2013

Virginia Energy Efficiency Industry Census:

REPORT AND RECOMMENDATIONS

VAEEC

VIRGINIA ENERGY EFFICIENCY COUNCIL

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ACKNOWLEDGEMENTS

The Virginia Energy Efficiency Council would like to thank the Energy Foundation for its generous support of the 2013 Virginia Energy Efficiency Industry Census. We also thank all of the firms that responded to the Census.

Additional thanks goes to the Center for Urban Affairs and Community Services at the North Carolina State University for assistance in programing the online survey and administering telephone interviews. The VAEEC also deeply appreciates the efforts of our partner organizations on the Southeast Clean Energy Industry Census: North Carolina Sustainable Energy Association, Southface, and the South Carolina Clean Energy Business Alliance.

The report was authored by Cynthia Adams, Bill Greenleaf, and Annie Suttle. Report reviewers included the Virginia Energy Efficiency Council Governance Board and Harold Crowder, Managing Director.

The nonprofit Virginia Energy Efficiency Council was founded in 2011 with a mission to assess and support programs, innovation, best practices and policies which grow the implementation of energy efficiency in Virginia and provide a forum for stakeholder interaction.

EXECUTIVE SUMMARY

In 2013 the Virginia Energy Efficiency Council (VAEEC) conducted the first-ever census of the energy efficiency industry in the Commonwealth of Virginia, measuring the impact of this robust and growing industry on the state's economy. More than 300 organizations responded to the survey, self-reporting on everything from how many people their companies employed and annual revenue, to skills gaps and market catalysts.

Among other key findings, the census revealed that energy efficiency is at a minimum a $289 million industry with an estimated 9,400 jobs.

The primary sectors identified that define the energy efficiency industry are:

- Energy Efficiency Retrofits to Existing Buildings
- Education, Services and Consulting
- New Energy Efficient Design and Construction

Companies cited as factors they consider when hiring:

- Consumer awareness
- Access to utility programs and incentives

Respondents identified five top market catalysts:

- Green/energy efficiency building programs
- Rebates
- Performance based incentives
- Adoption or enforcement of enhanced building codes
- Improved access to customer energy usage data.

Why conduct a survey of this nature?

The VAEEC understands the importance of assessing the state of an industry that is largely invisible despite its promise of jobs and economic opportunity. The VAEEC elected to pursue this census to obtain the first-ever snapshot of this important industry in Virginia. Prior to the establishment of the VAEEC, there was no collective voice for the energy efficiency industry – and certainly no accounting of the industry's breadth and depth. For the VAEEC or any entity to effectively show that energy efficiency is a powerful economic driver or that a certain policy would benefit the state, one needs real data.

The inaugural census will be the first of many, and as such it provides a baseline by which we can gauge the growth of the industry and effectiveness of policies and initiatives. The data in this report will be used to:

- Assess the state of the industry
- Educate media, consumers, businesses, and policymakers about the industry
- Advocate for the tools and initiatives for which the industry expresses a need
- Set a baseline for tracking the industry's growth
- Determine the effectiveness of new tools, initiatives and policies

To that end, this report closes with a set of recommendations for policy makers and stakeholders that were selected by asking three questions. First, what did Virginia businesses identify as the most important market drivers for hiring and

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expanding the industry? Second, where has the state already made investments with respect to energy efficiency on which we can build? And third, what are the low-hanging fruit that would have maximum economic impact at the least cost to the state budget?

What emerged was a set of five recommendations that the VAEEC will embrace:

1. Expand state support for the residential Home Performance with ENERGY STAR program
2. Enable the creation of a statewide Commercial Property Assessed Clean Energy (PACE) program for nonresidential buildings
3. Expand performance based contracting in state-owned buildings
4. Adopt IECC 2012 Building Code for residential construction without revisions
5. Convene a stakeholder session on increasing the breadth and depth of energy efficiency programs to help meet the state's voluntary energy efficiency goal

The energy efficiency industry in Virginia has deep roots and a strong growth pace, as evidenced by the 2013 census. The Commonwealth has made smart investments with proven ROI on which we can build, along with a trove of best practices to share and emulate. That is the landscape into which this report and these recommendations are introduced.

INTRODUCTION

RESEARCH CONTEXT

It is difficult to find a report or forecast on the energy industry that does not mention the strategic value of energy efficiency for meeting capacity, greenhouse gas emissions reductions, cost savings, or other goals important to our nation. At the state level, Virginia has been ranked 36 by the American Council on an Energy Efficient Economy (ACEEE) in its 2013 State Energy Efficiency Scorecard[1] for widespread adoption of policies and regulations to support the energy efficiency industry. To the south, ACEEE ranks North Carolina as 24, and to the north, Maryland as 9. Virginia does have a voluntary energy efficiency goal of reducing our electric use by 10% from the 2006 baseline by 2022. However, there are no prescribed milestones for tracking the state's success in meeting this goal. While the state's largest utility Dominion Virginia Power is projecting a 5.1% reduction if they fulfill all of their Integrated Resource Plan programs, that still leaves 4.9% unaccounted for, and Dominion is responsible for almost 70% of electric sales statewide. Virginia is also forecast to be short of electrical capacity by over 7000 MW by 2020[2], and hence companies such as Dominion and Appalachian Power are building more power plants to meet this increased demand and replace aging facilities. Clearly, and as is the case in many other states, there is more work to be done in the Commonwealth to ensure that cost-effective efficiency opportunities are included in our energy mix.

The VAEEC's inaugural census report identifies opportunities for all stakeholders – policymakers, regulators, businesses, and local and state government agencies – to engage in a dialogue on how best to support greater implementation of energy efficient technologies and services. However, "energy efficiency" can mean different things to different people; often it is confused with energy conservation that is behaviorally focused. In contrast, energy efficiency involves making asset level changes to buildings such that regardless of the occupant's behavior, that building is engineered to use less energy. Energy efficiency means using less to do more, as opposed to simply doing without. A perfect example of this is the state's DMV headquarters building on Broad Street in Richmond. According to the Department of Mines, Minerals and Energy (DMME), a recent energy efficiency project has reduced their annual energy bill by 35%, which demonstrates good governance of taxpayer dollars.

There are a range of products that can make a building more efficient: heating and cooling systems, insulation, air sealing, lighting, building controls and automation, fenestration, smart meter and smart grid technology, innovative design, water efficiency, and more. For existing buildings, usually some detective work is required via a comprehensive energy assessment, re- or retro-commissioning, or an investment grade energy audit. Some Virginia localities, like Arlington County, have even begun to look beyond individual buildings – to groups of buildings that would benefit from district heating and cooling. For new construction, energy efficiency is often value-engineered in during the design and planning stages of the building for maximum benefit at least cost for the owner or occupant. In many Class A commercial markets, LEED or ENERGY STAR certified buildings are becoming the norm, as owners and renters look to reduce operating costs over the life of the building through ensuring lower utility bills.

1. ACEEE 2013 State Energy Efficiency Scorecard *www.aceee.org/state-policy/scorecard*
2. 2010 Virginia Energy Plan *www.dmme.virginia.gov/DE/VEP_TitlePage.html*

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Generally speaking, energy efficient buildings rent or sell sooner and for a premium compared to buildings which are inefficient[3]. Many states have recognized these benefits and have created special lending programs like Commercial PACE to promote more energy retrofits in the commercial sector (e.g., Texas, Florida, and Ohio).

From a public sector perspective, energy efficiency is an asset that can be monetized with respect to our public buildings. Since 2008 public bodies' (state agencies, higher education, K-12 and municipalities) budgets have tightened to the point where it can be a struggle for facility managers to maintain and/or renovate their buildings. According to Trane, the leading energy performance contracting company in Virginia, most public buildings spend 20-30% more on energy than necessary; these expenses could be "recovered" through energy upgrades at no additional cost to taxpayers through work that pays for itself. Trane estimates that there are over $1 billion in self-paying energy efficiency projects in public buildings alone, which would be a huge boon to the Commonwealth's economy – creating jobs and catalyzing workforce development.

