, community outreach, etc.
    - $25,000 annual funding for education and community outreach
    - a competitive procurement process to select a third-party administrator for the program

PACE Work Group Members

KC Bleile, Viridiant

Paul Brooks, Johnson Controls

Larry Cummings, Trane

Michael DePaola, Candidate, Master of Urban & Regional Planning, VCU

Daniel Farrell, DMME

Bill Greenleaf, Virginia Community Capital

Chelsea Harnish, VAEEC

Abby Johnson, Abacus Property Solutions, LLC

Chris McDonald, DMME

Bill Nusbaum, Williams Mullen

Dr. Damian Pitt, VCU

Fact Sheet - Property Assessed Clean Energy (PACE) Loan Programs

What is PACE?

PACE is a loan program for commercial, industrial and multi-family residential property owners to finance energy efficiency and renewable energy measures for their properties such as: HVAC, controls, solar, lighting, & windows.

PACE loan programs are implemented by localities because the loan is secured by a priority lien (equal to tax lien) on the property and the loan is repaid as a special assessment, like a tax assessment. Localities are compensated for the work associated with placing the lien on the tax roll, typically through a fee on the PACE assessment.

Priority lien status (equal to tax lien) of the PACE loan is only granted if the existing mortgage holder voluntarily subordinates their lien to the PACE lien. Over 60 lenders have consented to PACE assessments in other states.

Private capital providers are permitted to fund PACE loans. Many banks and specialty lenders are now entering the PACE lending market. United Bank (a Virginia, Maryland, DC, West Virginia regional bank) would like to make PACE loans in Virginia. Bank of America has committed $75 million to fund loans in the New York area program.

Benefits of PACE

PACE financing has many features that can uniquely solve barriers to the adoption of energy efficiency and renewable energy investments in our buildings:

- 100% financing requires no up-front cash investment.
- Long-term financing (up to 20 years) results in immediate positive cash flow
- Loan is not paid off at sale - it transfers to the new owner (like a tax assessment)
- PACE assessments can be passed through to tenants if allowed for by the lease conditions.

PACE Legislation

VA Code Sec. 15.2-958.3 - Enables localities to create PACE loan programs and hire third party administrators to operate PACE programs and charge fees to PACE borrowers to cover administrative costs. Commercial and multifamily buildings (except condos) are eligible for PACE loans. PACE loans have tax lien status subject to subordination from the existing mortgage holder. A PACE loan is repaid as a special assessment.

PACE represents an economic development opportunity in Virginia. The stakeholders below would all benefit from a robust commercial building PACE program in Virginia.

- Commercial, industrial and multi-family building owners
- Contractors, consultants and engineers
- Localities seeking to create jobs and improve the building stock
- Lenders (PACE loans - a new loan product to offer)

National PACE Activity

PACE is a national initiative with enabling legislation adopted in over 30 states and the District of Columbia. There are currently 33 active PACE programs (25 commercial and 7 residential), which have financed over $100 million in PACE assessments in over 250 commercial buildings. The commercial building PACE program in Connecticut has funded over $60 million of PACE loans and has a $100 million pipeline.

PACE Program

Typical Administrative Functions

1. **Program Design**
    a. Determine building types eligible
    b. Types of energy improvements eligible – energy conservation, renewal energy
    c. The billing type (real estate tax, utility bill, etc.)
    d. The area of the locality to which it applies
    e. The administrative structure – locality with help of third party
    f. Provide template forms and model ordinance
    g. Technical underwriting standards
    h. Fee structure
    i. Minimum requirements for participating
2. **Local Ordinance Adoption**
    a. Codification of the essential elements of the program design
3. **Agreement with Treasurer on Billing**
    a. If Treasurer handles the billing, establish how the billing and collection process will be handled
    b. Modification of billing software
4. **Marketing**
    a. Marketing to the stakeholders (building owners, lenders, tenants, property managers, contractors, etc.)
5. **Training and education**
    a. Contractor training (contractors, architects, engineers, etc.)
    b. Train local government staff
6. **Contractor referral**
    a. Develop process for vetting contractors who wish to participate in the program
        i. Energy Audit
        ii. Construction
    b. Provide property owners with list of contractors
7. **Lender subordination consent**
    a. Work with the property owner to educate lender on PACE and the reasons why providing consent makes sense
    b. Obtain and file written consent from the lender
8. **Project Review -** Ensure the project conforms to program rules, the local ordinance, and state law.
9. **PACE Agreement -** Tripartite Agreement between Locality, Lender and Property Owner that spells out the nature of the improvements, the method of assessment and the method of dispersal of the assessment to the lender
10. **Post-completion Inspection**
    a. Inspect project to ensure that the energy improvements have been implemented per the PACE Agreement
11. **Billing and Collections**
    a. **Bill Property Owner for the Periodic Assessment Payment**– The periodic billing of the assessment to the property owner for the term of the loan
    b. **Collect and Record Assessment** – Receive the payment from the property owner and record it for accounting and audit purposes
    c. **Disburse Assessments to the Lenders** – Disperse the assessments to the appropriate lenders
    d. **Collect Unpaid Assessments** – Institute collection procedures against the property owner for any unpaid delinquent assessments
    e. **Filling of Tax Lien** – The filling of a tax lien for the unpaid assessments after the collection process has been exhausted
    f. **Tax lien sale/ Foreclosure**

Virginia Code § 15.2-958.3. Financing clean energy programs.

A. Any locality may, by ordinance, authorize contracts to provide loans for the initial acquisition and installation of clean energy improvements with free and willing property owners of both existing properties and new construction. Such an ordinance shall include but not be limited to the following:

1. The kinds of renewable energy production and distribution facilities, energy usage efficiency improvements, or water usage efficiency improvements for which loans may be offered;

2. The proposed arrangement for such loan program, including (i) a statement concerning the source of funding that will be used to pay for work performed pursuant to the contracts; (ii) the interest rate and time period during which contracting property owners would repay the loan; and (iii) the method of apportioning all or any portion of the costs incidental to financing, administration, and collection of the arrangement among the consenting property owners and the locality;

3. A minimum and maximum aggregate dollar amount which may be financed;

4. A method for setting requests from property owners for financing in priority order in the event that requests appear likely to exceed the authorization amount of the loan program. Priority shall be given to those requests from property owners who meet established income or assessed property value eligibility requirements;

5. Identification of a local official authorized to enter into contracts on behalf of the locality. A locality may contract with a third party for professional services to administer such loan program;

6. Identification of any fee that the locality intends to impose on the property owner requesting to participate in the loan program to offset the cost of administering the loan program. The fee may be assessed as (i) a program application fee paid by the property owner requesting to participate in the program, (ii) a component of the interest rate on the assessment in the written contract between the locality and the property owner, or (iii) a combination of (i) and (ii); and

7. A draft contract specifying the terms and conditions proposed by the locality.

B. The locality may combine the loan payments required by the contracts with billings for water or sewer charges, real property tax assessments, or other billings; in such cases, the locality may establish the order in which loan payments will be applied to the different charges. The locality may not combine its billings for loan payments required by a contract authorized pursuant to this section with billings of another locality or political subdivision, including an authority operating pursuant to Chapter 51 (§ 15.2-5100 et seq.), unless such locality or political subdivision has given its consent by duly adopted resolution or ordinance.

C. The locality shall offer private lending institutions the opportunity to participate in local loan programs established pursuant to this section.

D. In order to secure the loan authorized pursuant to this section, the locality shall be authorized to place a voluntary special assessment lien equal in value to the loan against any property where such clean energy systems are being installed. The locality may bundle or package said loans for transfer to private lenders in such a manner that would allow the voluntary special assessment liens to remain in full force to secure the loans.

E. A voluntary special assessment lien on real property other than a residential dwelling with fewer than five dwelling units or a condominium project as defined in § 55-79.2:

1. Shall have the same priority status as a property tax lien against real property, except that such voluntary special assessment lien shall have priority over any previously recorded mortgage or deed of trust lien only if (i) a written subordination agreement, in a form and substance acceptable to each prior lienholder in its sole and exclusive discretion, is executed by the holder of each mortgage or deed of trust lien on the property and recorded with the special assessment lien in the land records where the property is located, and (ii) evidence that the property owner is current on payments on loans secured by a mortgage or deed of trust lien on the property and on property tax payments, that the property owner is not insolvent or in bankruptcy proceedings, and that the title of the benefitted property is not in dispute is submitted to the locality prior to recording of the special assessment lien;

2. Shall run with the land, and that portion of the assessment under the assessment contract that has not yet become due is not eliminated by foreclosure of a property tax lien;

3. May be enforceable by the local government in the same manner that a property tax lien against real property may be enforced by the local government. A local government shall be entitled to recover costs and expenses, including attorney fees, in a suit to collect a delinquent installment of an assessment in the same manner as in a suit to collect a delinquent property tax; and

4. May incur interest and penalties for delinquent installments of the assessment in the same manner as delinquent property taxes.

F. Prior to the enactment of an ordinance pursuant to this section, a public hearing shall be held at which interested persons may object to or inquire about the proposed loan program or any of its particulars. The public hearing shall be advertised once a week for two successive weeks in a newspaper of general circulation in the locality.

2009, c. 773; 2010, c. 141; 2015, cc. 389, 427.

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Richmond City Council Ordinance/Resolution Request Form/updated 10.5.2012 /sis

Michael H. DePaola
Master of Urban & Regional Planning Program
L. Douglas Wilder School of Government and Public Affairs
Virginia Commonwealth University
Fall 2016

RVA Setting the PACE: Property Assessed Clean Energy Loan Financing Program Feasibility Plan

Prepared for the City of Richmond Office of Sustainability

RVA Setting the Pace: Property Assesed Clean Energy Loan Financing Program Feasibility Plan

Prepared For
City of Richmond Office of Sustainability

Prepared By
Michael H. DePaola
Master of Urban & Regional Planning Program
L.Douglas Wilder School of Government and Public Affairs
Virginia Commonwealth University
Fall 2016

Professional Plan Panel
Alicia Zatcoff JD, LEED - AP
Damian Pitt, Ph.D.
Ivan Suen, Ph.D

All findings and interpretations reflect the views of the author and not Virginia Commonwealth University or The City of Richmond.

Acknowledgements

First, I would like to thank my panel members, Ivan Suen, Damian Pitt, and Alica Zatcoff, for their time, guidance, and support throughout the development of this plan.

I would also like to thank the following members of the City of Richmond's PACE Work Group:

Bill Greenleaf, Virginia Community Capital
Abby Johnson, Abacus Property Group
Chelsea Harnish, Virginia Energy Efficiency Council
Al Christopher, Virginia Department of Mines, Minerals, and Energy
Larry Cummings, Trane
KC Bleile, Viridiant
Paul Brooks, Johnson Controls
William Nusbaum, Williams Mullen
Chris McDonald, Virginia Department of Mines, Minerals, and Energy
Dan Farrell, Virginia Department of Mines, Minerals, and Energy
Andrew Washo, Trane

In addition thanks to those organizations who took the time to discuss Property Assessed Clean Energy Loans throughout the process:

Fulton Hill Properties
RenewFinancial
Virginia Community Capital
Towne Bank
City and Guilds Builders
Colliers International
Williams Mullen

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EXECUTIVE SUMMARY

Property Assessed Clean Energy (PACE) Loan Programs are an efficient and innovative tool to reduce energy consumption and spur economic development with limited upfront costs. The City of Richmond Office of Sustainability requested this feasibility study to gauge the demand and supply as well as policy considerations and program elements for a commercial sector PACE program. This plan also fulfills the requirements of the Master of Urban & Regional Planning program in the L. Douglas Wilder School of Government and Public Affairs at VCU. This document begins the process of a PACE program development and to determine if a PACE program is a viable option for the City. The overall intent is to promote economic development and energy efficiency at the same time.

The RVA Setting the PACE plan came to fruition by following a climate action planning approach. Relevant best practices and precedent plans from two peer cities are included as well. Analysis of the City's commercial building stock and the Energy Information Administration's micro-data for energy consumption, interviews with stakeholders, commercial building owner/managers, and third party lenders provided a holistic view of the demand, supply, and policy comments for a potential commercial sector PACE program in Richmond, VA.

Energy calculations were split into two iterations. The first included only occupied commercial buildings, while the second was a "build-out" of the entire commercial sector including vacant or abandoned structures. The data is presented in charts and tables and the current occupied commercial building energy consumption estimate is 9.952 trillion BTU.

The resulting plan recommendations are intended to guide The City of Richmond and the supporting PACE Workgroup members in conducting future analysis and further policy development. The recommendations are structured as further analysis that needs to be conducted in order to gain a full understanding of the implications of a Richmond PACE program. In addition to further analysis, the remaining recommendations are presented to guide PACE policy development if it were to be approved in Richmond, VA.

Guide to RVA Setting the PACE

The first section of this plan provides background, history, and an introduction to contextualize the client's need for this document. The introduction section includes a discussion on the theory in planning utilized to develop the framework, a short review of two precedent plans that have been used to promote PACE, and an overview of the methodology employed.

Section 2, provides information needed to evaluate existing conditions in Richmond to determine whether Richmond is a conducive environment for development of a PACE program. This section includes an analysis of Energy Information Administration microdata and pairs that with city-level structure data in order to estimate the energy consumption amount per building, per end use. This analysis was performed twice. The first iteration includes only occupied commercial buildings, and the second includes all commercial structures including those that are vacant or abandoned, adding an additional 132 structures to the calculation. The plan maps existing commercial building stock by various criteria to provide a visual sense of the possible scale of the program and the current distribution of commercial buildings.

Section 3 includes responses from the three categories of stakeholder interviews: policy stakeholders, commercial building owners, and lenders/investors. The responses from the stakeholder interviews identified existing policy conditions, supply scope, and the demand for PACE loans. In addition to the interviews, this plan reviewed two precedent PACE plans. Case studies were utilized to discern key components of successful PACE programs in addition to identifying potential planning obstacles other programs have discovered. Case studies were selected from cities that have established or are in the process of establishing PACE programs.

Section four provides conclusions and results of the existing conditions analysis performed in both Section 2 and Section 3

The final section contains detailed goals, objectives, and recommendation strategies based on the research and analysis.

1. Introduction

Source: https://www.google.com/search?q=richmond+skyline&source=lnms&tbm=isch&sa=X&ved=0ahUKEwio3qDIo9HQAhUm2IMKHWY2A28Q_AUICCgB&biw=950&bi-

1.1 The Client

The client for the *RVA Setting the PACE* Feasibility Plan is the City of Richmond Office of Sustainability. The mission of this Office of is to work with citizens to meet environmental, social, and economic needs of our community without compromising the ability of future generations to meet those same needs. The Office is accomplishing this mission by implementing the RVAgreen Sustainability Plan, which it developed in partnership with the community. The RVAgreen Plan includes 55 Initiatives in five focus areas: Economic Development, Energy, Environment, Open Space & Land Use, and Transportation.

