

Virginia Energy Efficiency Council **SPRING 2022 FORUM**

Thursday, May 5th



ENERGY
SOLUTIONS



**Dominion
Energy**

SIEMENS



VAEEC
VIRGINIA ENERGY EFFICIENCY COUNCIL

Welcome & Opening Remarks

Agenda

Virginia Energy Efficiency Council
SPRING 2022 FORUM

1:00-1:10 pm	Welcome & Opening Remarks
1:10-1:30 pm	Keynote Speaker: <i>Senator Jennifer McClellan</i>
1:30-2:15 pm	Business Meeting & Member Share
2:15-2:30 pm	Networking Break
2:30-3:45 pm	Plenary: <i>Advancing Energy Efficiency in the Built Environment</i>
3:45-4:00 pm	Closing Remarks & Networking
4:00-6:00 pm	Happy Hour: <i>Triple Crossing Fulton</i>



Thank You, Sponsors

Virginia Energy Efficiency Council
SPRING 2022 FORUM



CHAMPION

Thank You, Sponsors

Virginia Energy Efficiency Council
SPRING 2022 FORUM

SIEMENS

project:HOMES

Schneider
Electric

 **TRC**

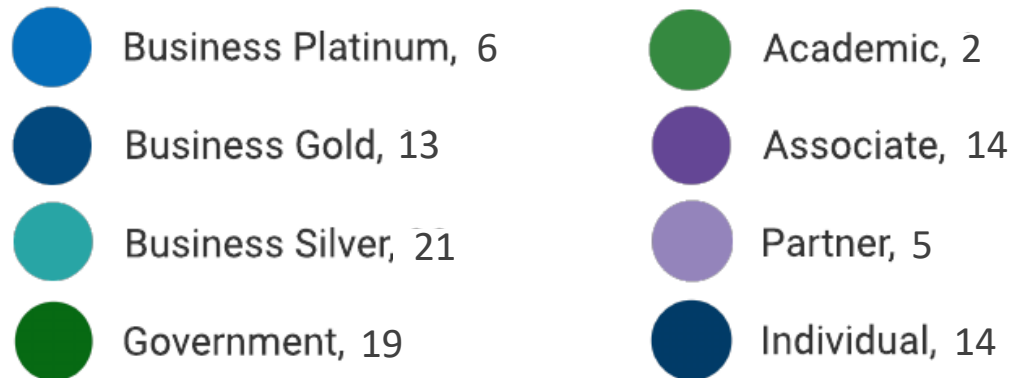
LEADER

ADVOCATE

SUPPORTER

VAEEEC Membership

Virginia Energy Efficiency Council
SPRING 2022 FORUM



2021 Successes

Virginia Energy Efficiency Council
SPRING 2022 FORUM



2022 Legislative Updates

Virginia Energy Efficiency Council
SPRING 2022 FORUM

Performance Contracting

Full roof replacements now allowed under energy performance contracting.

VCEA

Utility energy savings targets remain intact.