Unlike renewable energy technologies, such as solar panels on roofs, energy efficiency is largely invisible. That holds true from the individual building to the industry wide level. Utilities and Energy Service Companies (ESCOs) are the most recognized businesses having a vested interest in its implementation, but in fact, this industry employs thousands of workers across the state in activities as diverse as sheet metal manufacturing to demand response software.

Most people don't think of "energy efficiency" as a distinct product created from the efforts of a diverse industry; it is not generally valued as a true resource that can be measured, documented, and ultimately factored into our energy portfolio. Because of its relative invisibility, many of the economic benefits associated with energy efficiency often go unnoticed as well. These benefits extend far beyond reduced energy bills, and they include increased productivity, higher quality of life, health benefits through more or better ventilation, local economic development, and downward pressure on utility rates.

An important goal of the VAEEC is to help our state more fully realize the economic and social benefits that result from energy efficiency. Based on feedback from the census, this report also provides stakeholders with recommended next steps for achieving a robust energy efficiency industry.

3. Program on Housing and Urban Policy Working Paper Series, "The Economics of Green Building" *http://urbanpolicy.berkeley.edu/pdf/EKQ_041511_to_RESTat_wcover.pdf*

INTRODUCTION

PROJECT BACKGROUND

ABOUT THE VAEEC

This report was commissioned in 2013 by the Virginia Energy Efficiency Council (VAEEC), a nonprofit organization whose mission is to assess and support programs, innovation, best practices and policies which grow the implementation of energy efficiency in Virginia and provide a forum for stakeholder interaction.

The VAEEC was formed in 2011 by a handful of Virginia energy efficiency leaders and advocates who recognized that the industry needed a unified voice and presence to sustain growth and continue to provide strong economic and environmental benefits to the Commonwealth.

VAEEC's member ranks are comprised of 40+ (as of February 2014) member companies, local governments, utilities, nonprofits, Fortune 500 companies, and government agencies. Led by an 11-member Governance Board and, in early 2014, an Executive Director, the VAEEC's vision is for energy efficiency to be a widely implemented resource providing cost effective solutions for Virginia.

The full VAEEC Governance Board list, along with the full VAEEC membership list (as of February 2014), is available in the appendices.

ABOUT THE SOUTHEAST CENSUS

The Virginia Energy Efficiency Council census was part of a broader four state effort, the Southeast Clean Energy Industry Census (Southeast Census). The Southeast Census is a partnership among VAEEC, the North Carolina Sustainable Energy Association (NCSEA) http://energync.org/, South Carolina Clean Energy Business Alliance (SCCEBA) http://www.scceba.biz/, and Southface http://www.southface.org in Georgia. The Southeast Census surveyed companies, institutions, and organizations (collectively referred to as "firms" in this report) to understand employment, revenue, and policy drivers of various sectors and activities within the region's clean energy industry.

The data and reports are available online at www.cleanenergyindustry.org. The census questions are available online at www.vaeec.org.

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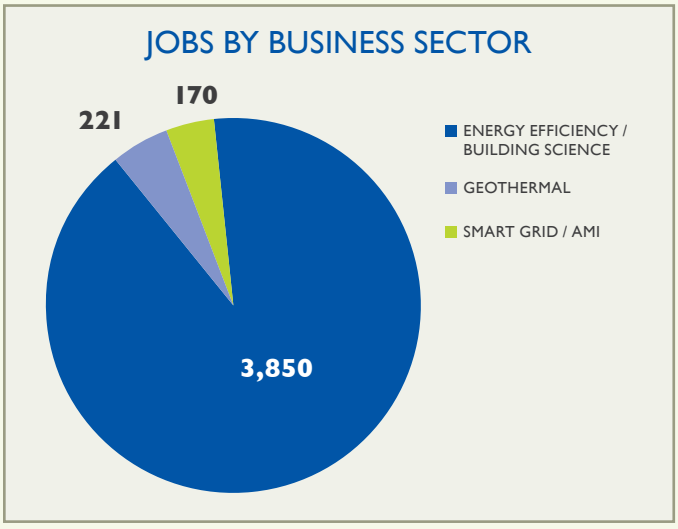
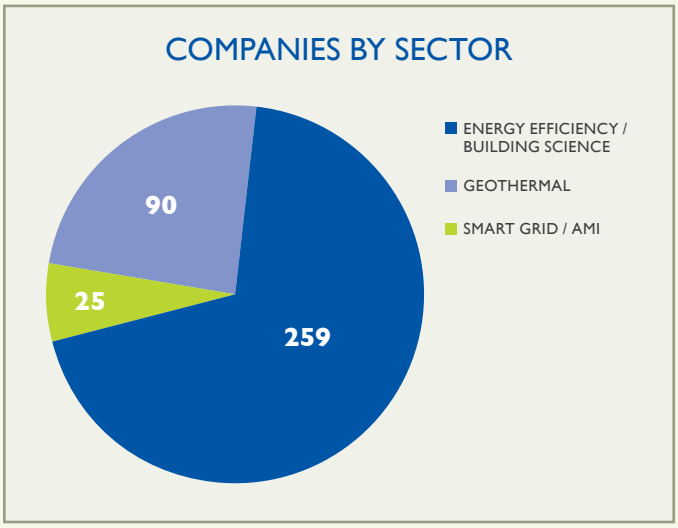
EMPLOYMENT AND BUSINESS ACTIVITY BY SECTOR

As can be seen by the graphs, most of the respondents to the census work in the building science or energy efficiency implementation sectors. Our estimate of 9,400 energy efficiency jobs (based on the 4,241 reported jobs in the census) is very conservative. Other proxy sources for energy efficiency jobs include the Department of Labor statistics on insulation and HVAC contractors, for example. As of May 2012, the US Government Bureau of Labor Statistics estimated 8,330[4] HVAC jobs[6] in Virginia and 1,500 insulation[5] jobs in Virginia. These two combined total close to 10,000 jobs, and this number does not include many other job categories working in the energy efficiency sector.

Wherein lies the discrepancy? The VAEEC found that many HVAC and insulation contractors did not view their work as being part of the energy efficiency industry, and even some who did only identified a single employee who might perform energy audits as being an energy efficiency related job. This despite the fact that the business employed hundreds of workers as installers, service technicians, estimators, and salespeople for high efficiency heating and cooling products. Misperceptions and miscategorizations limited the reported data for this question. In subsequent reports, the VAEEC will address these issues in our initial outreach to businesses.