The Energy Focus Area of the RVAgreen Plan includes initiatives to increase the city's energy resilience by reducing energy consumption and increasing the use of renewable energy. An excerpt of the RVAgreen plan's energy focus area can be seen below. To further the objective of providing easy financing for renewable energy installations, this plan presents a feasibility analysis of whether Richmond is ready and able to implement a Property Assessed Clean Energy (PACE) program.

Energy

Goal: Enhance Richmond's energy resilience

Initiative	Summary	Implementer	Cost*	
Objective 1: Reduce energy consumption in City government operations				
Adopt a green fleet policy	Adopt a policy that increases use of alternative/electric vehicles in City fleet	Public Works - Fleet Mgmt. Div.	$	☑ ☑ ☑ ☐ ☑
Enter into a performance contract for all City buildings	Hire a contractor to bear the upfront capital costs of efficiency improvements	Public Works - Facilities Mgmt. Div.; Procurement Services	$$	☑ ☑ ☑ ☐ ☐
Adopt an energy efficiency procurement policy	Ensure purchases are made with energy efficiency in mind	Procurement Services; Sustainability Office	$	☑ ☑ ☑ ☐ ☐
Adopt an energy efficiency policy or O&M standards for all City buildings	Create policy that promotes standards and guidelines for increased efficiency and reduced energy consumption in City buildings	Public Works - Facilities Mgmt. Div.	$	☑ ☑ ☑ ☐ ☐
Objective 2: Lower building energy consumption citywide				
Establish tax breaks for energy efficiency	Tax breaks for building owners based on implementation of energy saving measures	Assessor of Real Estate; Planning and Development Review	$	☑ ☑ ☑ ☑ ☐
Establish a residential weatherization program	Promote community weatherization of buildings through a new program	Non-profits and community partners	$$	☑ ☑ ☑ ☑ ☐
Establish a fund to assist businesses with energy efficiency improvements	Set up a revolving loan fund to finance the cost of business-related energy efficiency upgrades	Economic and Community Development; community partners	$$$	☑ ☑ ☑ ☐ ☐
Objective 3: Increase the use of alternative energy sources				
Provide low-interest loans for renewable energy projects	Provide easy financing for renewable energy installations that meet certain standards	Dept. of Finance; community partners	$$$	☑ ☑ ☑ ☑ ☐
Lower permit fees for alternative energy installations	Lower permit fees for renewable energy projects and installations	Planning and Development Review – Permits and Inspections Div.; City	$	☑ ☑ ☑ ☑ ☐

1.2 Background

In April 2011, Mayor Dwight C. Jones announced the RVAgreen planning process, with the goal of achieving a sustainable city. *RVAgreen: A Roadmap to Sustainability* is a plan that outlines goals, objectives, and initiatives that the city is striving to meet in order to create a healthy urban environment that is truly sustainable. *RVA Setting the PACE* addresses two of three supporting objectives within the Energy focus area. The first objective is to lower building energy consumption citywide, and this includes an initiative to establish a fund to assist businesses with energy efficiency upgrades. The second objective within the Energy focus area is to increase the use of alternative energy sources within the community by providing low-interest loans for renewable energy programs that meet certain standards.[1]

The City of Richmond has taken steps to improve energy efficiency and reduce emissions in municipal buildings by requiring new city buildings and substantial renovations to meet the minimum LEED (Leadership in Energy and Environmental Design) Silver standard. Commercial buildings would also benefit from a program to assist owners in reduc-

1 RVAgreen: A Roadmap to Sustainability, 2014

ing energy demand and increasing renewable energy consumption. The development and implementation of a Property Assessed Clean Energy (PACE) program is one such effort.

A PACE program establishes a financing mechanism to provide low interest loans to property owners that will finance energy efficiency upgrades such as renewable energy installations. Thus, PACE programs address one of the biggest barriers to energy efficiency upgrades: the large upfront cost. In addition, they create immediate positive cash flow from approved projects. Another advantage of a PACE loan financing program over conventional loans is that the repayments are made via property assessments, meaning that both the energy upgrade and the corresponding repayment obligation remain with the property if it is sold.

Source:http://aquillasolar.com/solar-programs-incentives/minnesota-pace-property-assessed-clean-energy/

In 2015, the General Assembly passed legislation that amended section 15.2-958.3 of the Code of Virginia to authorize localities to establish PACE programs. The legislation was established to assist entities, organizations, and individuals in the commercial sector with loans that would finance the high upfront costs associated with improving energy efficiency and installing renewable energy systems. In March of 2016, the Richmond City Council adopted a resolution calling for the Chief Administrative Officer to submit a proposal to City Council with recommendations for the development of a PACE program. The City has since formed a work group comprised of PACE stakeholders in order to help the City develop the proposal and fiscal impact study for a PACE program. This plan was developed in support of the PACE workgroup.

1.3 Plan Purpose

RVA Setting the PACE examines the existing policy framework, commercial/multifamily building stock, and supply and demand characteristics of the City of Richmond to determine if the current conditions are conducive to the development of a Property Assessed Clean Energy (PACE) loan-financing program. According to a 2013 greenhouse gas emissions inventory conducted by Richmond's Office of Sustainability, 38.16% of greenhouse gas emissions (GHG) within the city were generated from the commercial sector's energy usage, while 12.16% stems from the Industrial sector, with a staggering 50.32% of GHG emissions from the combined commercial sectors of the study.[2]

2 City of Richmond. (2014). RVAGreen Annual Progress Report 2014. Retrieved from http://www.richmondgov.com/Sustainability/documents/RVAGreen_Annual-

The 2013 greenhouse gas emissions inventory stated that within the commercial sector, each customer utilized an average of 373 million British Thermal Units (BTU's) per year while the industrial sector used an average of 23.14 billion BTU's annually per customer; the combined commercial and industrial sector totaled 9.556 trillion BTU. [2] A PACE program would enable Richmond to directly address GHG emissions from the commercial sector, and provide building owners an innovative way to finance large energy efficiency projects.

1.4 Planning Approach

This plan's approach draws from Climate Action Planning and the UN-Habitat's eight guiding principles to climate action planning, as it addresses the root causes of climate change and is both ambitious and inclusive of community stakeholders. The approach is also informed by two precedent plans which present planning obstacles and program elements to be included into a Richmond-based PACE program.

1.4.1 Climate Action Planning

Climate action planning is the most relevant theory in planning for this plan. It identifies cost-effective opportunities for dealing with climate change and its root causes, especially increased greenhouse gas emissions from our dependence on fossil fuels. Climate action plans provide recommendations to local and state governments including legislation and regulatory action that enable voluntary and incentive programs such as PACE. Climate action planning is a rational approach to planning. The plans define goals, identify and evaluate the alternatives, select the most appropriate, then establish an implementation schedule and monitoring for the selected alternative.

Implementation of climate change mitigation plans and programs requires changes both in the way businesses and government operate and the way government integrates with the citizens' daily lives. The integration of community members into the planning process creates an inclusive environment and gives all members of the community an equal say in the process.

Climate action planning theory offers two paths to program development; internal determinants and regional diffusion. The Internal Determinants model suggests that policy innovation is a function of political, social, and economic conditions of the municipality. If the community is receptive to innovation, the policy will be adopted.[3] The Regional Diffusion model establishes that innovation occurs in clusters when a municipality is in proximity to other municipalities that are innovating policy and planning approaches.[3] This model suggests that cities tend to replicate those within their region in regards to innovative policy and programs.

1.4.2 UN-Habitat Guiding Principles

The *RVA Setting the PACE* plan adheres to the UN-Habitat guiding principles of City climate action planning, creating an innovative and inclusive plan that is developed by reviewing existing PACE programs and those in development.

ProgressReport2014.pdf

3 Basset, E. V. (2010). Innovation and Climate Action Planning. Journal of the American Planning Association, 435-450

Innovative climate action planning and policies are built upon the UN-Habitat agency's eight guiding principles for city climate action planning. The plan should be ambitious, inclusive, and involve multiple city government departments, community stakeholders, and should reflect the massive scale of the problem of climate change. The recommendations presented should be fair and comprehensive, equitably addressing the risks, and should present the benefits to community members. The plan should be relevant to the local benefits and support local development. It will also be actionable to provide a cost effective solution that can be achieved within a realistic time horizon and within current constraints. A city climate action plan must be grounded by evidence and supported by previous plans and implementation efforts. It should also be transparent throughout the process, allowing for public participation and should set goals that can independently measured and verified.[4]

1.4.3 Precedent Plans

This plan is informed by two precedent plans from cities that have adopted PACE programs. The Milwaukee Property Assessed Clean Energy Financing Program was revised in 2013 and is expecting another revision this year. It includes a business case for PACE that addresses the foundation of why a PACE loan program is needed and why it will succeed. The Milwaukee plan focuses on benefits to the city and community as well as the challenges it will face during the implementation process. Milwaukee,'s PACE program was built off of the U.S. Department of Energy Clean Energy Financing Guide, 2013, which establishes eligible energy efficiency improvements as well as the effective useful life of an upgrade.

4 UN-Habitat. (2015). Guiding Principles for City Climate Action Planning. UN-Habitat.

The second precedent plan is the City of Ann Arbor's Report on a proposed PACE program. This plan breaks the program down into sections, focuses on finding the most effective funding mechanisms, and shifts into the eligibility requirements of property owners and their properties.[5] The plan then establishes eligible products in the same format as the Milwaukee plan, using the DOE Clean Energy Financing Guide.[6] The plan also establishes a ten-step process from the pre-application stage through the tracking and measurement & verification steps, which could be adopted into the Richmond plan.

1.5 Methodology

This plan's objective is to determine the feasibility of a commercial-sector Property Assessed Clean Energy loan financing program for Richmond. If the existing conditions are not favorable, the plan will recommend what can be done to create a more inviting environment. If conditions are conducive to a PACE program, recommendations will be made for the next steps in program development. Research and data collection are focused on evaluating the demand and supply options for a PACE program. Interviews were conducted to identify key policy considerations in evaluating the Richmond PACE program. The commercial building stock was evaluated using Richmond City Assessors data combined with Geographic Information System mapping and data from the US Energy Information Administration's Commercial Building Energy Consumption Survey. Case studies were performed to evaluate what was learned during

5 Clean Energy Coalition. (2012). City of Ann Arbor: Report on Proposed PACE Program. Ann Arbor: a2energy.

6 There is a 2016 version that was recently updated and will be utilized for the development of the Richmond PACE program.

the planning and implementation process in two other cities (Milwaukee, Ann Arbor) with approved PACE programs and another city (Arlington) with a program in development.

This plan focuses on the following four core research questions:

What is the existing demand for a commercial-sector PACE program in Richmond?

This question was addressed through a combination of data analysis on the existing commercial building stock and interviews with members of the Greater Richmond Association for Commercial Real Estate (GRACRE). The interviews gauge whether a sufficient number of building owners are interested in participating in a PACE program. The interviews also addressed the building owners' goals for their commercial buildings and the types of projects they would be interested in financing.

The existing commercial building stock was evaluated through analysis of City of Richmond Geographic Information Systems data, Richmond City Assessors data, and data from the US Energy Information Administration's Commercial Building Energy Consumption Survey. This data was used to generate tables, charts, and maps showing various attributes of the building stock, including buildings by city council district, age of the structure and others. Combining mapping with in person interviews allowed for a comprehensive demand-side evaluation.

Interviews were conducted with commercial and multifamily building owners, managers, and developers in order to measure interest in a commercial sector PACE program. Interview questions were developed with the assistance of the Richmond City PACE work group in order to gauge their interest in participating in a citywide PACE program.

Two members of the Greater Richmond Association of Commercial Real Estate were interviewed, as well as an individual developer and manager of both commercial and multi-family properties.[7]

What is the existing supply for a commercial-sector PACE program in Richmond?

Interviews with prospective lenders were performed in order to evaluate the scope of possible PACE funding. PACE workgroup members assisted in developing this process by developing a list of potential PACE lenders as well as specialty PACE investors. Interviews with lenders and investors focused on determining if there is sufficient capital that is able to be supplied from either party.

What elements from other PACE programs would be most helpful for a Richmond commercial-sector PACE program to adopt?

Case studies were used to evaluate program elements and obstacles in the

7 Greater Richmond Association of Commercial Real Estate https://www.gracre.org/

planning and implementation process that Richmond can anticipate when developing a PACE program. Two fully functional PACE programs (Milwaukee, WI and Ann Arbor, MI) and one in development (Arlington, VA) were examined as part of the case studies. The studies provided insight into the primary and secondary goals of a PACE program, such as whether implementation of a PACE program can drive tenants back into commercial/multi-family buildings.

What are the key policy considerations to address in evaluating a Richmond commercial-sector PACE program?

A final round of interviews was conducted with PACE stakeholders to determine the current policy environment within Richmond and gain perspective on what changes could and should be made to make a PACE program more feasible.

2. Evaluating Existing Energy Demand in the Commercial Sector

This plan was informed by a combination of data analysis on the existing commercial building stock, interviews with members of GRACRE, interviews with private PACE investors and lenders, interviews with PACE stakeholders and two case studies of precedent plans. This section takes an in-depth look at the existing commercial building stock in the City of Richmond, including classifications and current uses, as well as detailed climate adjusted energy consumption data.

2.1 Evaluating Existing Energy Demand in the Commercial Sector

Existing demand for a commercial-sector PACE program in Richmond, Virginia, was evaluated by reviewing commercial energy consumption and emissions. This was performed using Richmond City assessors data, National Commercial Building Energy Consumption data, Residential Energy Consumption Survey data, and Richmond-provided GIS data.

2.1.1 Data Sources

The City of Richmond has an extremely diverse commercial building stock comprised of 9,978 buildings classified as commercial according to City-maintained Geographic Information Systems (GIS) data. The first data set is Richmond City data, which is comprised of a parcels layer which contains unique pin numbers, property classifications, land uses, and other important information. In addition to the GIS layers, City assessors data was provided which contains fields such as building square footage, age, heating type, and building material.

The second data source examined was from the U.S. Energy Information Administration (EIA), which conducts periodic commercial building energy consumption surveys (CBECS). These surveys provide detailed reports on buildings across the country and attributes including energy consumption.[8] The most recent CBECS was in 2013 and can be used to make general assumptions for Richmond's commercial building Stock. The EIA also produces a Residential Energy Consumption Survey (RECS). Similar to the CBECS, the RECS provides energy consumption data for residential buildings including those designated as multifamily.