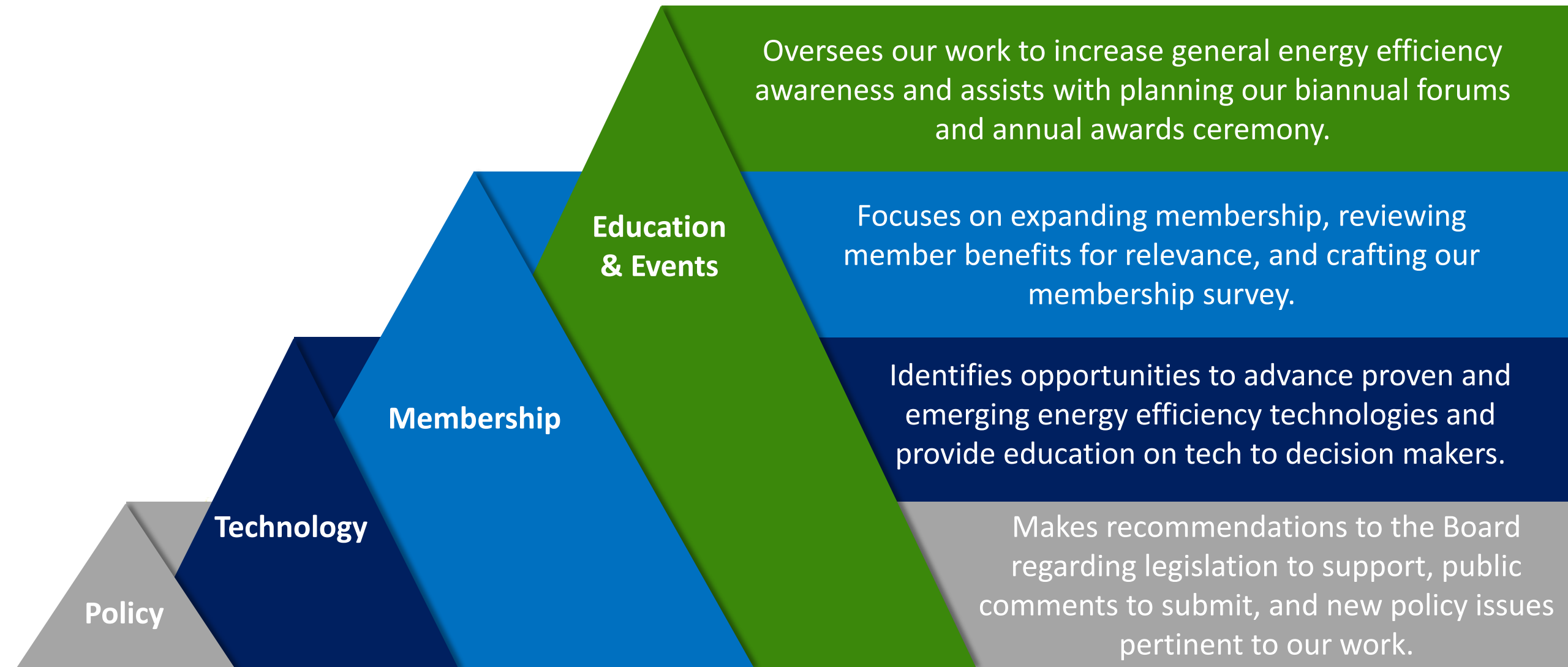
RGGI

Virginia continues to be part of the Regional Greenhouse Gas Initiative.

Strategic Planning

VAEEC Committees

Virginia Energy Efficiency Council
SPRING 2022 FORUM



Keynote

Senator Jennifer McClellan

Virginia State Senate



Business Meeting



Board Elections

Virginia Energy Efficiency Council
SPRING 2022 FORUM

- Vote by raising your blue voting card
 - *One vote per member organization*
- Full bios for each candidate can be viewed in the digital program
- Welcome, Joyce Bodoh (REC) and Bryna Dunn (Moseley Architects)!
 - Joyce and Bryna joined the VAEEC Board in Q4 2021



Board Re-Elections

Virginia Energy Efficiency Council
SPRING 2022 FORUM

Seven Board Members are up for re-election:

- Elizabeth Beardsley, U.S. Green Building Council
- Tim Bernadowski, Siemens Industry
- KC Bleile, Viridiant
- Bill Eger, City of Alexandria
- Stephen Evanko, Dominion Due Diligence Group
- Mark Jackson, CHP Energy Solutions
- Carrie Webster, Henrico County



Board Elections

Virginia Energy Efficiency Council
SPRING 2022 FORUM

The VAEEC Board selected the following candidate to fill an open seat on the Board of Directors.