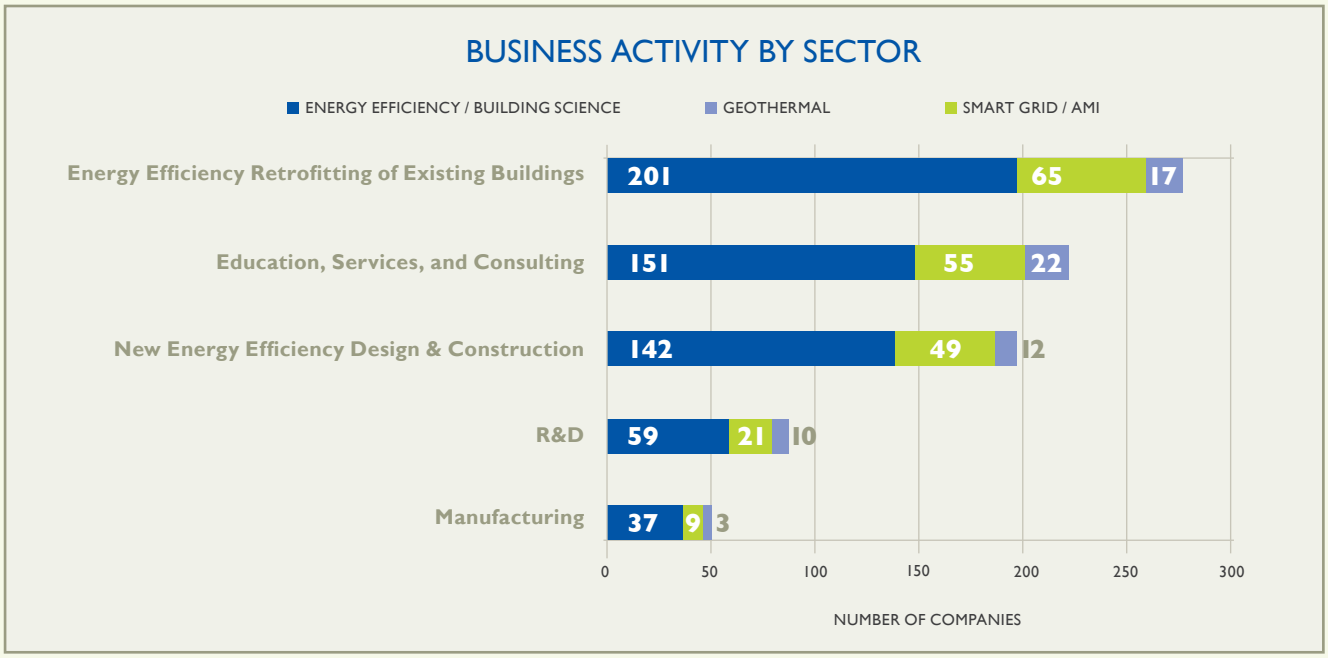


4. Occupational Employment Statistics: Heating, Air Conditioning and Refrigeration Mechanics and Installers" *http://www.bls.gov/oes/current/oes499021.htm* 5. Occupational Employment Statistics: Insulation Workers, Mechanical *http://www.bls.gov/oes/current/oes472132.htm*

FINDINGS

BUSINESS ACTIVITY BY SECTOR

Census respondents were asked to estimate the percentage of their organization's staff time allocated to a list of business activities. The primary business activities were Energy Efficient Retrofits to Existing Buildings (201); Education, Services and Consulting (e.g. law, engineering, finance) (151); New Energy Efficiency Design and Construction (142); Research and Development (59); and Manufacturing (37). The majority of businesses clearly work directly implementing energy improvements in buildings.



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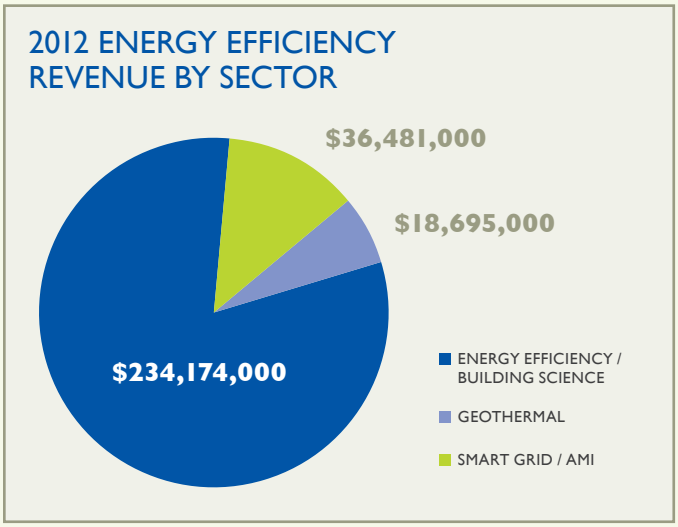
REVENUE SOURCES BY COMPANY SECTOR

The total energy efficiency revenue reported by those companies choosing to report their 2012 revenue to the VAEEC was $289 million. The majority of the revenue is derived from the building science focus area. The revenue breakdown by efficiency sector is presented in the graph.

The actual energy efficiency revenue in Virginia is likely to be to two or three times the reported number of $289 million as less than 25% of the companies working in the energy efficiency sector in Virginia responded to the census.



According to information provided by the Department of Mines, Minerals and Energy, from 2001 to 2012 over $550 million of energy performance contracting has been put in place, saving state taxpayers a combined $170 million from 2001 to 2012. Trane estimates an additional $1 billion of performance contracting opportunities exist in Virginia.

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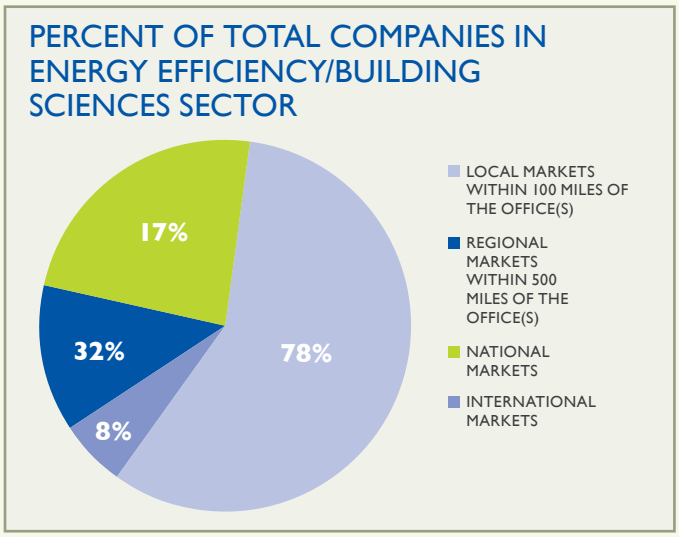
DISTRIBUTION OF PRODUCTS AND SERVICES

Census respondents were asked what percentage of their organization's products and services in the past 12 months were provided to customers in: local markets within 100 miles of the office(s); regional markets within 500 miles; national markets, and international markets.

More than three-quarters (78%) of the energy efficiency/ building sciences companies serve their local markets within 100 miles of their offices. An additional 32% serve regional markets.

These findings underscore the significant economic driver and job creator energy efficiency can be in Virginia, as the majority of the work performed benefits markets and clients located in the state. Major aspects of the industry, such as residential weatherization and commercial energy upgrades, are difficult to outsource. Thus these activities support the local and state economy via taxes, payroll, and goods/services delivered. Notably, workers who are locally based make their own purchases of goods and services in the local community, thus multiplying the economic benefits.