The EIA CBECS breaks commercial buildings into a variety of categories. For the purpose of this study, eight categories were chosen that accurately represent Richmond's commercial building stock: service, warehouse and storage, office, mercantile, lodging, healthcare, food service, and food sales. In addition to the eight CBECS categories, one category from the RECS called Multifamily Greater than Five Units was utilized from the RECS category list to encompass multifamily structures.[9] City building classifications were then paired with a corresponding EIA category to allow for energy consumption data to be calculated. Pairing the classifications with the corresponding Energy Information Administration was performed manually.

EIA categories and their descriptions can be seen below and in Table 1 on the following page.

Food Sales: Includes classifications such as convenience stores and supermarkets.

Food Service: Within the City's data set, food service is comprised of fast food restaurants, general restaurants, and bars.

Healthcare: Healthcare is dominated by medical clinic/office space with only one hospital/nursing home property.

8 U.S. Energy Information Administration - EIA - Independent Statistics and Analysis, CBECS, 2013

9 U.S. Energy Information Administration - EIA - Independent Statistics and Analysis, RECS, 2009

Lodging: This category is comprised of hotels, motels, and bed & breakfast classifications

Mercantile: This EIA category is comprised of large and specialty retail services such as big box, community shopping centers, drug stores and pharmacy, and larger retail strips.

Multifamily: The multifamily category includes the largest amount of property classifications, all of which represent multifamily structures that contain greater than five units.

Office: Includes traditional office buildings as well as vacant commercial shells.

Service: Service is a diverse category with classifications ranging from banks, to funeral homes, and mixed use

Warehouse: This EIA category includes traditional industrial properties and uses.

Many of the City's property classifications are not utilized within this project. The only classifications used are those that had corresponding buildings within the commercial land use. Using ARCMap, the assessor's data and City of Richmond parcel data were joined based on parcel pin. The data was then sorted by land use classifications in order to find those classifications that best fit the commercial and multifamily requirements of the enabling state legislation.

Property class data was extracted from the data set and sorted in order to get a holistic view of the Richmond commercial building stock's property classifications. EIA categories were selected for use and each city property classification was assigned a category in order to properly group it for the energy consumption calculations. The preceding calculations were performed in two iterations: first, the total energy calculation excluded those classifications which were uninhabited, those that were building shells or vacant. The second calculation included those vacant buildings for a build-out analysis to show how much energy would be consumed if all of the vacant commercial shells were occupied.

Table 1:EIA Cateogry total counts with property classification breakdown and structure counts

EIA Category	Total Count	Property Classification	Structure Count
Food Sales	119	B Convenience Store	107
		B Supermarkets	12
EIA Category	**Total Count**	**Property Classification**	**Structure Count**
Food Service	271	B Restaurant/Bar	207
		B Fast Food Restaurant	63
EIA Category	**Total Count**	**Property Classification**	**Structure Count**
Healthcare	125	B Medical Clinic/Office	105
		B Hospital/Nursing Homes	20
EIA Category	**Total Count**	**Property Classification**	**Structure Count**
Mercantile	136	B Retail Strip	44
		B Neighborhood Shopping Center	32
		B Community Shopping Center	22
		B Commercial Common Area	17
		B Drug Stores/Pharmacy	10
		B Big Box Retail	6
		B Regional Shopping Mall	4
EIA Category	**Total Count**	**Property Classification**	**Structure Count**
Office	985	B Professional Office	517
		B Commercial Condo	144
		B General Office	124
		B Commercial Shell	104
		B Class A or B Office Bldg	67
		B Commercial Leasehold	22
EIA Category	**Total Count**	**Property Classification**	**Structure Count**
Warehouse/Storage	904	B Storage Warehouse	432
		B Distribution Warehouse	218
		B Light Industrial	136
		B Heavy Industrial	48
		B Industrial Flex Building	27
		B Transit Warehouse	27
		B Industrial Shell	9

EIA Category	Total Count	Property Classification	Structure Count
MultiFamily	5,586	R Condo Residential 50+ Units	2,119
		R Condo Residential 12-49 Unit	1,105
		R Condo Residential <11 Units	489
		R Four Family Blt-As	405
		R Apartment 5-11 Units	301
		R Apartment 12-24 Units	231
		R Condo Common Area	204
		R Apartments 100+ Units	197
		R Apartment 25-99 Units	166
		R Apt/Comm Mixed Use 5-49 Unit	130
		R Four Family Converted	127
		R Apt/Comm Mixed Use 50+ Units	36
		R Rm Hse/Grp Home (Unlicensed)	18
		R Apartment Shell	17
		R Apartments High Rise	16
		B Multi-Family Common Area	6
		R Res/Comm Mixed Use	4
		R Multi-Family Vacant(R53)	2
EIA Category	**Total Count**	**Property Classification**	**Structure Count**
Service	1796	B General Retail/Service	658
		B Mixed Use	608
		B Vehicle Service/Car Wash	276
		B Community Ctr / Club	81
		B Vehicle Sales & Service	58
		B Bank	44
		B Day Care Facility	38
		B Funeral Home	15
		B Theater	15
EIA Category	**Total Count**	**Property Classification**	**Structure Count**
Lodging	56	B Motel	28
		B Hotel	21
		R Bed and Breakfast	7

Data Source: City of Richmond

2.1.2 Calculating Building Energy Consumption

The EIA CBECS and RECS provide the end user with either summary data or more detailed microdata to provide an informed method to calculate energy consumption. This plan utilizes the microdata set, which provides region and classification numbers along with corresponding square footages of structures, heating degree days, cooling degree days, weighted values, and a variety of energy consumption data presented in thousand BTU (kBTU). This project isolated entries utilizing region three, the South Atlantic Region, which contained Virginia, in order to gain the most accurate holistic view of the City's energy consumption.

The data set contains end use energy consumption data including heating, cooling, cooking, lighting, refrigeration, office equipment, computing uses, and other, which includes motors, pumps, air compressors, process equipment, backup electricity generation, other appliances, and plug-load. The RECS category "other" includes lighting, cooking, and computer usage consumption. These end use numbers were multiplied by the weighted values provided and a weighted energy usage number was obtained. This weighted energy usage number was divided by the square footage of the corresponding building within the isolate EIA entries to obtain thousand BTU consumed per square foot. The data was then summed for each category and divided by the sum of the total square footage for every building in the data set to yield kBTU per square foot.

Table 2: Energy Intensity (kBTU per squarefoot) for Each EIA End Use Category

kBTU per Square Foot -- Commercial										
Office	**Total**	**Heating**	**Cooling**	**Hot Water**	**Lighting**	**Cooking**	**Refrigeration**	**Office Equip.**	**Computer Use**	**Other**
	55	17	6	2	8	0	2	4	10	7
Warehouse Storage	**Total**	**Heating**	**Cooling**	**Hot Water**	**Lighting**	**Cooking**	**Refrigeration**	**Office Equip.**	**Computer Use**	**Other**
	170	8	5	1	14	0	116	2	4	20
Food Sales	**Total**	**Heating**	**Cooling**	**Hot Water**	**Lighting**	**Cooking**	**Refrigeration**	**Office Equip.**	**Computer Use**	**Other**
	222	7	10	4	17	16	148	5	3	13
HealthCare	**Total**	**Heating**	**Cooling**	**Hot Water**	**Lighting**	**Cooking**	**Refrigeration**	**Office Equip.**	**Computer Use**	**Other**
	234	59	35	33	28	11	9	9	15	34
Food Service	**Total**	**Heating**	**Cooling**	**Hot Water**	**Lighting**	**Cooking**	**Refrigeration**	**Office Equip.**	**Computer Use**	**Other**
	313	24	24	25	13	134	70	5	3	14
Lodging	**Total**	**Heating**	**Cooling**	**Hot Water**	**Lighting**	**Cooking**	**Refrigeration**	**Office Equip.**	**Computer Use**	**Other**
	75	17	6	12	5	3	8	8	1	13
Mercantile	**Total**	**Heating**	**Cooling**	**Hot Water**	**Lighting**	**Cooking**	**Refrigeration**	**Office Equip.**	**Computer Use**	**Other**
	193	25	24	24	20	18	52	6	7	18
Service	**Total**	**Heating**	**Cooling**	**Hot Water**	**Lighting**	**Cooking**	**Refrigeration**	**Office Equip.**	**Computer Use**	**Other**
	83	41	5	10	11	0	2	1	2	11
MultiFamily >5	**Total**	**Heating**	**Cooling**	**Hot Water**	**Lighting**	**Cooking**	**Refrigeration**	**Office Equip.**	**Computer Use**	**Other**
	50	20	4	9			3			13

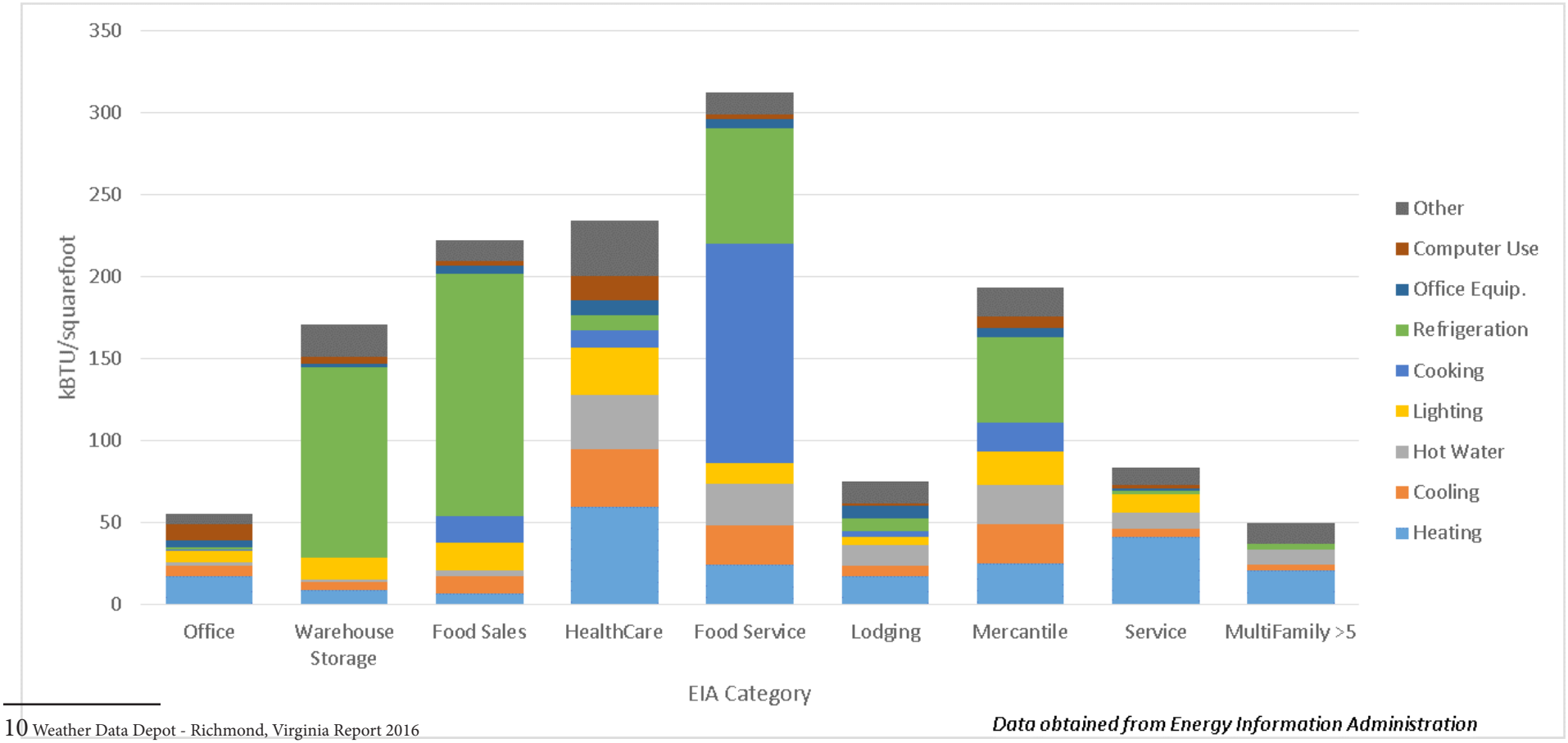
Data Source: Energy Information Administration - RECS 2009 & CBECS 2013

The data for heating and cooling required climate adjusting. The EIA provides energy for the whole South Atlantic region. However in order to get more accurate localized data it had to be adjusted to reflect Richmond's local heating and cooling needs. The heating and cooling data was divided by the heating degree days (HDD65) and cooling degree days (CDD65) respectfully, divided then by the sum total of the square footage for every building in the data set. Finally, the heating and cooling data was multiplied by the HDD and CDD averages for the City of Richmond, 3,743 HDD and 1,844

CDD respectively.[10]

Performing these adjustments allowed for the identification of climate adjusted energy consumption data, per end use, per square foot, and for every EIA category utilized as seen on the previous page in Table 2. Figure 2 below depicts the energy intensities for each EIA category. Food Service structures have the highest energy intensity with over 65% of consumption coming from cooking and refrigeration. Lighting is a large consumer in the Healthcare and Mercantile sectors while minimal in the others. Heating is the largest consumer for traditional office buildings. These detailed consumption estimates provide the information that the different types of end uses represent higher portions of energy load for the different commercial categories.

Figure 2: Energy Intensity (kBTU per squarefoot) for Each EIA End Use Category



Data obtained from Energy Information Administration

10 Weather Data Depot - Richmond, Virginia Report 2016

2.1.2.1 TOTAL OCCUPIED BUILDING ENERGY CONSUMPTION FOR EIA CATEGORIES

Energy consumption greatly depends on the category of the property. For example, note how food service has a considerable amount of energy consumption per square foot when compared to the rest of the categories. The highest average kBTU consumed per square foot for Food Service originates from the cooking and refrigeration categories, which totals 65% of the Food Service category's energy consumption. Similar conclusions can be drawn from the energy intensity data throughout the commercial sector buildings to provide estimates per-square foot for each potential PACE customer.

The energy consumption per square foot (energy intensity) estimations were calculated for each type of commercial building shown in the left column of Table 2. The Richmond Assessors data was parsed through and all property classifications the represented vacant or abandoned structures were removed from the total. Removing vacant or abandoned structure classifications removed 132 buildings from the analysis. EIA categories affected by this change were Warehouse/Storage, Multifamily, and Office. The resulting classifications provide a comprehensive list of occupied buildings according to the most recent assessors data.