- Megan Partridge, Franklin Energy



VAEEC Engagement

Virginia Energy Efficiency Council
SPRING 2022 FORUM

- Join a VAEEC advisory committee

Education
& Events

Membership

Policy &
Programs

Technology



Member Share

Networking Break



ENERGY
SOLUTIONS



**Dominion
Energy**

SIEMENS



VAEEC
VIRGINIA ENERGY EFFICIENCY COUNCIL

Advancing EE in the Built Environment

Plenary Session

Virginia Energy Efficiency Council
SPRING 2022 FORUM

- Advancing Energy Efficiency in the Built Environment
 - Abby Johnson, Virginia PACE Authority
 - Andrew Grigsby, Viridiant
 - Benjamin Knopp, Community Housing Partners
 - Bryna Dunn, Moseley Architects
 - Julia Reynolds, Chesterfield County (moderator)



VAEEC: Plenary

Spring Forum

May 5, 2022



Virginia PACE Authority (VPA)

- Program administrator for the Commonwealth of Virginia
- Organized as a 501(c)(3) nonprofit
- Key staff have over nine years of experience in C-PACE around the country
- Active in Virginia since 2015
- Administer 10 local C-PACE programs in Virginia representing nearly half of Virginia population
- Virginia Energy awarded VPA the contract to establish a statewide C-PACE Program



C-PACE 101 *Commercial Property Assessed Clean Energy*



Economic Development

Infused \$3+ billion nationally into local economies in 2,600+ projects, creating over 24,000 jobs.



Clean energy and resiliency

Funds clean energy, water efficiency, and resiliency projects, reducing GHG and energy usage, improving air and water quality.

C-PACE 101 *Innovative Clean Energy Financing Solution*

100% upfront financing for eligible projects and properties

Eligible projects: energy efficiency, renewable energy and resiliency

Eligible properties: private and nonprofit commercial, multifamily and agricultural -only residential 1-4 units excluded

Competitive fixed-rate, fully amortizing loans for up to 30+ years

No personal or corporate guarantees

Refinance eligible improvements two years after completion



C-PACE 101 *Innovative Clean Energy Financing Solution*

Private lenders structure financing terms with borrowers

Secured by voluntary special assessment lien placed on the property

As a special assessment, stays with property upon sale or refinance

As a special assessment, lien is enforced typically by locality

C-PACE loans are prepayable per agreement with private lender



Ben created the
1st assessment
district in 1776

Statewide Update

- Development of standard documents:
 - Legal: ordinance, program agreement, recording documents, etc.
 - Technical: Program Guide, centralized application and approval process
 - Marketing/Outreach updates: Website, marketing collateral, tutorials, training
- State program opt-in for localities with agreement between Virginia Energy and locality (under development)
- Existing programs remain operational in interim
- Statewide program will be available in Q2-2022 and will allow localities to join using one set of standardized documents and guidelines

§ 15.2-958.3 Amendment

- Passed with bipartisan support: House 72 - 28; Senate 40 - 0
- Signed into law by Governor on April 11; changes go into effect July 1
- Addition of safe drinking water, environmental remediation and EV infrastructure as eligible improvements
- Common areas of cooperatives and POAs eligible
- Locality can delegate billing, collection (including enforcement), and remittance of C-PACE Loan payments to third-party
- Specific locality opt-in language for statewide program

C-PACE Potential Benefits for Virginia

- Powerful economic development tool:
 - If 15% of buildings in VA were financed with C-PACE:
 - 250,000 jobs would be created
 - \$32 Billion economic impact
 - 17 million metric tons of reduced carbon



Source: From PACENation's A PACE Enabled World, January 20, 2022

Opportunities of Virginia C-PACE Program

Building Owners and Developers

- Install high performing improvements with no upfront costs
- Pays for wide range of hard and soft costs in both existing buildings and new construction
- Lowers cost of new construction or gut rehab
- Addresses value engineering issues in high performing buildings
- Helps meet ESG Targets



Opportunities of Virginia C-PACE Program

Localities

- Free Economic development tool
- Meet Sustainable and/or resiliency goals
- Attract or retain new businesses
- Help small and underserved communities and businesses that cannot access affordable capital easily
- Building values increase over time
- Create new jobs