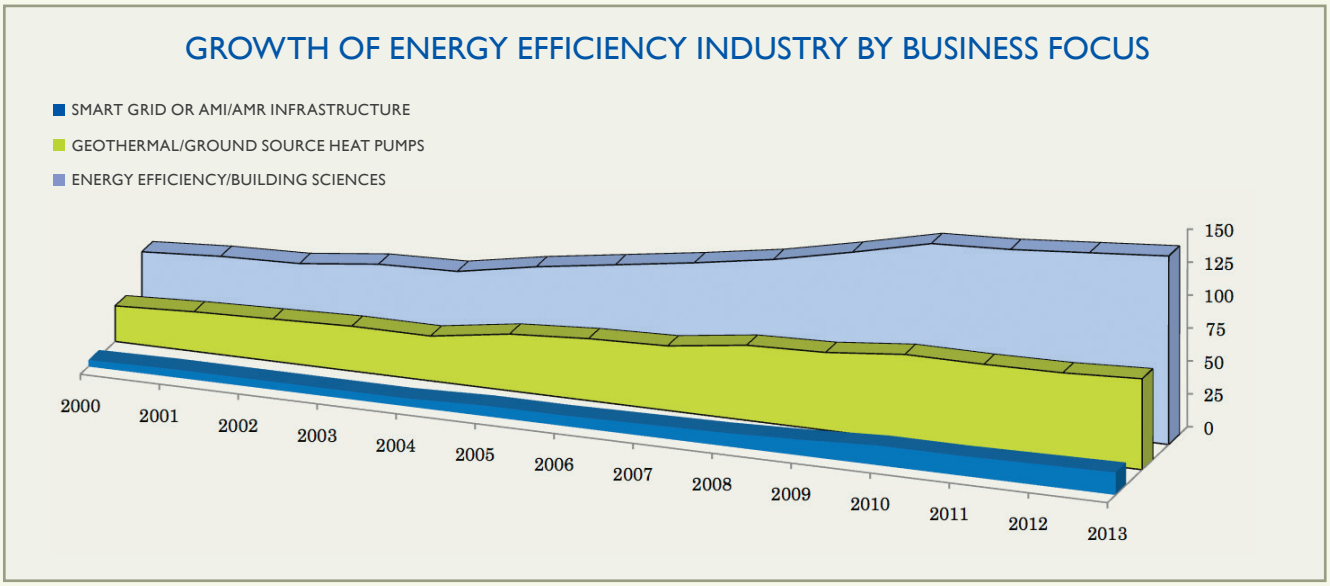
The Southeast Energy Efficiency Alliance utilized an IMPLAN model (IMpact – PLANning) to analyze the economic impacts of energy efficiency programs as part of their BetterBuildings program whose performance period ran from 2010 - 2013. This program included four Virginia subgrantees. SEEA looked at direct, indirect, and induced economic effects with the results showing for a grant investment of $5.8M in funding, Virginia saw over a 3:1 return of $18.8 M in economic effects[6].

6. Southeast Energy Efficiency Alliance, The Economic Impact of Energy Efficiency Investments in the Southeast *www.seealliance.org/pdfs/SEEA_EnergyPro3_CadmusROI_Report.pdf*

FINDINGS

GROWTH OF BUSINESSES

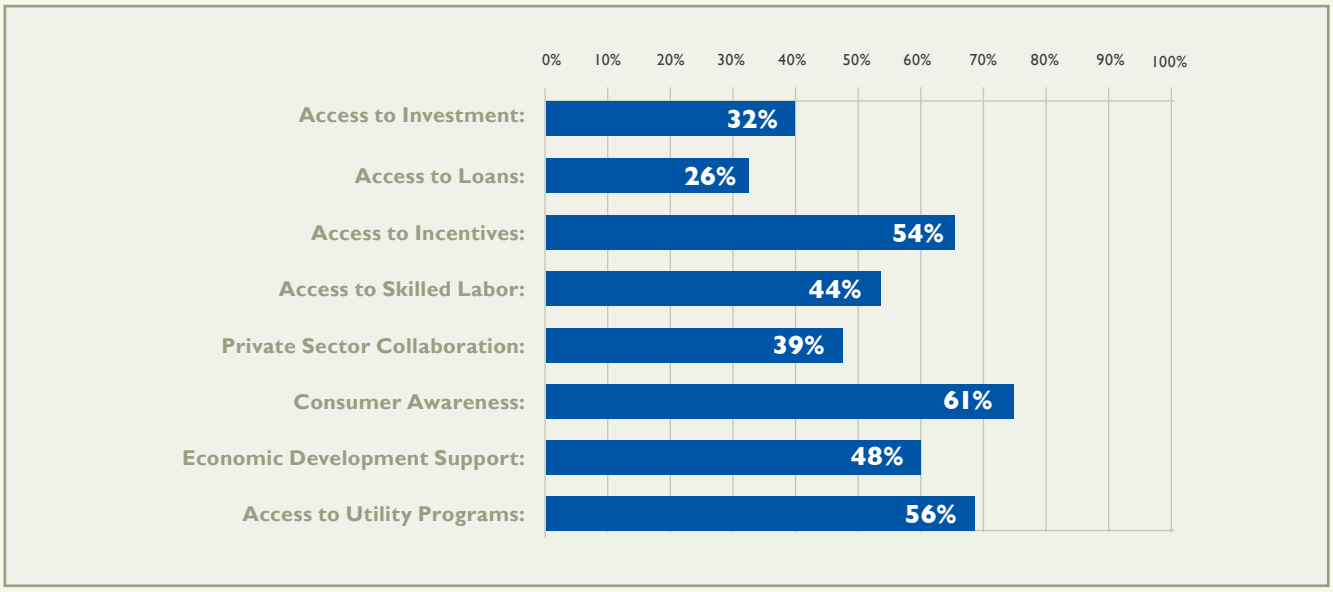
Energy Efficiency is a growing industry. Since 2000, Virginia has seen a 191% growth in the number of companies offering energy efficiency services – from 43 to 149. The number of companies counted in the census includes new companies as well as pre-established companies that entered the energy efficiency, smart grid or geothermal markets.



FINDINGS

FACTORS CONSIDERED WHEN HIRING FOR ENERGY JOBS

Census respondents were asked what factors would lead to them adding new jobs. The two most common answers were: consumer awareness and incentives.



Demand for energy efficiency services is the real driver for hiring new employees, and consumer awareness and incentives are two leading drivers of demand. Simply put, if companies cannot keep up with demand for their services, they will hire more staff to meet that demand. Consumer awareness is complicated to create, as it implies marketing and outreach to gain mind-share or simply to promote products and services the consumer might desire but not know how to access.

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ENERGY INCENTIVES IN ACTION: CASE STUDY #1

The experiences of the nonprofit program implementer Local Energy Alliance Program (LEAP), based in Charlottesville, are evidence that incentives and utility rebates can drive demand for homeowners. A recipient of multiple grants to fund energy efficiency programs, in a geographic region where LEAP had access to incentive dollars for customers, it was able to achieve a 3.6% market penetration in jobs completed over three year timeframe, according to information provided by LEAP. Market penetration numbers in localities LEAP served with minimal or no incentives were far less robust. Also, working as a contractor in Dominion Virginia Power's Home Energy Checkup program, LEAP was able to perform in-home evaluations and offer residents instant cash rebates for checkups. LEAP's grass roots outreach to promote the checkups in combination with Dominion's rebate proved very successful for the nonprofit, resulting in the creation of five more energy efficiency jobs within a six-month timeframe.

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ENERGY INCENTIVES IN ACTION: CASE STUDY #2

The DMME oversaw an appliance rebate program whose funding came from Virginia's American Reinvestment and Recovery Act ("Stimulus") allocation. During a 20-month timeframe this program helped residents replace older, inefficient appliances with new, ENERGY STAR® qualified models. Virginia residents received a total of 43,331 rebates, representing total annual energy savings to the state of nearly 82 billion Btu. This is enough energy to heat, cool, and power 745 homes for a year. While there was not funding to determine the degree to which purchases or upsell in higher efficiency equipment was incentivized from the rebate dollars, the direct economic benefit to the state just in terms of sales tax provided a rate of return of $.60 for every dollar invested. Data show a 13:1 leverage in terms of consumer spending for goods and services attached to the rebates[7].