The energy intensity values in Table 2 were then multiplied by the square footage of each commercial building in that category, which was obtained from the Richmond assessors data. This produces an estimated energy consumption by end use for each individual building, which is then used to calculate a full building estimated annual energy consumption. This process is shown in Figure 3, the flow chart of how the energy consumption data was produced. Annual commercial sector energy consumption for occupied buildings is shown in Table 3 in million BTU. End uses include lighting, cooling, heating, hot water, cooking, refrigeration, office equipment, computer usage, and other. Total estimated annual energy consumption in BTU for the City of Richmond's commercial sector totals 9.952 trillion BTU which, when compared to Richmond's Greenhouse Gas Inventory of 2013 number of 9.956 trillion BTU is only a difference of 4.15%. [11]

11 City of Richmond. (2014). RVAGreen Annual Progress Report 2014. Retrieved from http://www.richmondgov.com/Sustainability/documents/RVAGreen_Annual

Figure 3:Flowchart Depicting Energy Consumption Calculations

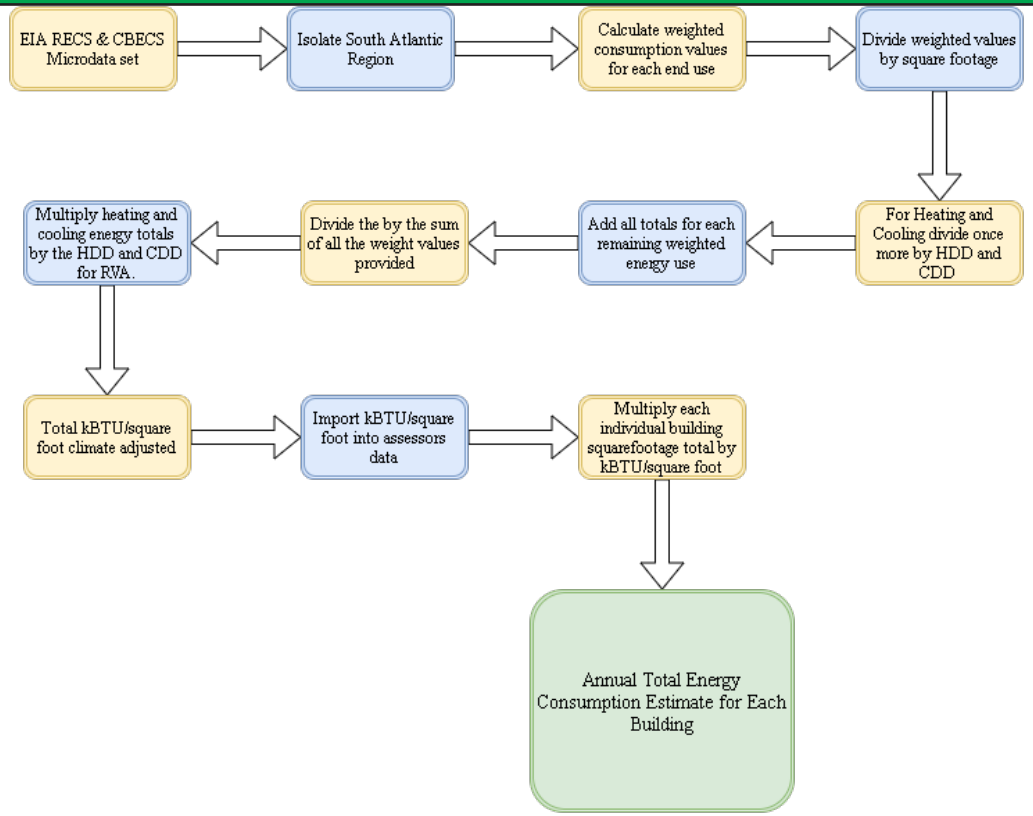
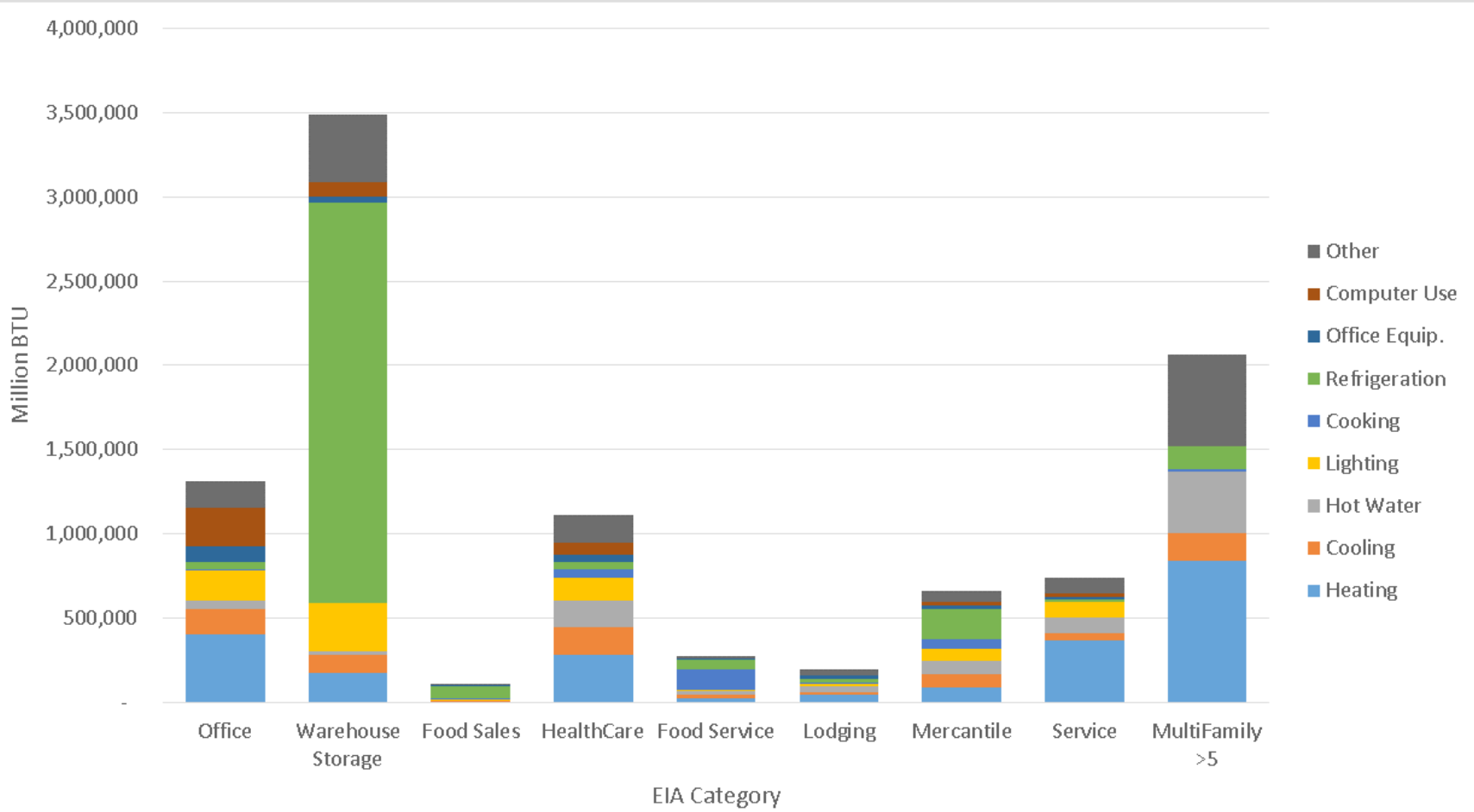


Table 3: Annual Total Energy Consumption (million BTU) for Occupied Commercial Buildings

	Total	*Heating*	*Cooling*	*Hot Water*	*Lighting*	*Cooking*	*Refrigeration*	*Office Equip.*	*Computer Use*	*Other*
Office	1,312,713.83	403,721.15	150,488.35	46,072.17	178,914.29	10,104.79	39,177.56	95,730.03	230,529.77	157,975.72
Warehouse Storage	3,490,803.23	171,974.69	106,288.68	21,289.92	285,858.93	262.55	2,379,689.38	39,877.70	83,038.21	402,523.17
Food Sales	106,931.57	3,285.54	4,904.07	1,716.54	8,302.94	7,594.03	71,149.35	2,319.76	1,641.18	6,018.15
HealthCare	1,108,849.35	281,660.82	165,625.98	158,258.04	134,387.25	49,849.85	43,250.30	44,431.86	71,726.08	159,659.16
Food Service	271,559.49	20,958.00	20,651.36	21,900.47	11,297.66	116,417.89	61,228.68	4,536.35	2,779.25	11,789.82
Lodging	196,834.42	45,003.82	16,775.32	33,002.91	14,009.22	8,704.14	20,603.56	20,645.24	3,305.27	34,784.95
Mercantile	657,210.06	84,856.60	80,851.56	81,529.42	69,443.21	59,896.90	178,175.06	19,213.27	23,705.23	59,538.81
Service	741,205.98	364,713.23	43,264.22	91,026.36	95,392.10	734.08	17,584.68	12,933.08	19,166.37	96,391.86
MultiFamily >5	2,066,760.96	837,678.97	165,697.64	365,924.50	-	15,465.58	137,089.38	-	-	544,904.88
Total	9,952,868.89	2,213,852.84	754,547.18	820,720.34	797,605.59	269,029.81	2,947,947.96	239,687.30	435,891.36	1,473,586.52

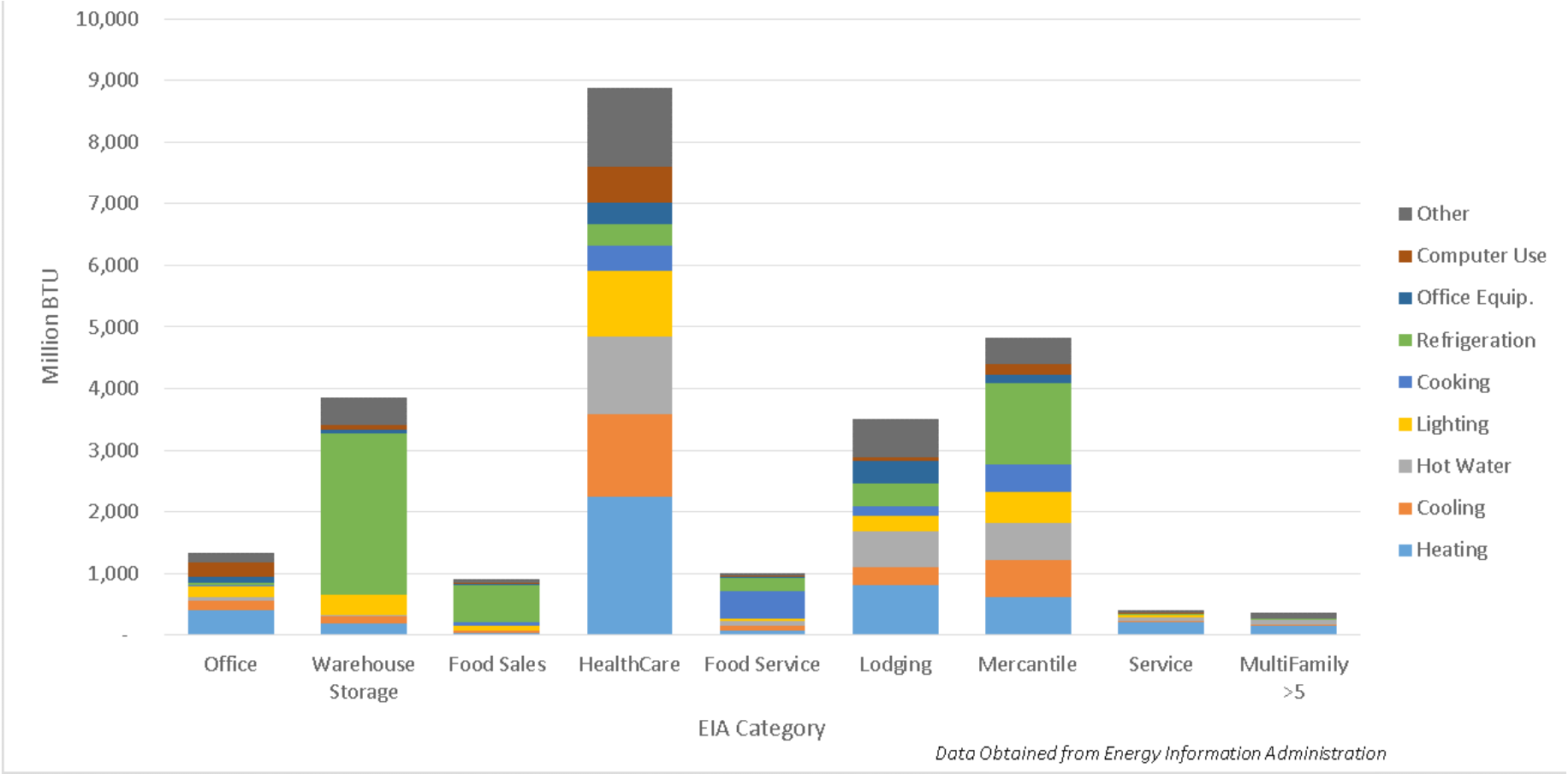
Figure 4: Total Annual Energy Consumption (million BTU) for Each EIA Category



Data obtained from Energy Information Administration

Annual total energy consumption for occupied commercial buildings totals 9.952 trillion BTU. Property classifications that were excluded from this data set are B Commercial Shell, B Industrial Shell, R Apartment Shell, and R Multi-Family Vacant (R53), totaling 132 vacant commercial structures. The classifications were removed from EIA categories, "Office", "Warehouse/Storage", and "Multifamily". The remainder of the EIA categories did not contain property classifications that represented vacant buildings. The first calculation set only includes occupied structures to allow for a more accurate energy consumption estimate, one that excludes the vacant structures, and presents numbers that are not skewed by possible future consumption data.

Figure 5: Average Annual Energy Consumption for Occupied Commercial Buildings



Average annual energy consumption for each occupied building is presented above in Figure 5. This data provides a quick snapshot of building energy consumption per sector. Healthcare has the highest average energy consumption with heating as the largest consumer of power, while Multifamily, and Service have the lowest average energy usage per building. This is important in order to quickly target high energy consumers if a PACE program is developed in Richmond. It also allows for the proposed program to directly address areas of the highest energy consumption such as refrigeration for Warehouse/Storage structures.