Challenges to C-PACE Adoption

- Structural: Lien enforcement, local -> state considerations
- Touchpoints needed to understand product
- Getting senior lenders excited about consenting and using C-PACE
- Outreach beyond “friends of energy efficiency”

Aspirations in next 12-18 months

- \$20MM in closed C-PACE Loans
- C-PACE Loan by commercial bank
- C-PACE Loan to owner in underserved community
- 20% of contractors are SWaM and/or veteran certified
- Existing localities have opted into statewide program

Contact us anytime:

Abby Johnson
abby@virginiapace.com

Nikia Fisher
Nikia@virginiapace.com

Ellen Dickson
ellen@virginiapace.com



Building Retrofit

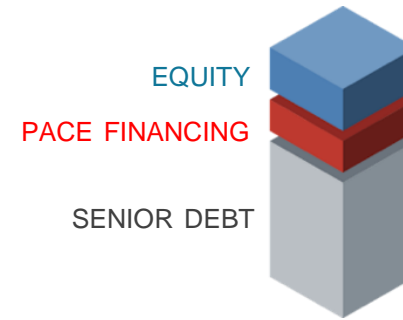
- Pay for building upgrades with C-PACE and use cash instead for operations or other purposes
- Enhance building value by upgrading building with highly efficient improvements
- Install high-efficiency improvements that lower utility and maintenance costs, making C-PACE cash flow neutral or even positive
- Off-balance sheet potential
- Pass through to tenants depending on lease type



20-year, \$785K C-PACE
loan for nonprofit

New development or gut rehab

- Fund up to 25% of hard and soft construction costs
- Gap financing that replaces equity or more expensive “mezz” debt
- Lowers overall cost of capital on development projects, improves ROI
- Defer payments for multiple years
- Interest only financing available
- Funding soft costs in loan can improve construction cash flow



20-year, \$1.93MM C-
PACE loan on new hotel

§ 15.2-958.3: Resiliency Definition Update

- Resiliency improvement: an improvement that increases the capacity of a structure or infrastructure to withstand or recover from natural disasters, the effects of climate change, and attacks and accidents, including, but not limited to:
 1. Flood mitigation or the mitigation of the impacts of flooding
 2. Inundation adaptation
 3. Natural or nature-based features and living shorelines
 4. Enhancement of fire or wind resistance
 5. Microgrids
 6. Energy storage and
 7. Enhancement of the resilience capacity of a natural system, structure, or infrastructure

Energy Efficiency in the Built Environment

VAEEC Spring Forum: May 5, 2022



viridiant

1431 West Main Street
Richmond, VA 23220

Phone: (804) 225-9843
admin@viridiant.org



viridiant

Viridiant is a non-profit organization committed
to supporting sustainable building processes
through education, consultation, and
certification.



Supporting Virginia's Clean Energy Workforce

Advanced Ready Workforce Southeast

- US DOE funded
- Three years starting Oct. 2021
- Three partners: SEEA, AZS, Viridiant
- Industry engagement/listening
- Workforce training to increase advanced EE technology utilization
 - Air-source heat pumps
 - Heat pump water heaters
 - EV charging
 - Battery storage
- Intervention routes, anticipated: CTE, Community College, Industry and associations