"The appliance rebates to Virginia consumers resulted in stimulating Virginia's economy, creating jobs, saving energy, educating consumers about ways to improve the energy efficiency of their homes, and reducing energy usage and emissions," according to ***Barbara Ford, Grants Administration Specialist with the Virginia Department of Mines, Minerals and Energy.***

ECONOMIC ACTIVITY GENERATED FROM VIRGINIA'S APPLIANCE REBATE PROGRAM

	Major Appliances	HVAC	Water Heaters	All Products
Rebate Payments to Customers (Thousands)	$2,202	$4,579	$425	$7,206
Consumer Spending (Thousands) and Leveraging Ratio	$31,645 (13.4:1)	$66,875 (13.6:1)	$2,495 (4.9:1)	$101,015 (13.0:1)
Sales Tax Leveraged* (Thousands) and Leveraging Ratio	$1,266 (0.6:1)	$2,675 (0.6:1)	$100 (0.2:1)	$4,041 (0.6:1)
Annual Cost Savings* (Thousands)	$969	$2,342	$284	$2,342
Annual Energy Savings* (Billions of BTU	15	82	16	82

7. Department of Energy, Energy Efficiency and Renewable Energy. Virginia Program Impacts, State Energy Efficient Appliance Rebate Program, February 2013.

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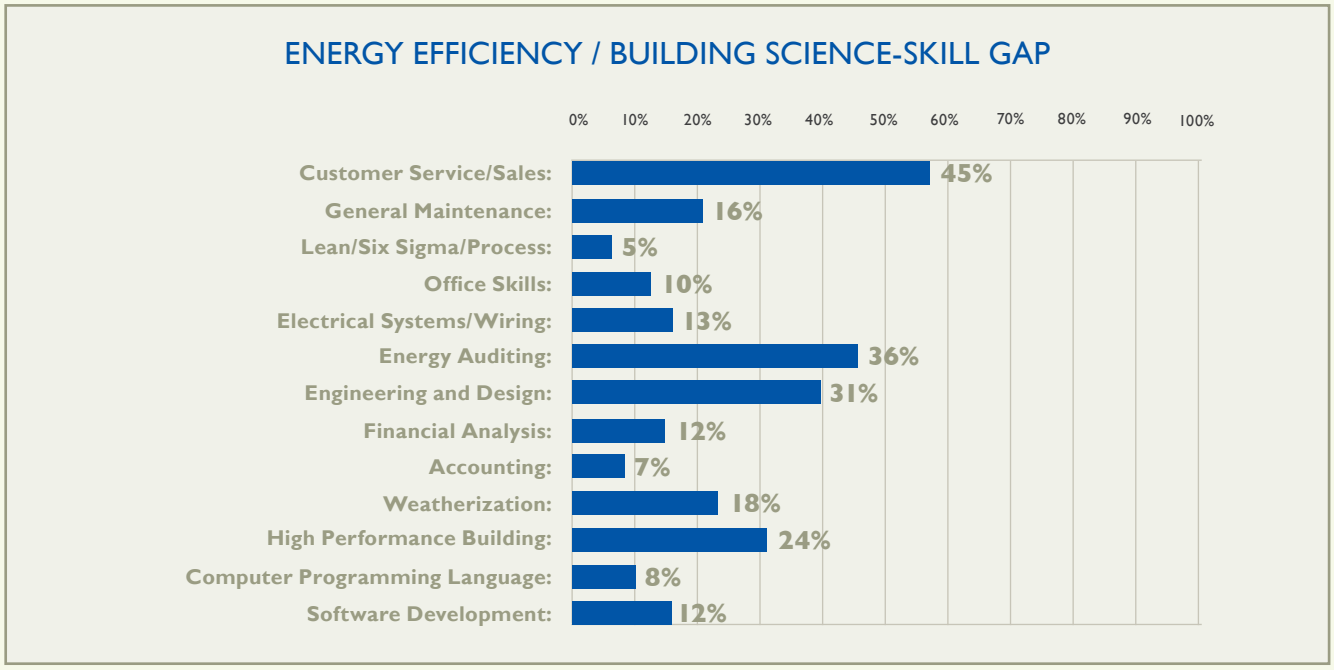
JOB SKILLS GAP

Census respondents were asked to select the top three factors that represent a skills gap with respect to their business needs. The options included: Customer Service/Sales; General Maintenance; Lean/Six Sigma/Process; Office Skills; Electrical Systems/Wiring; Energy Auditing; Engineering and Design; Financial Analysis; Accounting; Weatherization; High Performance Building; Computer Programming Language; and Software Development.

Almost half (45%) cited Customer Service/Sales as a skills gap, with Energy Auditing (36%) and Engineering and Design (31%) a close second and third.



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MARKET CATALYSTS

Census respondents were asked to choose from a list of 21 initiatives that would serve as market catalysts to grow the industry. The top five responses were:

1. Green/Energy Efficiency Building Programs
2. Rebates
3. Performance Based Incentives
4. Adoption or Enforcement of Enhanced Building Codes
5. Improved Access to Customer Energy Usage Data

Respondents were not asked to provide specific examples. The examples below were compiled by VAEEC to reflect the types of and precedents for programs and policies of this nature.

Example: Green Building Program

A Virginia example of a "green/energy efficiency building program" is the approach implemented by the Virginia Housing Development Authority (VHDA) in 2007 to encourage green building through the federal multi-family Low Income Housing Tax Credit (LITHC) program. The allocation of LIHTC tax credits by VHDA is competitive: the request for tax credits exceeds the number available every year. Starting in 2007, VHDA modified the system of allocating federal low income housing tax credits to create an incentive for developers to build to a green building standard – such as Earthcraft or LEED. Due to this initiative, 100% of VHDA's competitive tax credit projects selected to certify under the EarthCraft program for the past three years[8].

Example: Rebates

In Central Virginia, Dominion Virginia Power's rebate for commercial duct sealing work led one energy efficiency contractor to hire 20 employees in 2013[9]. Two years ago, there was virtually no market for commercial duct sealing, but with the creation of this utility rebate for duct sealing, according to Dominion nearly 400 commercial duct sealing projects were completed by the end of 2013 in their Virginia service area.

Example: Performance Based Incentives

Many states choose to offer performance based incentives to create markets or encourage investment in a particular industry. A great example of this is the Virginia state tax credit for historic properties. In 1997, Virginia created a rehabilitation tax credit program to encourage the redevelopment of historic buildings and spur urban revitalization. This program has helped cities rebuild their tax base, repopulate blighted urban areas and has created thousands of jobs across Virginia. A study by Virginia Commonwealth University's Center for Urban and Regional Development released in 2014[10] found that the state historic tax credit led to the investment of $3 billion in spending on 2,375 projects, created 31,000 part- and full-time jobs, and generated $133 million in state and local tax revenues in the first 17 years of the program.

According to the American Council on an Energy Efficient Economy[11] (ACEEE), about 25 states currently have some

8. Virginia Housing Development Authority *www.vhda.com/about/NewsCenter/Pages/eNewsJan2013-Sec6.aspx#b* **9.** Sustainable Technology Institute **10.** Preservation Virginia, Economic Impact of Historic Rehabilitation Tax Credit Programs in Virginia *http://preservationvirginia.org/docs/VCU_Historic_Tax_Credit_Report_FINAL_21-1-2014smallpdf.com.pdf*

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kind of performance based incentive for energy efficiency. Several common approaches include: performance target incentives, shared savings incentives, and rate of return incentives. However, Virginia does not currently offer performance based incentives to utilities.

Example: Adoption or Enforcement of Enhanced Building Codes

Energy codes that establish a higher minimum threshold for buildings' energy performance are among the most effective methods to improve energy efficiency. As every new building or major renovation must comply with the codes, a huge and ongoing market already is in place. No major infrastructure projects or new regulatory mechanisms are needed to reap the benefits. Also, high-performance building technologies and materials are much more cost-effective when included as part of an initial construction package compared to retrofits years later, so establishing a high baseline for efficiency increases implementation at the lowest possible cost.

The benefits of rigorous energy codes start with local job creation. Constructing high-performance buildings requires more and better labor as well as increased quality control. This drives local investment in worker training and increases job numbers and wages on jobsites. For example, Tennessee, a state with comparable housing numbers to Virginia, has calculated that adopting the 2012 International Energy Conservation Code unaltered will create more than 1000 direct, indirect, and induced jobs in the residential housing sector, with more added every following year[12].