2.1.2.2 Total Building Energy Consumption for EIA Categories

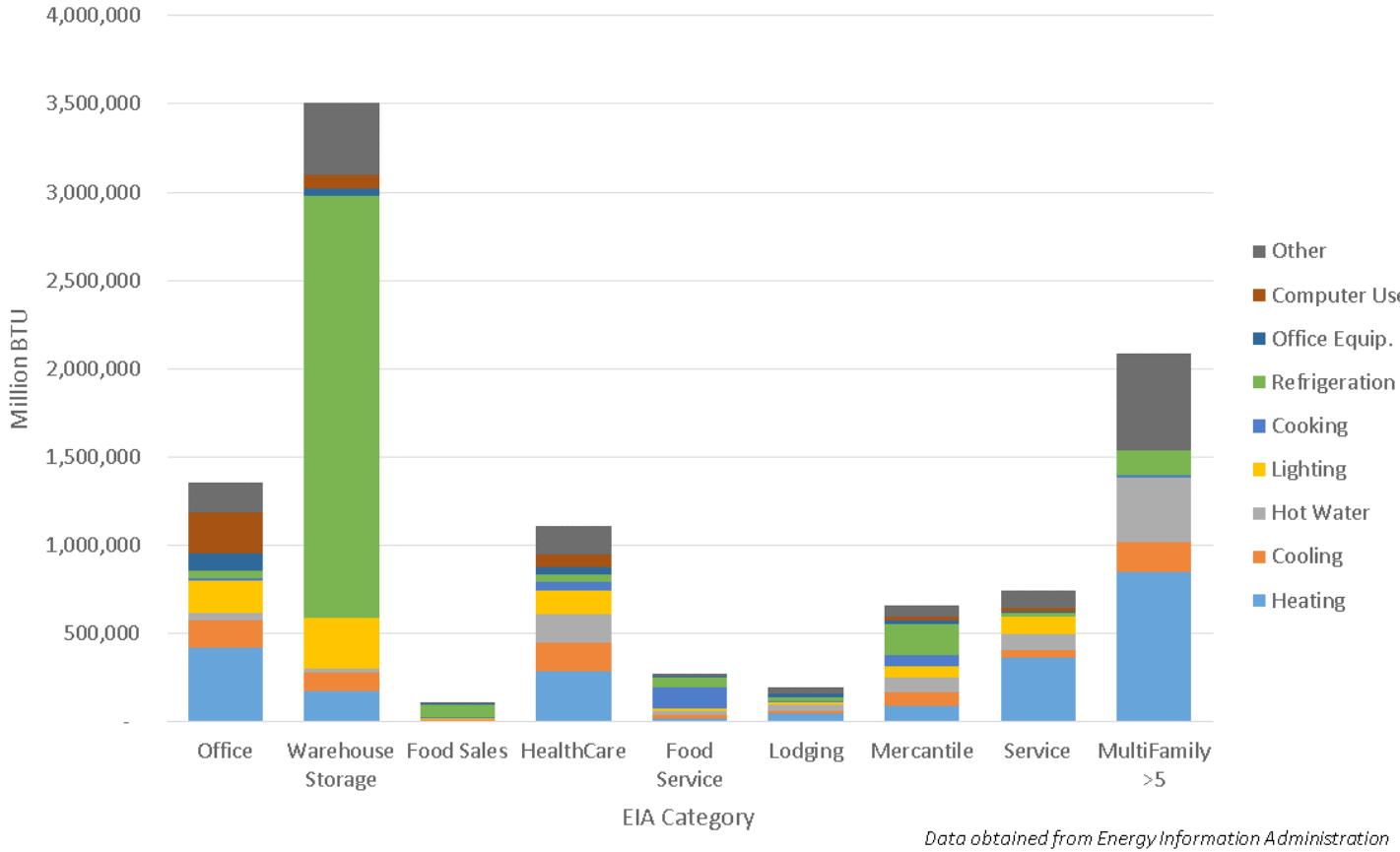
The second iteration of the Richmond commercial sector energy consumption calculations includes all occupied and vacant commercial buildings that were previously excluded, adding an additional 132 structures to the calculation. This produced energy consumption totals that represent the built out building stock; if all vacant commercial structures were rehabilitated and occupied.

Energy consumption for all commercial buildings totals 10,027,293 million BTU; while the difference is not substantial, it is a generous within the affected EIA categories, Multifamily, Office, and Warehouse/Storage. Energy distribution throughout each category remains the same as the previous calculation.

The largest difference is present in the heating end use for Warehouse/Storage structures with a difference of over 1 trillion BTU between the two calculations.

The distribution throughout the EIA cateogies can be seen in Appendix D which presents a series of charts broken out by end use consumption by percentage.

Figure 6: Annual Total Energy Consumption (million BTU) for All Commercial Buildings

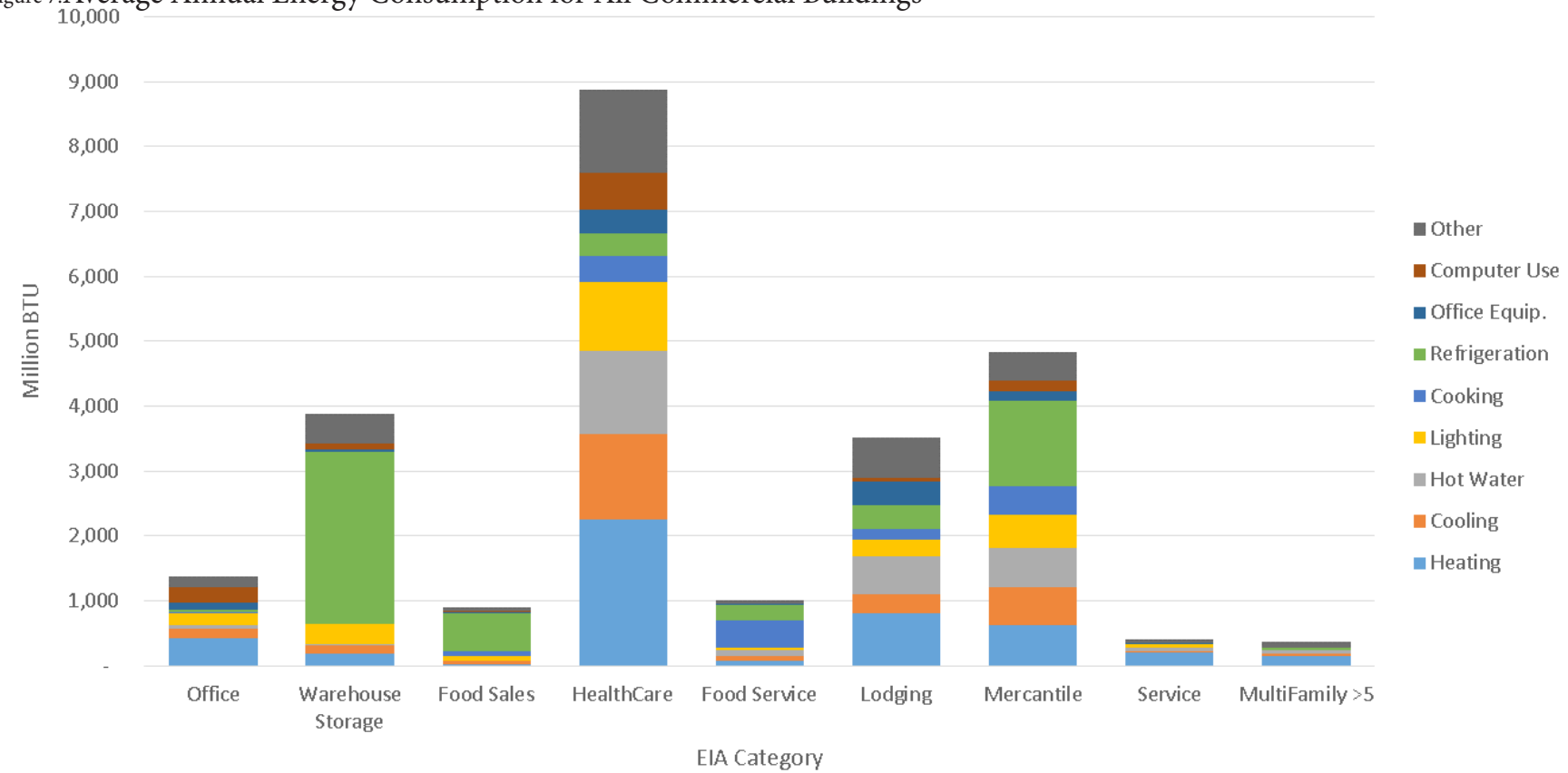


Data obtained from Energy Information Administration

Figure 6 below depicts the estimated average annual energy consumption for all commercial buildings. The chart is nearly identical to Figure 5 due to the structure count difference of only 132 buildings. Many of the average consumption values per building adjust one or two trillion BTU as seen in the Warehouse/Storage category. Detailed consumption comparison between the two calculations can be seen in Appendix E, in addition to the percentage of energy consumed by each EIA category broken out by end use.

The process for calculation was nearly identical as the previous section: energy intensity estimates were multiplied by each building, including the vacant structures, and then totaled. The totals for each EIA category and end use were then divided by the building total for all commercial buildings.

Figure 7: Average Annual Energy Consumption for All Commercial Buildings



Data Obtained from Energy Information Administration

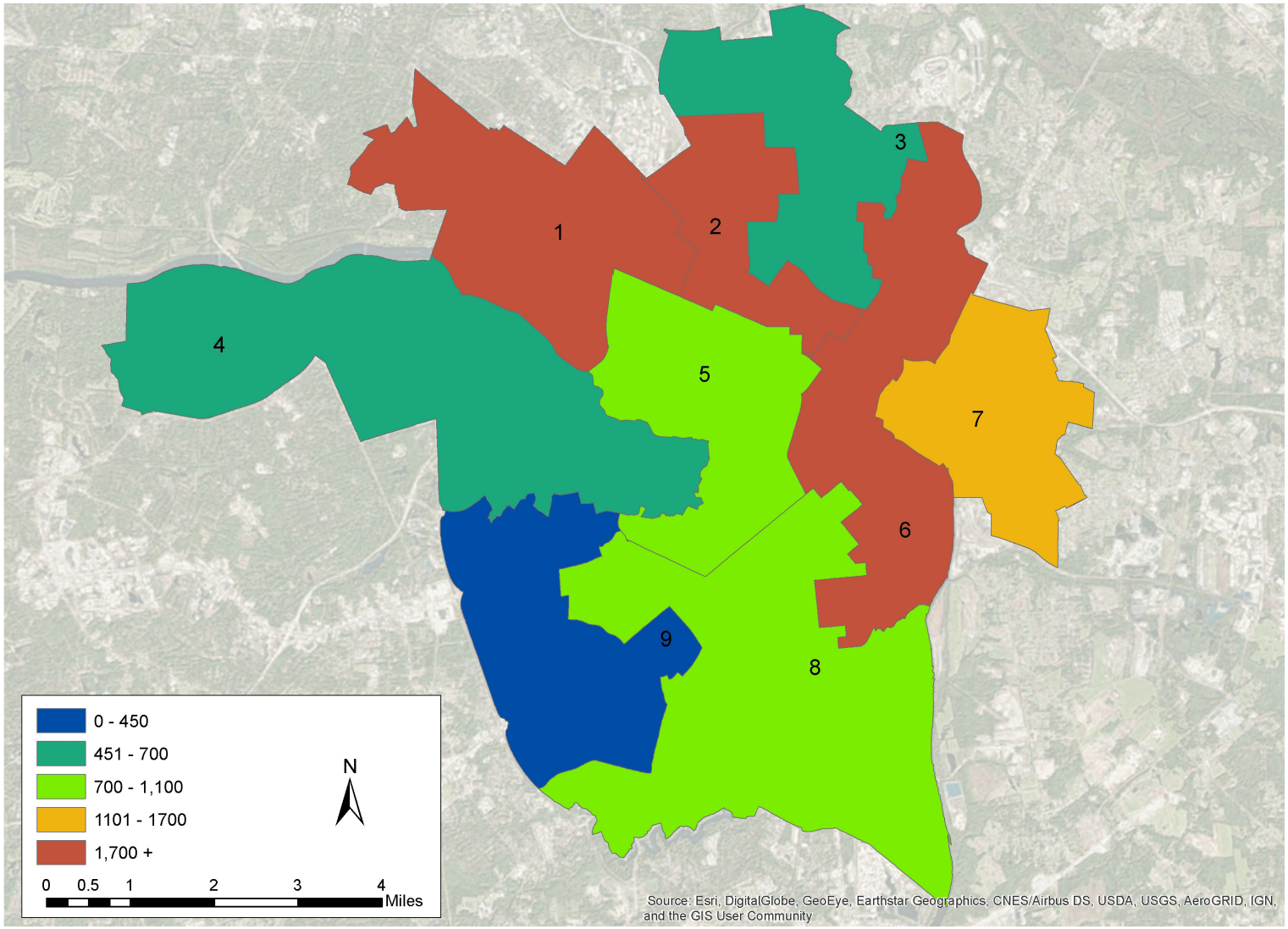
2.1.2.3 GEOGRAPHIC INFORMATION SYSTEMS

Geographic Information Systems (GIS) software is helpful in providing a visual representation of the commercial properties within Richmond, VA. All commercial parcels were first confirmed to have a structure located on them. Those classified as a commercial parcel without a structure were removed from the data set. The City parcels data set was then assigned an EIA category as discussed previously, by pairing property classifications with the EIA categories. The City has just under ten thousand commercial structures. Maps on the following pages present all commercial buildings within the City of Richmond based on assigned category as well as within each City Council district. Using the various data sets, maps were produced about the existing commercial building stock, including distribution over City Council districts, distribution over the entire City, and building stock age.

Utilizing GIS illustrates a great possibility for a commercial PACE program in the City of Richmond, due the volume and variety of commercial buildings distributed throughout the city.

The map below shows the number of commercial and multifamily structures (which have more than 5 units) with each City Council district. The first, second, and sixth districts have the highest concentration of commercial sector buildings.