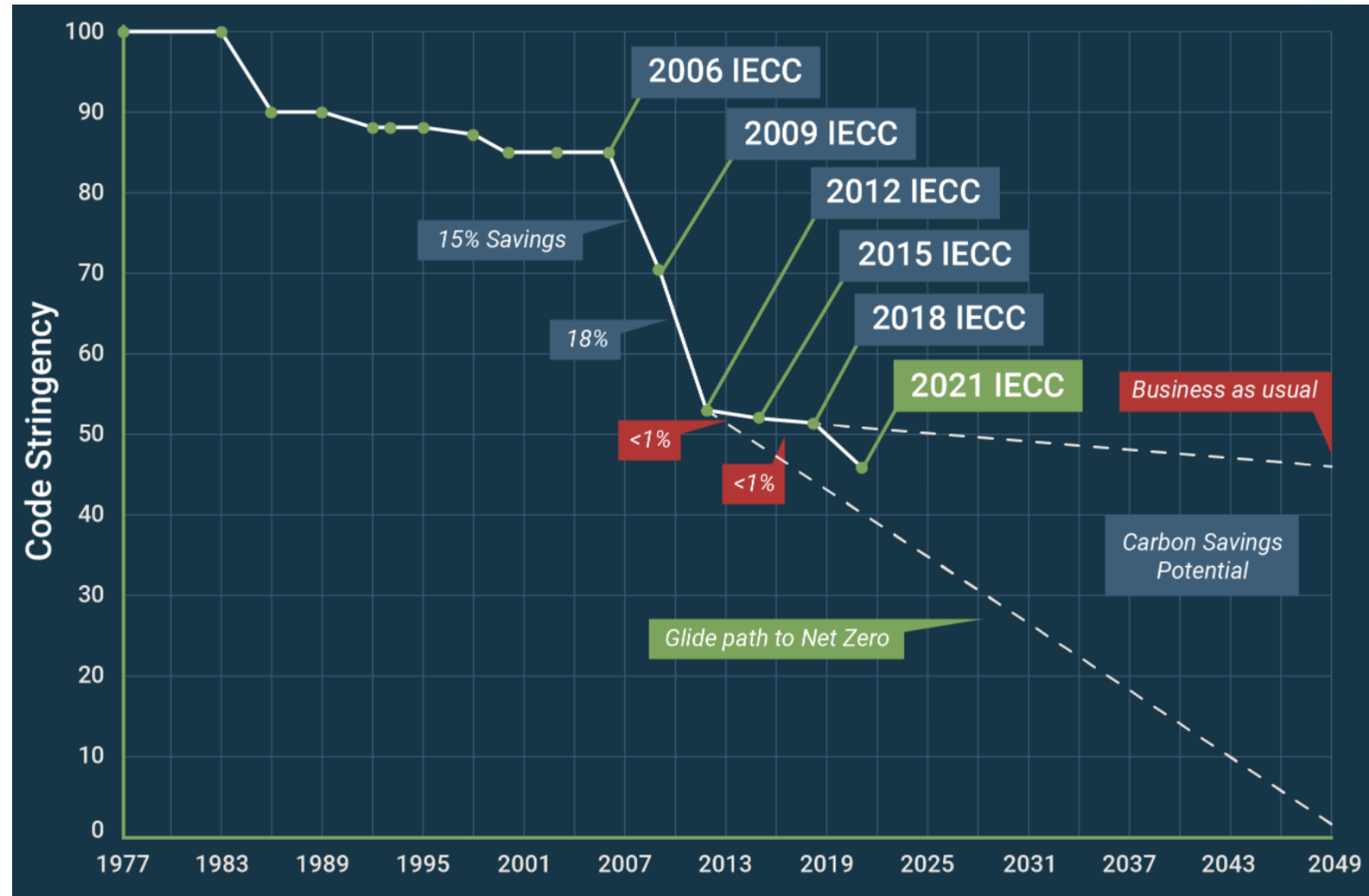


viridiant

The International Energy Conservation Code