The economic advantages of efficient buildings are also apparent after construction: building operators see lower energy costs every month. This has positive economic externalities for communities as stable, smaller energy bills free up money for other investments in goods, services, and job creation.

Finally, high-performance homes and other buildings help to smooth out the spikes in electricity demand on peak-use days. This delivers improved predictability for grid managers and provides cost savings, safety, and reliability for all electricity consumers.

Example: Improved Access to Consumer Data

SmartGrid technologies give utilities detailed information on energy use at the meter level and can also provide homeowners with detailed information down to the plug load level. While SmartGrid implementation presents an opportunity to save rate payers money by allowing utilities to run a more efficient grid, it also compounds privacy issues. Utilities are understandably hesitant to make customer data available to third parties since protecting customer privacy is a legal imperative. Yet, there are many business opportunities related to energy analytics when customer data is shared with a third-party service provider who knows how to interpret that data in a meaningful way for the customer. How and when those service providers are granted access to that information is the crux of the issue. For energy efficiency programs, software providers, and ESCOs, access to consumer data is critical to the value proposition of their businesses.

11. ACEEE *www.aceee.org/sector/state-policy/toolkit/utility-programs/performance-incentives* **12.** Department of Energy report, Potential Job Creation as a Result of Adopting New Residential Building Energy Codes *www.energycodes.gov/potential-job-creation-final-reports*

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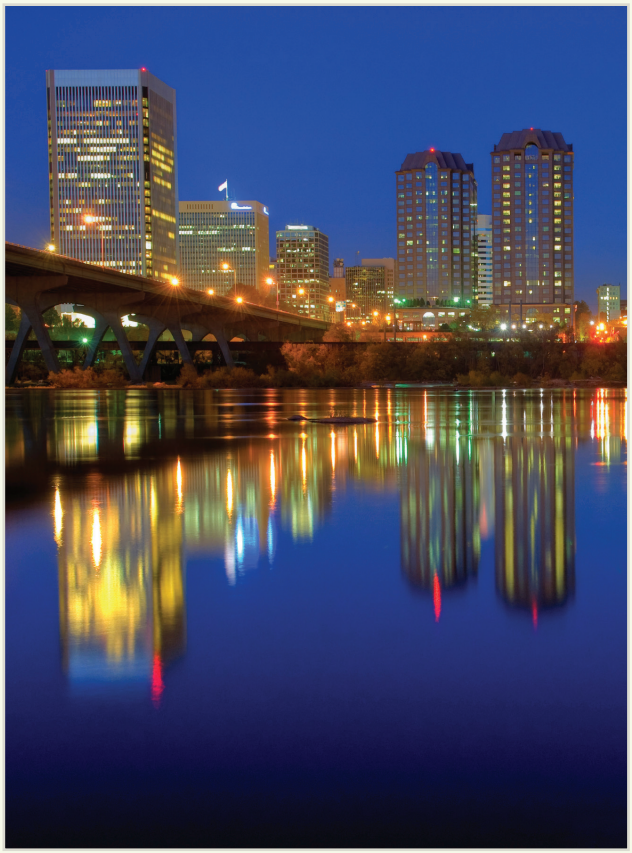
With access to utility data, other kinds of market signals are enabled, namely building labeling and certification. Some jurisdictions like Washington, D.C. and New York City have implemented mandatory benchmarking and disclosure of buildings' energy use to help spur demand for increased energy efficiency in their buildings. Energy use can factor into lease negotiations but only if the landlord or potential tenant has access to it.



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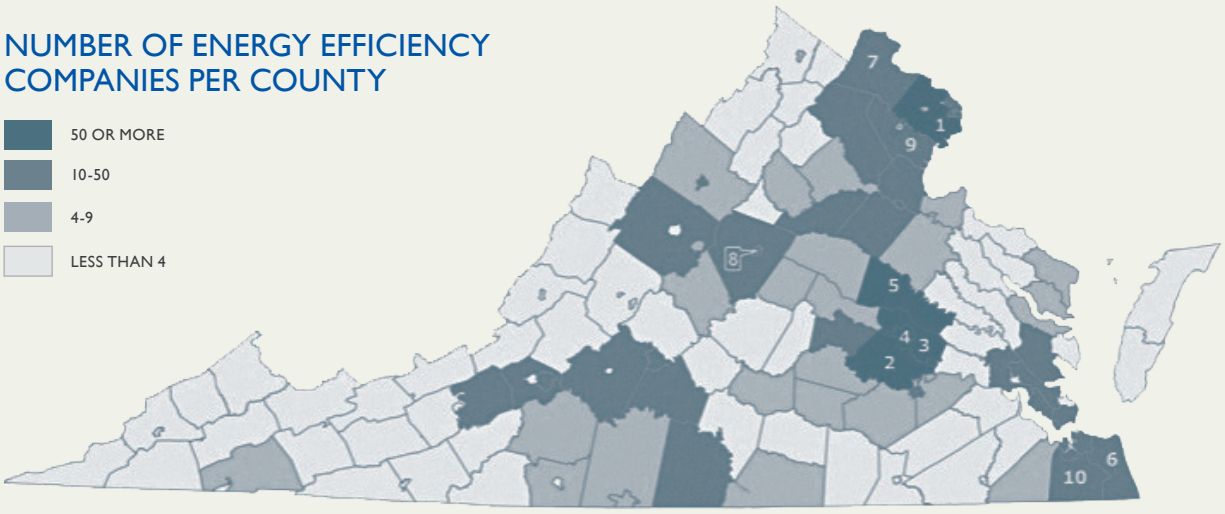
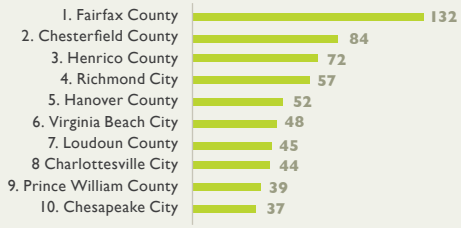
COMPANIES PER COUNTY

The energy efficiency sector is active across the Commonwealth with centers of activity in Richmond and Northern Virginia. Of the 291 companies responding to the census with an energy efficiency/building science focus, 132 had their primary offices in Fairfax County, 84 in Chesterfield County, 72 in Henrico County and 67 in the City of Richmond.

NUMBER OF ENERGY EFFICIENCY COMPANIES PER COUNTY



TOP TEN COUNTIES BY NUMBER OF ENERGY EFFICIENCY BY COMPANIES



VAEEC has identified over 1,300 companies that are currently conducting business in Virginia's energy efficiency sector.

Source: Southeast Clean Energy Industry Census 2013
Map by Jerry Carey, NCSEA

RECOMMENDATIONS

It is clear that census respondents look to policy makers and regulators for critical leadership in expanding the implementation of energy efficiency in the Commonwealth. Many of the factors identified for market development and industry growth are tied to legislation, regulation and financial incentives that must be approved by legislators and/or the State Corporation Commission (SCC). The many benefits to consumers, property owners, rate-payers, local and state governments, and industry warrant aggressive adoption of best practices to implement energy efficiency throughout the Commonwealth, from the kitchen electrical outlet to the power grid.