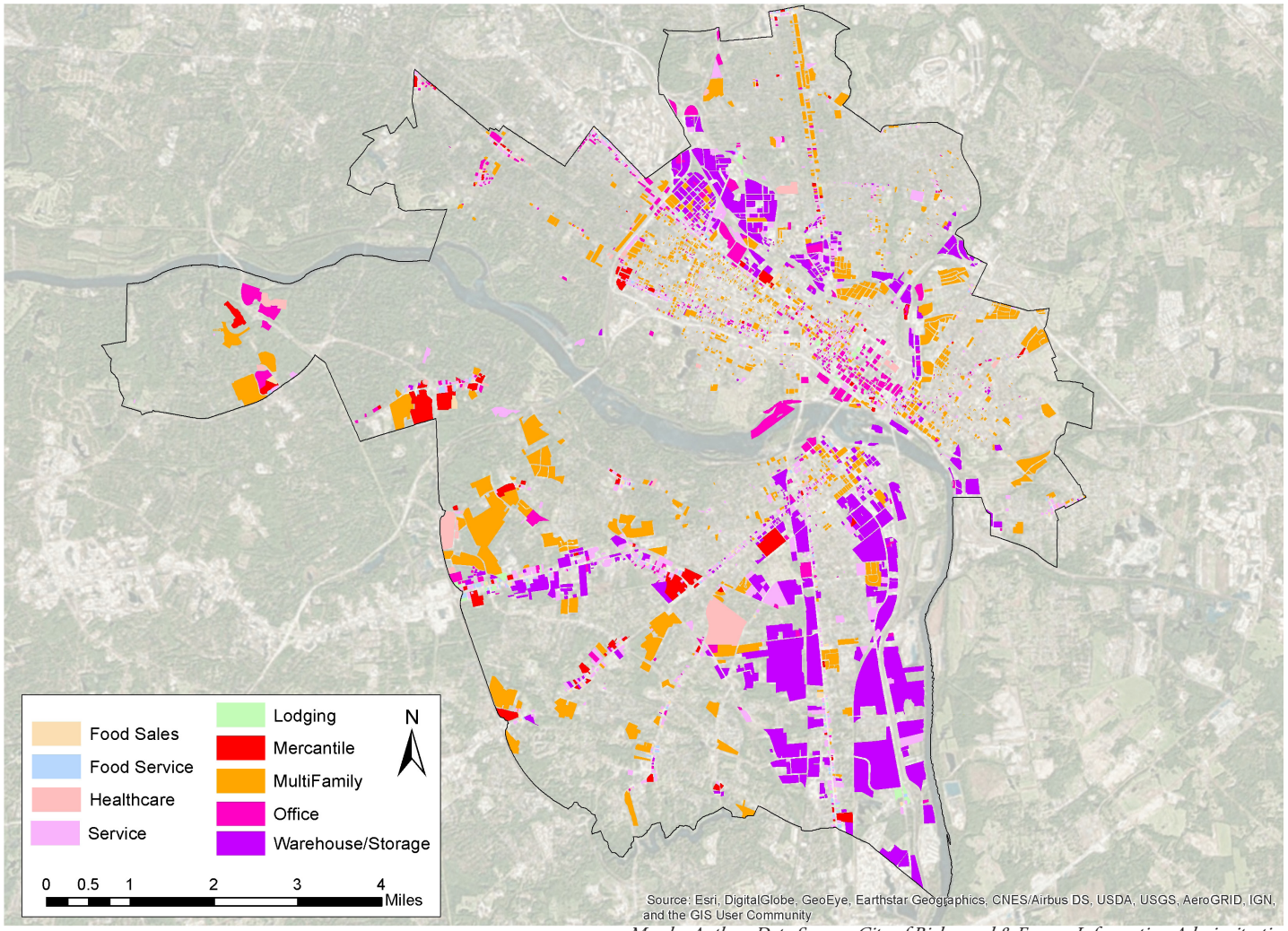
Figure 8: Commercial Building County by City Council District



Map by Author; Data Source: City of Richmond

The map below shows the overall commercial building distribution throughout the City based on the Energy Information Administration's categories. There is a large concentration of warehouse/storage buildings south of James River and a concentration in the northside of the City. Multifamily structures are more evenly spread throughout the city. Conveying the building concentrations by building cateogry allows for a holistic view of the building distrubution.

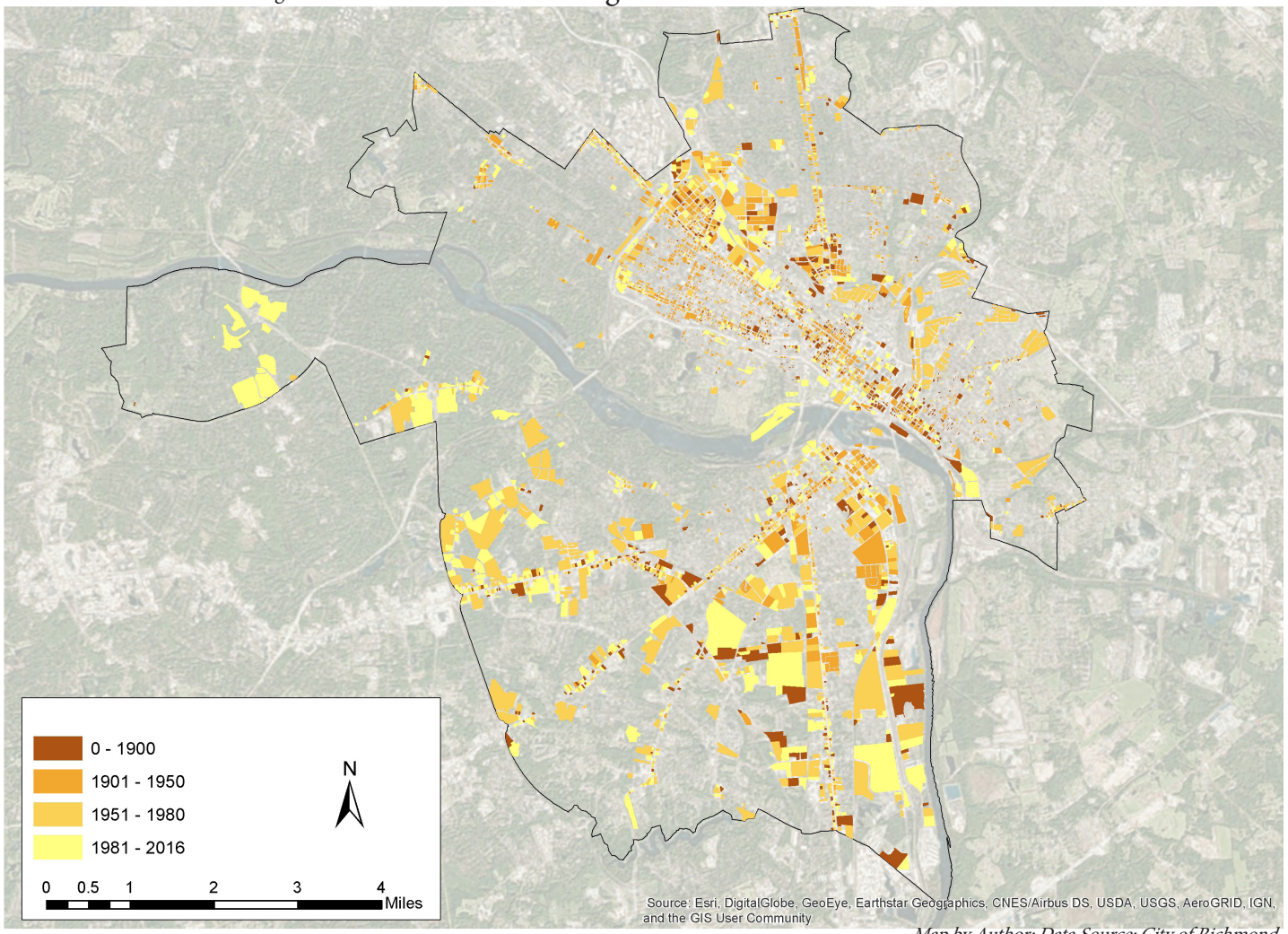
Figure 9: Commercial Building Categories in Richmond, Virginia



Map by Author; Data Source: City of Richmond & Energy Information Adminsitration

The age range of the City's commercial building stock is shown below. Older buildings are presented as a darker color and new buildings a lighter color. This map is meant to present the age range in order to show the distribution of older structures throughout the City. While an older building's construction year does not necessarily mean that these buildings haven't been renovated up to modern standards, newer structures have certainly met the more modern building standards which include modern energy efficiency standards. It is intended that building age not be used as a primary tool for targeting structures, but more as a guide on where to begin.

Figure 10: Commercial Buildings Construction Year



Map by Author; Data Source: City of Richmond

3. Interviews and Case Studies

3.1 Building Owners, Managers, & Developers

Fulton Hill Properties has a portfolio of ~500,000 square feet and concluded that PACE would be something they would be interested in participating in, and even lobbying for.

Fulton Hill Properties manages both residential and commercial properties. Residential tenants are responsible for their own electric and the remainder of the utilities through a pass-through rate the company establishes. Commercial tenant utility responsibility depends on the type of lease, but for office space, it is a net lease with a base stop, meaning the landlord covers utilities up to a certain level, and then the tenant pays the excess costs.

Within Fulton Hill Properties, energy consumption is a huge concern and a large expense. Energy consumption directly translates into what they charge their tenants and how they price units, and directly impacts construction costs and their bottom line. The company is interested in offering as many green upgrades as possible. The more they offer, the more desirable their structures become.

City & Guilds Builders has a range of buildings between 18,000 sqft and 44,000 sqft and said that energy consumption as a large concern with their buildings. Behind debt service, it is the largest annual expense. The organization would be interested in efficiency upgrades especially on historic buildings. They would be interested in participating in a Richmond PACE program to upgrade windows, HVAC systems, insulation, and lighting, with a focus on minimizing cash flow to capital improvement budgets.

Colliers International is a commercial real estate firm that specializes mostly in managing leases and facilitating transactions but also has a small property management operation. The firm mostly represents landlords of commercial, multifamily, and industrial properties. While the organization is invested in energy efficiency and interested in a PACE program, their clients see energy efficiency projects as undertakings with large upfront costs and a limited return on investment. The lack of knowledge about energy efficiency upgrades and PACE suggests a great opportunity for educational materials on PACE. These would demonstrate how the program could help commercial and multifamily landlords attract tenants, while also helping the tenants attract younger employees in the commercial sector by having an upgraded workspace.

The interviews confirmed that there is demand for PACE in Richmond. All interviewed parties are willing and excited to participate in the program and have projects that they desire to complete. Additionally, an opportunity exists for the development of educational and marketing materials in order to convey the benefits of PACE and energy efficiency upgrades. Existing commercial building owners, managers, and developers have a wide selection of commercial and multifamily buildings that qualify for PACE, creating a wide base for the program to be developed upon.

3.2 Lenders & Specialty PACE Investors

The main obstacle that a developing PACE program faces is securing initial

funding for the large loans that the program will be making. Many similar programs are supported with a set amount of total funding available - as was the case in Milwaukee - with a public/private combined funding amount of $100 million.

The older, more established PACE programs received block grants from the DOE, while newer PACE programs lobby for state funds and have to secure private financing. Private PACE investors have stated throughout the interview process that they see PACE programs as an opportunity to gain access to an asset class that is more secure than mortgages and provides a higher yield than traditional treasury bonds. Investing in PACE programs allows their investment portfolio to have a solid base that returns a consistent rate of return. This is due to these loans being tied to property and utilities, and because of that, the loans tend to have a lower default rate.

PACE investor RenewFinancial is interested in participating in mid to long-term investments that are secure in nature with a relatively high yield. A loan interest rate range between 6% and 10% was continuously stated as the optimal range to provide low-interest financing with a return that made the loans viable. RenewFinancial currently participates in both commercial and residential PACE loans. Their loans cap at $25,000 and are typically set up with a payback time frame of 7 to 10 years. These have the purpose of funding small, effective energy efficiency upgrade projects that add value to the community.

Virginia Community Capital (VCC) currently participates in PACE loans in Washington DC (only in the commercial sector) in order to support the organization's commitment to clean energy. VCC currently makes loans terms of between $50,000 to $5 million up to 20 years with interest rates fixed for 5 years and reset every 5 years. They would be willing to make PACE loans in the Richmond market as long as the projects have realistic energy savings estimates, and have a third party program manager to market the program and train the contractors.

TowneBank would not likely be interested in participating in the PACE market in Richmond. It was stated that TowneBank is not interested in participating in a "non-traditional" investment. TowneBank would however, reconsider if a wider adoption of PACE were to take place in the State.

3.3 Case Studies

3.3.1 City of Ann Arbor – Report on Proposed PACE Program

Ann Arbor, Michigan has a long history of advocating for energy conservation, renewable energy, and energy efficiency. Beginning in 2005, Mayor Hieftie issued the city's first Green Energy Challenge in order to investigate how Ann Arbor could reach 20% renewable energy by 2010 for municipal operations, and by 2015 for the whole community.[12] Following the Green Energy Challenge, the city put forth a series of Climate Action Planning goals which included a reduction in city-wide greenhouse gas emissions by 8% from 2000 levels by 2015. It has since been adjusted to project an overall reduction of 25% by 2025 and 90% by 2050.

12 Clean Energy Coalition. (2012). City of Ann Arbor: Report on Proposed PACE Program. Ann Arbor: a2energy.

WHY PACE?

Ann Arbor, Michigan decided to pursue a PACE Loan program after state legislation provided authority for local governments to establish energy financing districts and raise money through the issuance of bonds. The legislation establishes that bonds or notes insured under the legislation advances public purposes, including reducing energy costs, reducing greenhouse gas emissions, encouraging economic stimulation, and increasing employment.

Goodyear Building, Ann Arbor's First PACE project Source: http://www.aadl.org/

Ann Arbor's program operates using a special assessment, a charge that a government can levy against real estate parcels to pay for the installation of projects that serve a public purpose.[11] This is performed within a Special Assessment district. The city receives an application for an applicable PACE project and then, if approved, levies the special assessment against the property for loan repayment. PACE projects serve a public purpose due to their pollution reduction capabilities and resource conservation.[13]

Projects must fall within a range of $10,000 to $350,000 and complete an application screening process where the program administrator determines if the property is qualified or not.[14] If not, the administrator provides information on other avenues for energy efficiency funding. For projects that will exceed $250,000, the administrator requires energy performance contracting.

Benefits

Ann Arbor's decision to move forward with a city wide commercial PACE

13 http://pacenation.us/wp-content/uploads/2013/06/Annual-report-6.18.13.pdf

14 Clean Energy Coalition. (2012).

program was backed by a long list of benefits they identified during the planning process. A longer repayment period allows for more comprehensive energy saving work to be done and therefore allows the scope of projects to be larger and more inclusive.[12] Repayment transfers with ownership, which removes some reluctance to invest in a property that may need to be sold off within a few years. The low interest rates are also an added benefit due to lower interest rates on municipal bonds and other sources of financing available to local governments. That low interest rate is also tax deductible for businesses.

Finally, Ann Arbor stated goal was to increasing economic activity to creates new jobs as the energy sector grows from performing these upgrades on commercial structures.[12] This includes installation positions as well as maintenance and other positions created to support the PACE program.

In addition to the benefits Ann Arbor would receive, the plan stated benefits for the lenders and investors in order to make the program an attractive option. Benefits included lower operating costs, securing energy improvement financing on real property, and that an energy retrofit would create value in excess of the amount of the lien. The created lien is too trivial to merit consideration to the overall value of the property. Finally, the energy savings are dollars that stay in the local community.