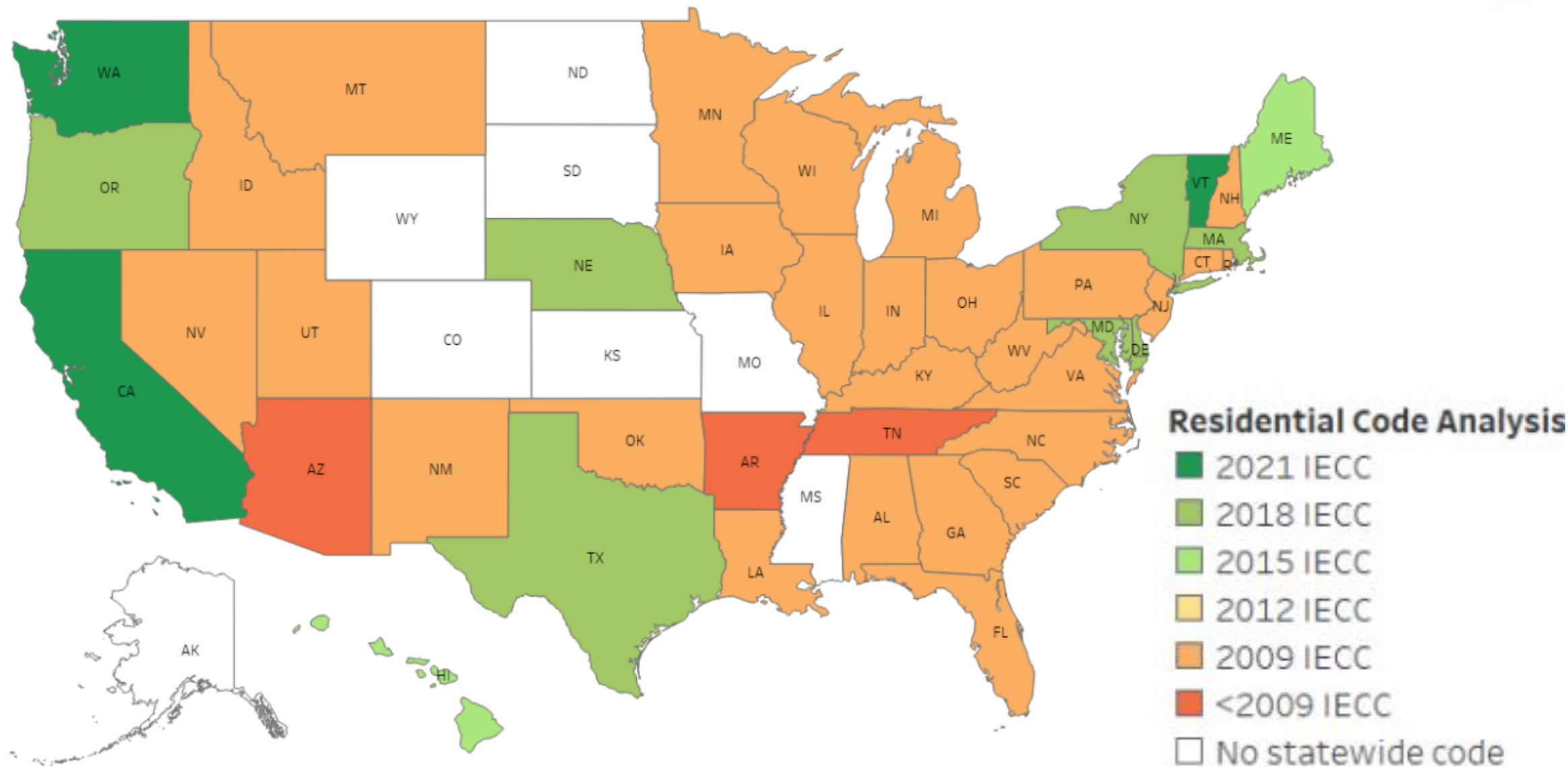
IECC Advances:
Historic and
Projected

There's only one
way to go!