Based on the following criteria, the VAEEC has selected recommendations for policymakers and stakeholders. First, what have our state's businesses identified via the census as the most important market drivers for hiring and expanding the industry? Second, where has the state already made investments with respect to energy efficiency, creating infrastructure and resources? Third, what are the low hanging fruit which have maximum economic impact and at least cost to the state budget? With these criteria in mind, the VAEEC recommendations are:

1. Expand state support for the residential Home Performance with ENERGY STAR (HPwES) program
2. Enable the creation of a statewide Commercial Property Assessed Clean Energy (PACE) program for nonresidential buildings based on national best practice standards for supporting legislation, program structure, and implementation
3. Expand performance contracting in state-owned buildings
4. Adopt IECC 2012 building code for new residential construction without revisions
5. Convene a stakeholder session on increasing the breadth and depth of energy efficiency programs to help the state meet its voluntary energy efficiency goal

1. EXPAND STATE SUPPORT FOR THE RESIDENTIAL HOME PERFORMANCE WITH ENERGY STAR PROGRAM

Consistent with the establishment of "green/energy efficiency programs" identified in the census as the top market catalyst, the VAEEC recommends the state provide continued support for the Home Performance with ENERGY STAR program (HPwES). HPwES is the recognized national leader in the existing home market for certified home energy improvements, and any future federal tax credits or rebates will likely be tied to the ENERGY STAR brand.

Virginia was a recipient of a State Energy Program 2011 award for residential energy efficiency programs from the Department of Energy (DOE). Home Performance with ENERGY STAR is currently administered in the northern, parts of central, and southwestern regions of the state (vaenergystar.com). However, homeowners and contractors in other areas have no access to this ENERGY STAR program for existing homes. Unlike the ENERGY STAR program for new homes, HPwES requires a program sponsor/administrator to prequalify contractors and to perform

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quality assurance inspections.The DMME has provided some support to this program through a grant to the nonprofits who are currently implementing it, but the performance period for this grant ends in 2014. It is unknown if there will be further funding.

The Commonwealth has made an investment in other aspects of residential energy efficiency besides program development and administration. It has funded contractor training to support residential energy upgrades through grants to community colleges, weatherization training centers, local energy alliances, and other nonprofit partners. Certifications for energy auditing and professional training in HVAC, insulation, air sealing and other energy improvements were also underwritten by federal grants which flowed through several state agencies and provided professional development to thousands of Virginia residents.

Census respondents identified consumer awareness and education as vital to their industry's ability to drive market demand. Education and outreach on energy efficiency is part of HPwES and other energy efficiency and conservation programs in Virginia. Given this, the VAEEC also recommends that a statewide HPwES program coordinate with municipalities, the real estate community, utilities, and the SCC's Value Your Power campaign on energy conservation to support quality work, consistent messaging, and lower marketing costs for all entities involved.

Given the established infrastructure already in place, the Commonwealth has much to gain by working with existing stakeholders to provide continued support to the HPwES program and to expand the program statewide.

2. ENABLE THE CREATION OF A STATEWIDE COMMERCIAL PROPERTY ASSESSED CLEAN ENERGY (PACE) PROGRAM FOR NONRESIDENTIAL BUILDINGS BASED ON NATIONAL BEST PRACTICE STANDARDS FOR SUPPORTING LEGISLATION, PROGRAM STRUCTURE, AND IMPLEMENTATION

Consistent with the establishment of "green/energy efficiency building programs" as a market catalyst, the VAEEC recommends the establishment of a commercial energy efficiency program whose financing component will assist building owners in making improvements.

Virginia was the recipient of a commercial energy program award under the 2012 State Energy Program from the DOE. Award subrecipients such as the Northern Virginia Regional Commission (NVRC) and Local Energy Alliance Program (LEAP) worked to support pilot commercial energy efficiency and benchmarking programs in areas of the state. Part of this grant's work included the development of alternative financing models with a particular focus on PACE. Through this process, NVRC identified real interest among municipalities and building owners, but also real barriers to program creation based on the state's current enabling legislation.

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Virginia's existing PACE law gives enabling power to jurisdictions to create PACE programs for residential and commercial buildings. However it is not aligned with national best practices for enabling legislation, program structure, and implementation. Hence, not one locality in Virginia has created a program, although several have investigated doing so (Arlington County, City of Charlottesville, City of Fairfax).

The VAEEC recommends policy makers, interested municipalities, and the state energy office (DMME) work together to create a replicable template program defined by sensible legislation that creates demand and opportunity for Virginia businesses.

3. EXPAND PERFORMANCE CONTRACTING IN STATE-OWNED BUILDINGS

Consistent with the establishment of "green/energy efficiency programs" as a market catalyst, the VAEEC recommends the state's energy efficiency program for state buildings be expanded to include all cost effective improvements. Much like federal legislation requiring justification for inaction on performance contracting, agencies could be required to give their rationale for not implementing energy performance contracts that guarantee savings and lower the tax burden on the Commonwealth's citizens.

Virginia was the recipient of a performance contracting in government owned buildings program award under the 2013 State Energy Program from the Department of Energy. The DMME has worked with other state agencies and consultants to provide additional education and outreach on the value of performance contracting and to optimize its current Virginia Energy Management Program (VEMP). The state has seen $600,000 in benefits from performance contracting projects completed thus far in public buildings according to DMME, but there remain many buildings whose energy costs are draining the state budget unnecessarily. As referenced earlier, there is a $1 billion dollar economic development opportunity for the Commonwealth by leveraging performance contracting, which has the potential to create thousands of jobs at no additional cost to taxpayers.

With tightened state budgets for the past five years and expected lean budgets for the foreseeable future, hundreds of millions in deferred maintenance has built up. State agencies maintenance and reserve dollars have shrunk considerably over the years, and the competition for capital dollars has increased. There is no current comprehensive strategy and/or financial solution. Performance contracting can help address the most dire needs and significantly reduce deferred maintenance in the Commonwealth. By attacking the deferred maintenance problem through performance contracting, Virginia should be able to divert needed capital dollars away from buying chillers, etc. and funnel those dollars to agencies' mission critical activities. As previously referenced, the DMV headquarters in Richmond reduced its energy bill by 35% through performance contracting. As a result, the agency was able to use its allotted funding to address other infrastructure issues. This demonstrates good governance of taxpayer dollars.

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As with energy retrofits in residential and commercial building sectors, performance contracting is a catalyst for workforce development. Virginia's businesses and community colleges can work together to develop and implement additional workforce development strategies. For example, Trane is working with the Virginia Community College System to help enhance their HVAC labs so the students are learning on state of the art HVAC systems and will be industry-ready when they graduate.

Modeled on the federal bill, Energy Savings Through Public-Private Partnerships Act of 2013, a commonsense approach to increasing energy performance would direct state facility and higher education energy managers to benchmark their buildings and consider, not later than two years after completion of a comprehensive energy and water evaluation of the facilities: (1) implementation any energy- or water-saving or conservation measure identified in the evaluation that is life cycle cost-effective, and (2) bundling individual measures of varying paybacks together into combined projects.

4. ADOPT IECC 2012 BUILDING CODE FOR RESIDENTIAL CONSTRUCTION WITHOUT REVISIONS

Consistent with "adoption or enforcement of enhanced-building codes" identified as a market catalyst, the VAEEC recommends the adoption of the 2012 IECC energy code without the revisions currently proposed by the Department of Housing and Community Development. Currently, Virginia is compliant with IECC 2009 building code with an amendment allowing for visual inspection of duct sealing when ducts are located inside conditioned space. Significant changes from 2009 to 2012 code include requiring a blower test for air infiltration, limiting the number of air exchanges per hour to 3, increasing the percentage of energy efficient lighting fixtures, and requiring insulation of hot water piping.

While implementation of more stringent code is not without its limitations in terms of builder know-how, raising the bar on new construction provides consumer benefits for decades of homeownership. According to a Department of Energy Building Technologies study[14], moving to the 2012 IECC from the current Virginia Construction Code is cost-effective for Virginia residents over a 30-year life cycle. On average, homeowners will save $5,836, and the reduction to energy bills will significantly exceed increased mortgage costs. After accounting for up-front costs and additional costs financed in the mortgage, homeowners should see net positive cash flows (i.e., cumulative savings exceeding cumulative cash outlays) in 1 year, with a simple payback of 5.2 years. Average annual energy savings are $388 for the 2012.