Challenges

The one challenge that the Ann Arbor program identified was the National Environmental Policy Act (NEPA) compliance. In order to comply with NEPA, all projects must include a waste management plan in order to address construction waste generated by a proposed project. The plan includes safe disposal methods of sanitary or hazardous waste (construction debris, old light bulbs, lead paint, lead ballasts, piping, roofing material, and asbestos) that is generated by the project.[12]

3.3.2 City of Milwaukee- Property Assessed Clean Energy (PACE) Financing Milwaukee Energy Efficiency (ME2)

The City of Milwaukee, WI has recognized that a PACE financing program creates a strong incentive for commercial property owners to move forward with energy efficiency upgrades in their buildings. Milwaukee published its first sustainability plan in July 2013 with a goal to improve the energy efficiency of 1,000 commercial/industrial buildings and businesses within five years.[15] Second, the plan identifies a goal of 5 million square feet of commercial buildings that will cut energy intensity by 20% by 2020. PACE was recognized in the sustainability plan as a mechanism to achieve those goals set forward.

The Milwaukee PACE program specifically focused on resolving the split-incentive challenge, where benefits from these upgrades gets passed onto the tenants while the building owner receives limited benefits. The property owner is allowed to invest in an energy efficiency upgrade and pass the energy savings and upgrade loan repayment to their tenants by a special charge. [13] The special charge may allow property owners to pass through the cost of improvements to the building's tenants under certain leasing agreements. The City of Milwaukee provides no advice on whether

15 ME2, C. o. (2013, 1 1). Milwaukee PACE Program Manual . Retrieved from Milwaukee PACE: http://city.milwaukee.gov/ImageLibrary/Groups/cityMe2/PDF/Me2PACEProgramManual.pdf

the pass through of charges is legal and is solely dependent on seeking outside legal or accounting advice.

In addition to the special charge, the program provides the standard PACE benefits including access to long-term financing so that energy savings can meet or exceed loan repayment obligations. Milwaukee's open market program allows for building owners to go through their preferred lender if the lender is willing to make PACE loans. If the project is approved, the owner, the lender, and the City will enter into a three party agreement. The city of Milwaukee currently is partnering with Clean Fund and the Milwaukee Economic Development Corporation (MEDC) in order to provide $100 million of private capital to the PACE program. Currently, the minimum project size that the lenders are willing to fund are $150,000.[16]

In addition to the financial partners, the city's energy efficiency program titled, ME2, produced a list of approved commercial contractors that can serve as general contractors, sub-contractors, or performance guarantee contractors which are required for projects over $250,000.

University Club, Milwaukee, WI's first PACE project
Source: http://www.skylinescenes.com/milwaukee-wi/aerial-of-milwaukee-wisconsin_v32254.

Benefits

The City of Milwaukee has a very active citywide energy efficiency program titled (ME2) under which the PACE program falls. Many of the standard PACE benefits discussed in the previous case study apply here: improving value of the property, improving occupant comfort, and replacing outdated equipment with modern efficient equipment. However, the Milwaukee PACE program heavily promotes the marketability of "green features" and the ability to pass project costs to tenants over time. The PACE program is

16 Milwaukee PACE Program Manual, 2013

only available for commercial properties and must not have any property tax delinquencies for three years, and no disputes on record.

In addition to the reduction in energy consumption and subsequent greenhouse gas emission reduction, the city has cited that building occupancy is increasing in buildings that have had PACE projects take place. Sheldon Oppermann of the Building Owners and Managers Association of Wisconsin stated that "our building is more occupied than it's ever been," referring to the City Center building which now, thanks to PACE is both certified as Energy Star and LEED.

Arlington, Virginia

Arlington, Virginia is currently in the process of developing a PACE program. There have been delays in the process of selecting a program administrator, however, the program is expected to be functional in late 2017. Arlington's PACE planning documents could not be obtained for the purpose of this study but should be reviewed as the planning process continues.

Case Study Conclusions

Case studies revealed several program elements that could be incorporated into the proposed Richmond program such as special assessments. Securing private financing must be a key component to program construction, and internal loan and program characteristics must be developed. The reviewed precedent PACE programs utilized both educational materials and a robust marketing campaign in order to educate building owners on the benefits of energy efficiency upgrades and PACE programs.

3.4 Policy Considerations

Interviews with PACE stakeholders within the region revealed clear goals of a commercial sector PACE program and Richmond. Outside of the two traditional goals of PACE, reducing energy consumption and therefore greenhouse gas emissions, two program goals were discussed consistently: the City should develop the program with the intention of (1) making more buildings economically viable, and (2) spurring economic development. Economic development and improving the value of the building stock should be main priorities of a PACE program. The secondary goal of a PACE program should be the reduction in greenhouse gas emissions and an increase in renewable energy.

Benefits of a commercial scale PACE program would extend to property owners, the City, contractors, and capital providers. First, it would address energy consumption and emissions from existing buildings which saves property owners, and possibly tenants, and money on utility bills while also decreasing emissions within the City. Second, PACE is appealing to property owners because of the secure long term financing it offers which results in lower annual payments and immediate positive cash flow. Third, interviewees stated increased marketability of the buildings which increases tenant concentration and therefore tax revenue for the city. It is a way to create jobs, increase economic activity, and improve the building stock, with little to no capital investment on the City's part while also meeting energy conservation goals. Finally, PACE financing can be used as a debt source, where if a project is short on capital PACE financing can be used to fill that gap.

Potential obstacles were discussed with interviewees, and obtaining adequate financing to implement a PACE program was identified as a main barrier to PACE in Richmond. There has to be some upfront financing to implement the program. Another barrier identified is lease adjustment, which is currently not being performing in Virginia. Lease adjustment is important in order to resolve the split incentive challenge that is traditionally an issue with PACE programs. A third barrier is ensuring that the fee structure isn't too high. Limiting the costs to run the program is important because if the cost barrier to even apply is too high, many owners won't participate in the program.

4. Conclusions on PACE Feasibility

Data analysis provides energy consumption values for each commercial building EIA category as well as detailed consumption data describing how energy is utilized within that property type. The analysis produced average consumption values per square foot per end use. These end use consumption numbers create an opportunity to produce a targeted outreach to commercial building owners, focusing on the areas of highest energy consumption. Warehouse/Storage buildings have the highest estimated annual energy consumption total, this provides an opportunity to explore providing incentives on converting vacant or abandoned warehouses, or even underutilized structures to housing or other uses with lower energy consumption rates.

Interviews with commercial building owners, managers, and developers yielded mixed results. Some participants were excited about PACE and would be interested in using the program to finance upgrades to their buildings to reduce costs and use it as a marketing tool to gain more tenants in buildings with vacancy. One interview, Colliers International, said that the clients that they represent often aren't familiar with the benefits of energy efficiency upgrades, therefore that poses an opportunity for an educational, marketing and outreach program to be developed in conjunction with the PACE policy. Common challenges interviewees cited were the time from proposal to implementation, and city bureaucracy.

Interviews with lenders revealed what types of financial support is available or could be available for a Richmond-based PACE program. Loans between $25,000 and $5 million, with interest rates ranging between 6%-10%. Lenders said that the city utilizing a third party administrator was a core component of what it would take to make loans in Richmond.

During the interview process, several new challenges to operating a commercial PACE program arose that were not revealed from case studies or data analysis. Investors cited that commercial PACE loans were more challenging to obtain but when they were reported, they were lucrative, resulting in a very large loan, return, and project scale. Interviewees consistently listed three challenges facing commercial PACE programs.

1. Split-incentives
2. Low Effort Aspect
3. Ownership structure of some properties is extremely complex

The first challenge, split-incentive, is the notion that if an energy upgrade was installed, the tenant or the owner would reap the benefits. Typically, building owners require tenants to pay for energy consumption, so when the building uses less energy due to a project the owners financed, the tenant receives the benefit rather than the owner. In section 2.3.1, the case studies revealed that utilizing a special charge or assessment on a property allowed for building owners to pass along the cost of the projects to the tenants who typically pay the utility bills for the program.

The split incentive issue becomes relevant when a project is performed during the middle of a tenant's lease. The building owner is then unable to modify the lease and is left with paying the bill for the PACE project, while the tenant receives the conservation benefits. Developing a special assessment in order to pass the costs along to tenants would solve the

split incentive issue.

The second challenge noted by the stakeholders is the low-effort aspect. From interviews, the low-effort challenge is that a building owner will wait for certain rebates from local, state, or federal government to perform energy efficiency upgrades. PACE requires building owners to be actively involved in the energy consumption of their building. However, often the building owner isn't local and this leads to the third problem.

The third challenge noted by stakeholders is that the ownership structure of the commercial buildings are sometimes extremely complex. An interviewee noted that often, large financial organizations were the actual owner of the building, however, there were several steps of ownership and smaller companies in between. Interviewee's noted that when they had to contact the owner for financial reasons, they were often passed between larger financial firms, ultimately ending up at larger financial institutions.

An additional challenge arose from discussing PACE with GRACRE members. Many of the buildings that are rehabilitated in Richmond are historical structures that come with restrictions such as no window replacement. How will PACE address those historical roadblocks, or does the historical building guidelines override PACE projects? The city must adequately address those concerns before moving forward with program development.

The existing conditions within the City of Richmond are conducive to supporting a Property Assessed Clean Energy Loan program. There is a large energy demand within the commercial and multifamily sectors, a large commercial building stock totaling almost 10,000 individual structures, and the owners of these structures are interested in performing energy efficiency upgrades at a low upfront cost.

After review of the existing conditions presented in this document, a Property Assessed Clean Energy Loan program in Richmond, Virginia has the strong potential to be successful.

5. Vision, Goals, and Recommendations

To determine the feasibility of a Property Assessed Clean Energy Loan Program in Richmond, Virginia which simultaneously spurs economic development, creates jobs, reduces traditional energy consumption, and reduces Richmond's greenhouse gas emissions.

5.1 Goals and Objectives

Goals and objectives were established to guide the realization of the vision. If the City of Richmond were to move forward with the development of a PACE program, the following goals would provide clear next steps. These recommendations are intended for the City of Richmond and the members of the City approved PACE workgroup in order to guide future analysis and future policy development. Recommendations are established so Recommendation 1 provides future research suggestions on the feasibility of PACE while Recommendations 2-4 are to occur after PACE has been deemed feasible.

Recommendation 1 – Establish next steps of work that needs to be completed in order to determine if a Richmond based PACE loan program is feasible.

Recommendation 2 - Develop a strategy to engage lenders in participating in PACE loans.

Recommendation 3 - Determine program elements that should be further examined for the Richmond City government to adopt into the proposed PACE loan program.

Recommendation 4 - Develop an inclusive Property Assessed Clean Energy Loan Program that adequately addresses challenges and benefits of a PACE program.

Recommendation 1 – Establish next steps of work that needs to be completed in order to determine if a Richmond based PACE loan program is feasible

Objective 1.1 - Engage commercial building owners through marketing and outreach efforts utilizing end use energy intensities as supporting data

The commercial building owner community is largely unaware that PACE programs exist. Extensive marketing and outreach should be performed by the City or third party program administrator in order to advertise the availability of the program if implementation is chosen. Educational programs should focus on high energy consuming sectors with the majority of the energy consumption coming from one end use. For example, warehouse/storage building owners should be targeted with the specific goal of lowering energy consumption within the refrigeration end use, and multifamily building owners should be targeted in order to reduce heating energy consumption levels, which are the highest for the multifamily cateogry.

The City can utilize the Virginia Energy Efficiency Council as a partner in the engagement of commercial building owners and managers. VAEEC is focusing on Richmond, Norfolk, and Charlottesville right now but planning to expand into other markets in 2017. The spread of knowledge of PACE and the corresponding projects it can finance is crucial to the success of PACE, not only in Richmond but in Virginia as a whole. VAEEC provides PACE lunch and learns where interested parties can come to a 90-minute presentation on PACE and enjoy a provided lunch while learning about the benefits of a PACE program. Utilizing VAEEC's extensive network and current educational plans would allow for the Richmond market to be educated on PACE and allow for the City to achieve the above goal.

Recommendation 1 – Establish next steps of work that need to be completed in order to determine if a Richmond based PACE loan program is feasible

Objective 1.2 - Perform a per-unit analysis for Multifamily structures to identify detailed energy consumption

Evaluating multifamily structures more closely will provide a more accurate description of energy usage within the large building stock in Richmond. Obtaining square footage totals of individual units and adjusting for common space would provide a more accurate energy consumption number on a per-unit basis. Further analysis of the multifamily building stock was requested by workgroup members in order to provide more detailed consumption data about currently occupied and vacant multifamily housing units.

Objective 1.3 - Address how vacant structures should be incorporated into the PACE program

The energy calculation as previously discussed includes two scenarios, one with occupied buildings and one with all commercial buildings, both occupied and vacant. Further analysis is needed to determine how vacant structures should be approached as the PACE program is developed. The difference in energy consumption from all commercial buildings when compared to only occupied buildings is 74.424 billion BTU. This consumption amount is what would be consumed by the vacant buildings and building shells if they were to be occupied according to existing energy consumption estimates.

Within this objective an evaluation of an incentive to convert warehouse/storage structures to other uses should occur. Warehouse/Storage structures have the highest estimated annual energy consumption, and with a large footprint could provide opportunities for future developments, led by the rehabilitation and use of PACE loans to create an energy efficient structure.

Recommendation 2- Develop a strategy to engage lenders in participating in PACE loans

Objective 2.1 - Develop a Request for Quotes (RFQ) for lenders

After PACE has been deemed feasible to develop in Richmond, VA, a Request for Quote (RFQ) should be developed for lenders. The RFQ would provide minimum qualifications for lenders to participate in the Richmond PACE program and would also allow Richmond to consolidate lender terms. The RFQ should incorperate guidelines from Objective 2.3, DMME's uniform statewide financial underwriting guidelines in order to provide a streamlined RFQ process.

Objective 2.2 – Establish which local/regional lenders would be interested in making PACE loans and willing to consent with an existing mortgage

Through discussion and interviews, it has been made clear that lenders would be interested in working with and making PACE loans in the proposed Richmond market. Engaging local and regional lenders in addition to large national firms would allow for the program administrator to provide a consolidated list of local, PACE program approved lenders to potential clients. This list would also keep the market competitive providing choice to the clients.

Objective 2.3 – Incorporate and utilize DMME's uniform statewide financial underwriting guidelines for PACE loans

The Virginia Department of Mines, Minerals, and Energy established uniform statewide financial underwriting guidelines to be used when lenders are making PACE loans. These guidelines were developed shortly after passage of the Virginia legislation that enabled localities to adopt PACE programs. Adoption of DMME's uniform underwriting guidelines is mandatory and lenders must be aware of these guidelines when making PACE loans.

Recommendation 3: Determine program elements that should be further examined for the Richmond City government to adopt into the proposed Program

Objective 3.1 – Review 15.2-958.3 of the Code of Virginia item E, to evaluate the implications of implementing a voluntary special assessment lien on real property

State statute 15.2-958.3, item E states that a locality can implement a special assessment on a property for the facilitation of the PACE program. These special assessments are attached to the land and transfers when ownership changes. This enables the City to enforce it in the same manner that a property tax lien against real property can be enforced. The special assessment enables the program to recover costs and expenses attributed with a PACE program.

Objective 3.2 – Determine the types of renewable energy production/distribution, energy usage efficiency improvements, or water usage efficiency improvement that qualify for PACE

PACE stakeholders and City officials should determine the types of renewable energy and efficiency projects that would be covered under the proposed PACE program. It is recommended that policy developers look to other successful PACE programs around the country in order to gain an understanding of what is typically covered under these programs. Successful PACE programs tend to include all energy efficiency upgrades from insulation to HVAC upgrades to renewable energy installations, in order to adequately cover the market desires. Peer PACE programs such as Milwaukee and Ann Arbor, include renewable energy production systems, water efficieincy systems, building envelope improvements, and new doors and windows.

Source: https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=r-

Recommendation 4 - Develop an inclusive Property Assessed Clean Energy Loan Program that adequately addresses challenges and benefits of a PACE program

Objective 4.1 - Determine how a PACE program would function in conjunction with Historical Tax Credits and the Historical building Code

Evaluate Richmond's historical building code and federal and state historical tax credit programs to determine if PACE projects can be implemented on properties utilizing those tax credit programs. Through interviews with commercial building owners, it was revealed that the interaction between historical building code and historical tax credit programs and the proposed PACE program was a point of contention.

Building owners were wary that if they participated in PACE projects that they would lose the ability to participate in historical tax credit programs and be unable to meet historical building code requirements. It is recommended that PACE program developers converse with the City of Richmond Planning & Department and specifically those that work in Planning & Preservation to determine if there is an overlap where both programs can function successfully. The program must determine how to benchmark energy usage to establish savings when the building is vacant.

Objective 4.2 - Support the streamlining of the implementation process for localities to adopt PACE

The VA Department of Mines, Minerals, and Energy is heading a project titled:

The Mid-Atlantic PACE Alliance: Transforming and standardizing Property Assessed Clean Energy Markets in Virginia, Washington, DC, and Maryland.

Which is comprised of several processes in order to educate and streamline the development and implementation of PACE programs in the mid-atlantic. The program is comprised of engaging stakeholders through outreach efforts, providing a strong consistent marketing strategy, and providing technical assistance in all jurisdictions. During program development Richmond should work with DMME in order to implement some of these processes.

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Appendicies

Appendix A - Commercial Building Owners/Managers Interview Questions

Richmond is currently evaluating existing conditions in support of and interest in a Property Assessed Clean Energy program and as my professional plan for the masters of urban and regional planning program at VCU I'm assisting in the evaluation of the feasibility of a citywide PACE program. The city would also would like feedback on interest in energy benchmarking, building energy labels, and building energy competitions.

Property Assessed Clean Energy programs are programs that provide loans for energy efficiency upgrades to a building. Virginia passed enabling legislation in 2015 that allows localities to form a PACE lending program for commercial buildings, including industrial and multi-family buildings with greater than 4 units. Under a PACE program a building owner could apply for funding for a specific clean energy project. If a loan is granted, those fund are used to cover the up-front costs of the clean energy project. These loans can be used to fund a variety of projects including water conservation upgrades, energy efficiency retrofits, or renewable energy installations. Repayments on the loan are then made via the property tax assessments, and the loan obligation stays with the property if it is sold to a new owner.

Benchmarking energy use is a process of comparing building energy use over a period of time, both internally and externally, to similar buildings to determine how its performance measures up. If benchmarking reveals poor performance relative to the peer group, management can take actions to improve.

Building energy labels are typically developed as a result of energy benchmarking similar to the federal government's Energy Star program which awards the Energy Star designation to commercial buildings that achieve a score of 75 or higher using Portfolio Manager benchmarking. LEED certification, National Green Building Standards and other green building programs operate in a similar manner.

Finally, building energy competitions which allow owners and occupants to compete and earn recognition for their efforts for reducing their energy consumption when compared to their peers in benchmarking software. The city gains access to the consumption data and can operate a local competition or participate in national scale ones.

Appendix A continued

1. Are you a real estate developer, building owner, or property manager?

2. What type of properties do you own, manage, or develop?

3. What is the typical size of the buildings you own, manage, develop, etc.?

4. How much is energy consumption a concern with your building?

5. Are tenants or owners responsible for energy usage payments?

6. Are the monthly energy payments a major cost concern?

7. Are you/would you be interested in water efficiency, renewable energy, or energy efficiency upgrades?

8. Have you heard of Property Assessed Clean Energy Financing prior to me contacting you?
   a. How did you learn about it?

   b. With the information about PACE that is presented would you be interested in participating in a PACE program if it was available in Richmond? Why or why not?

   c. What types of projects would you consider financing with PACE?

   d. What are the potential benefits of a PACE program?

   e. What benefits of a PACE program do you find most attractive?

   f. What potential concerns do you have with utilizing a PACE program?, or what challenges you see with the process?

Appendix B - Lender/Investor Interview questions

Does your organization currently make PACE loans, or participate in a PACE program in any way?

IF YES:

1) In what communities do you make PACE loans?

2) Do you make commercial or residential PACE loans - or both?

3) Why are you making PACE loans?

4) What is the range of loan amounts (in dollars) that you offer?

5) What are some of the key loan terms for a PACE loan?

6) What PACE program factors or dynamics are important?

IF NO:

1) Would you be willing to make PACE loans for commercial-sector borrowers in Richmond?

IF YES:

1) Why would you be interested in making PACE loans?

2) What is the range of loan amounts (in dollars) that you would be willing to offer?

3) What would be some of the key loan terms for a PACE loan?

4) What PACE program factors or dynamics are important?

IF NO:

1) Why not?

2) Would any factors or conditions make you more likely to consider offering PACE loans?

Appendix C - PACE Stakeholder Interview Questions

1. What do you think should be the goals of a commercial-sector PACE program in Richmond? Please rank the following on a scale of 1 (least important) to 6 (most important):

   a. Create new jobs in the clean energy sector
   b. Encourage capital investment in commercial and multi-family building stock
   c. Make existing commercial and multi-family buildings more energy efficient
   d. Increase renewable energy use in existing commercial and multi-family buildings
   e. Reduce citywide greenhouse gas emissions
   f. Reduce citywide energy use

2. Please elaborate on the goals that the program should have, including any that were not included on this list.

3. Please rank the benefits that you think could result from the development and implementation of a commercial PACE loan program in Richmond from 1 (least important) - 4 (most important).

   a. Enables secure financing over a long term to spread the cost of the project over 5-20+ years
   b. Establishes repayment of debt obligation which transfers along with ownership of property and overcomes hesitancy to invest in longer payback projects
   c. Addresses energy efficiency and emissions from existing buildings with a large carbon foot print
   d. Increases value and marketability of the buildings

4. Please elaborate on the potential benefits of the program, including any that were not included on this list.

5. Please rank the potential barriers to the development and implementation of a commercial-sector PACE program in Richmond from 1 (least important) - 3 (most important).

   a. Obtaining adequate financing to offer a PACE program
   b. Owner/tenant split incentives: Meaning that owners pay for energy upgrades but the tenants reap the benefits of the decrease in energy consumption
   c. Legal, administrative and other expenses to set up a PACE program Not large enough scale (i.e. number of properties willing to participate) in Richmond for PACE program to succeed

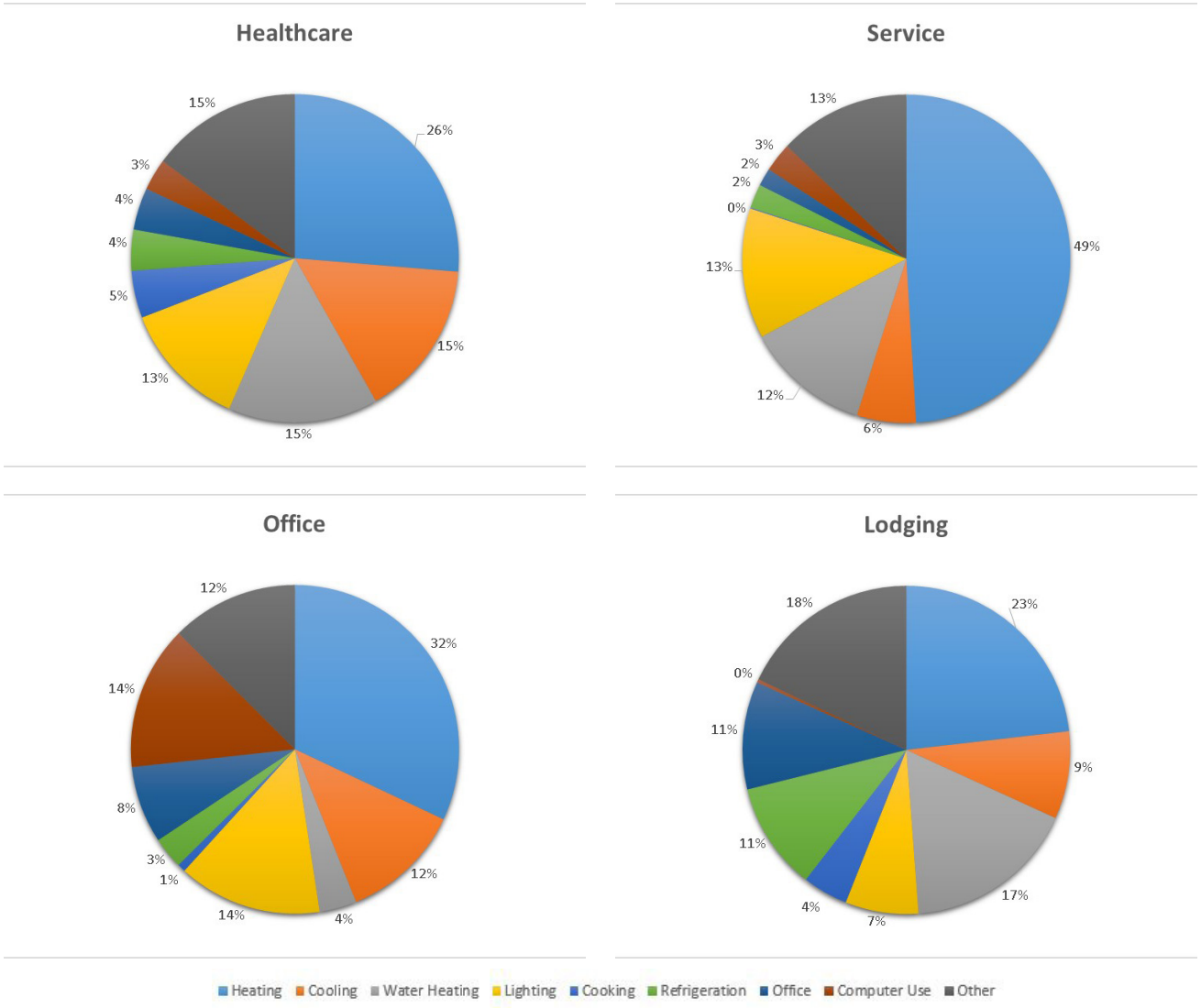
Appendix C - PACE Stakeholder Interview Questions

6. Please elaborate on the potential barriers to the development and implementation of the program, including any that were not included on this list.

7. Do you think a PACE program is the best method to reduce citywide energy use and greenhouse gas emissions as opposed to other initia tives, i.e. benchmarking and disclosure, energy competitions, etc?

8. What do you think are the most important factors for the success of a Richmond PACE program?

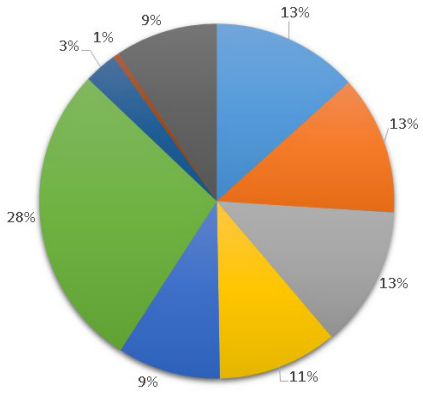
Appendix D - Energy Breakdown by end use for Each EIA Category



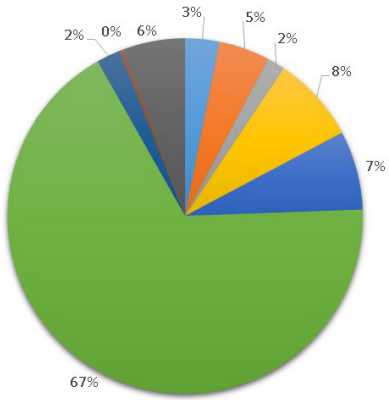
Charts Compiled by Author; Data Source: Energy Information Agency

Appendix D - Continued

Mercantile



Food Sales



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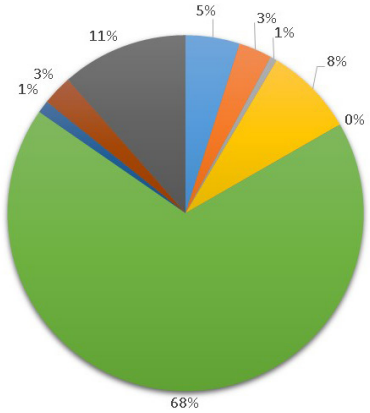
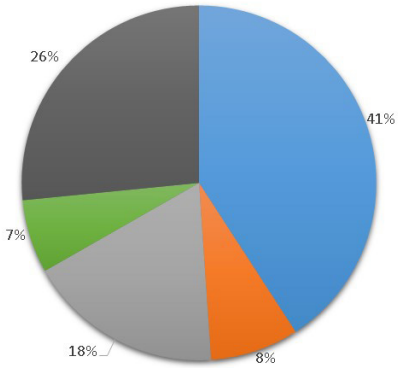
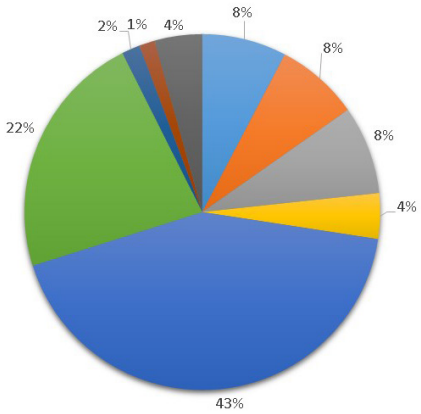


Multifamily >5



Food Service



Heating Cooling Water Heating Lighting Cooking Refrigeration Office Computer Use Other

Charts Compiled by Author; Data Source: Energy Information Agency