While Virginia has a projected effective date of 2012 IECC in July 2014, revisions to the code include a visual inspection of ducts (as opposed to diagnostic), opting out of a mandatory blower door test, and increasing the number of air exchanges from 3 per hour to 5. With respect to the building shell, these diagnostic tests are what verify perfor-

14. Department of Energy report, Potential Job Creation as a Result of Adopting New Residential Building Energy Codes *www.energycodes.gov/potential-job-creation-final-reports*

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mance. The VAEEC supports a building science approach based on actual performance as indicated by diagnostic tests verifying the efficiency of the structure and its distribution system.

5. CONVENE A STAKEHOLDER SESSION ON INCREASING THE BREADTH AND DEPTH OF ENERGY EFFICIENCY PROGRAMS TO HELP THE STATE MEET ITS VOLUNTARY ENERGY EFFICIENCY GOAL

In March 2007, the Virginia legislature passed SB 1416, amending the state's earlier electric industry restructuring law to include an energy efficiency goal of 10% electricity savings by 2022 relative to 2006 base sales. The SCC was charged by the Virginia legislature to determine if this goal could be cost effectively met through the operation of fair and effective demand side management, conservation, energy efficiency, and load management programs, including consumer education programs. The SCC determined that it could be (Case No. PUE-2007-0004).

However, there are no prescribed milestones for tracking the state's success in meeting this goal. As stated earlier, while the state's largest utility, Dominion Virginia Power, is projecting a 5.1% reduction if they fulfill all of their Integrated Resource Plan programs, that still leaves 4.9% unaccounted for. A coordinated strategy between stakeholders is necessary to ensure effectiveness of messaging, rebate programs, financing, and other market drivers. In short, some market transformation will be needed to meet the state goal, and it will require more than utility rebate programs to do it. The VAEEC notes that cooperative and municipal utilities do not have the same resources available them as do investor-owned utilities, making it more difficult to create energy efficiency programs for their members/customers. Local governments, environmental organizations, and the real estate community have a vested interest in the outcomes of energy efficiency efforts as well, but they often are not part of the larger energy efficiency conversation taking place among industry businesses.

The VAEEC recommends that the Governor convene a working group made up of a variety of industry stakeholders to assess the effectiveness of current efforts, determine barriers, identify opportunities for coordination and collaboration, and report on a list of practical strategies to help the Commonwealth meet a goal the VAEEC believes will provide tangible and lasting benefits to Virginia residents and businesses.

The VAEEC is proud to present the results of our inaugural industry census for the Commonwealth along with the recommendations we believe will spur more widespread and rapid growth of an industry that has largely been invisible until now. Conservative estimates show that energy efficiency in Virginia is a $289 million industry fueling 9,400 jobs – clearly a robust industry and economic driver. We look forward to the dialogue and action that ensue in the wake of this report and to tracking our collective success.

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METHODOLOGY

The Virginia Energy Efficiency Census was completed in the summer of 2013 as part of a broader four-state effort, the Southeast Clean Energy Industry Census (Southeast Census). The Southeast Census is a partnership among VAEEC, the North Carolina Sustainable Energy Association (NCSEA) http://energync.org/, South Carolina Clean Energy Business Alliance (SCCEBA) http://www.scceba.biz/, and Southface http://www.southface.org in Georgia. The Southeast Census surveyed companies, institutions, and organizations (collectively referred to as "firms" in this report) to understand employment, revenue, and policy drivers of various sectors and activities within the region's clean energy industry. The same questions were used by all four census partner states, and each company contacted was asked if they have energy efficiency or renewable energy business activity in each of the four states.

The full census questions are available online at www.vaeec.org.

Census respondents were asked if they had a business focus in the following categories: Solar, Wind, Biomass, Hydroelectric, Geothermal, Smart Grid/AMI, Energy Efficiency/Building Sciences, Energy Storage and Alternative Fuels or Clean Fuel Vehicle Conservation. Where possible, the VAEEC broke out the data to only include data in this report for companies that had a focus area defined as energy efficiency/building science, smart grid, or geothermal. During the first phase of the survey, an email containing a hyperlink, login ID, and password to the secure Census server was sent to all companies that VAEEC had an email address and point of contact identified (1,334 companies). As there is not a definitive list of companies working specifically in energy efficiency, the initial contact group was identified through attendee lists from various energy efficiency conferences, industry trade lists, and contractors who participated in utility and other energy efficiency programs. After an initial four week period, phone calls to collect Census responses from non-respondents were initiated; calls continued until the Census window ended. The survey window for 2013 ran from July 1 to September 30. Companies were asked to confirm they had at least one

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employee in Virginia dedicating a portion of their time to energy efficiency to be eligible to participate in the Census.

VAEEC uses "full time equivalent" employees, or FTEs, as opposed to the number of individual employees. We calculate FTE employees by multiplying a company's total number of Virginia employees by the percentage of time that the company spends operating in the energy efficiency industry. FTEs provide a high degree of flexibility for accurately modeling the equivalent man-hours spent working on energy efficiency. For example, an employee who spends ¾ of their time on energy efficiency would be calculated as an energy efficiency FTE of 0.75; however they would still be represented in a head count as one employee.

The VAEEC estimated the number of FTEs working in the energy efficiency sector for those companies that did not respond to the census (1,063 companies). The estimated FTE job number was calculated as follows:

1. The VAEEC calculated the average number of jobs by responding companies by using a 90% trimmed mean- by removing the upper and lower 10% of the actual reported FTE positions from the 291 companies reporting jobs in the energy efficiency sector in Virginia. After removing the bottom and top 10%, 233 companies remained- with a job count ranging from .1 to 22 FTEs. This resulted in average energy efficiency FTE per com pany of 5.12 for the 233 companies.

2. The VAEEC applied the 5.12 average FTE per company to 95% of the 1,063 companies that did not take the census. 95% was used to account for any errors in the list of companies identified as working in the energy efficiency sector.

3. The estimated FTE job number for those companies not responding to the census is 5,166 (1,063 X .95 X 5.12).

4. The total number of FTEs working in the energy efficiency sector in Virginia is very conservatively estimated at 9,407 (4,241 actual reported and 5,166 estimated).

This was the first year the VAEEC conducted a census to measure the economic impact of the energy efficiency industry in Virginia. Not surprisingly, we encountered some limitations which are to be expected of a first year census. For example, many businesses had not yet heard of the VAEEC and were reluctant to share financial information with an organization or caller with whom they were not familiar. Another limitation concerned misperception and/or miscategorization. When contacted, many HVAC companies did not classify themselves as working in the energy efficiency industry and declined to take the census.

LIST OF OCCUPATIONS

The VAEEC determined that companies operating in the following sectors would qualify as working in the energy efficiency industry. This list includes firms that directly sell, service, manufacture, and install energy efficiency products and services; energy efficiency program administrators; and contractors, consultants, designers, and engineers whose planning and specification work includes building features related to energy use.

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The following is a list of technologies and/or services that apply:

- Residential and commercial heating, ventilation, and cooling (HVAC)
- Building automation controls
- Weatherization
- Smart grid/Advanced Metering Infrastructure (AMI)
- Green architecture
- Manufacturing-energy star building supplies
- Energy management software
- Distributor of energy efficiency products
- Residential and commercial energy and assessments
- Insulation
- Energy performance contracting
- Geothermal/ground source heat pumps
- Green Home building
- Manufacturing of heating and cooling equipment
- Energy efficiency consulting

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