Source: <http://bcapcodes.org/doe-issues-final-determination-2015-iecc/>

Residential Energy Code Adoption, January 2022



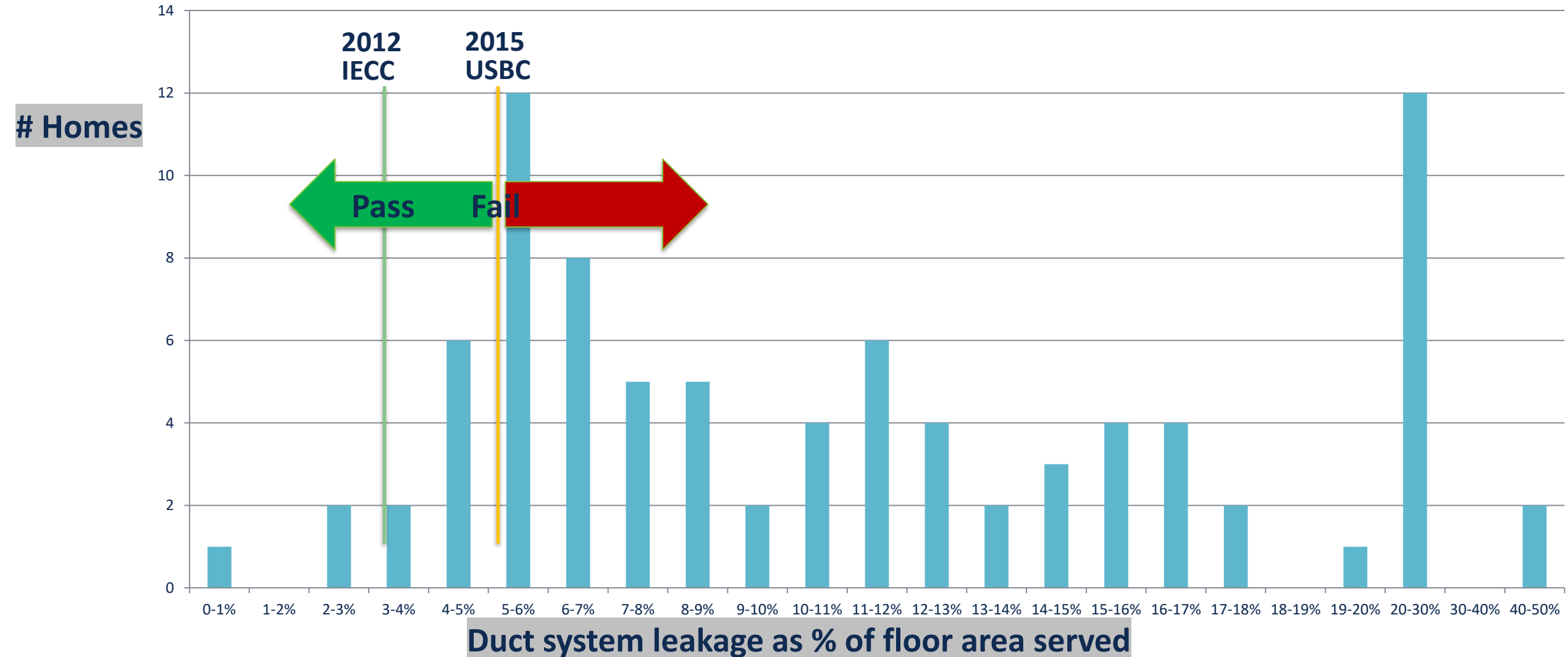
The 2019 USDOE Virginia “Field Study”

Estimated Annual EE Potential from Energy Code Compliance

Measure	Total Energy Savings (MMBtu)	Total Energy Cost Savings (\$)	Total State Emissions Reduction (MT CO₂e)
Duct Leakage	6,4168	1,244,243	31,520
Envelope Air Leakage	30,343	474,867	7,117
Lighting	8,808	399,441	20,017
Exterior Wall Insulation	20,984	362,571	7,267
Ceiling Insulation	19,163	351,530	8,038
Foundation Insulation	6,035	56,409	-1,195
Window SHGC	130	31,505	2,053
Window U-Factor	1,122	16,276	175
TOTAL	150,752 MMBtu	\$2,936,843	74,992 MT CO₂e

Energy Code Enforcement Is Critical

Total duct leakage in 87 homes: Field Study results



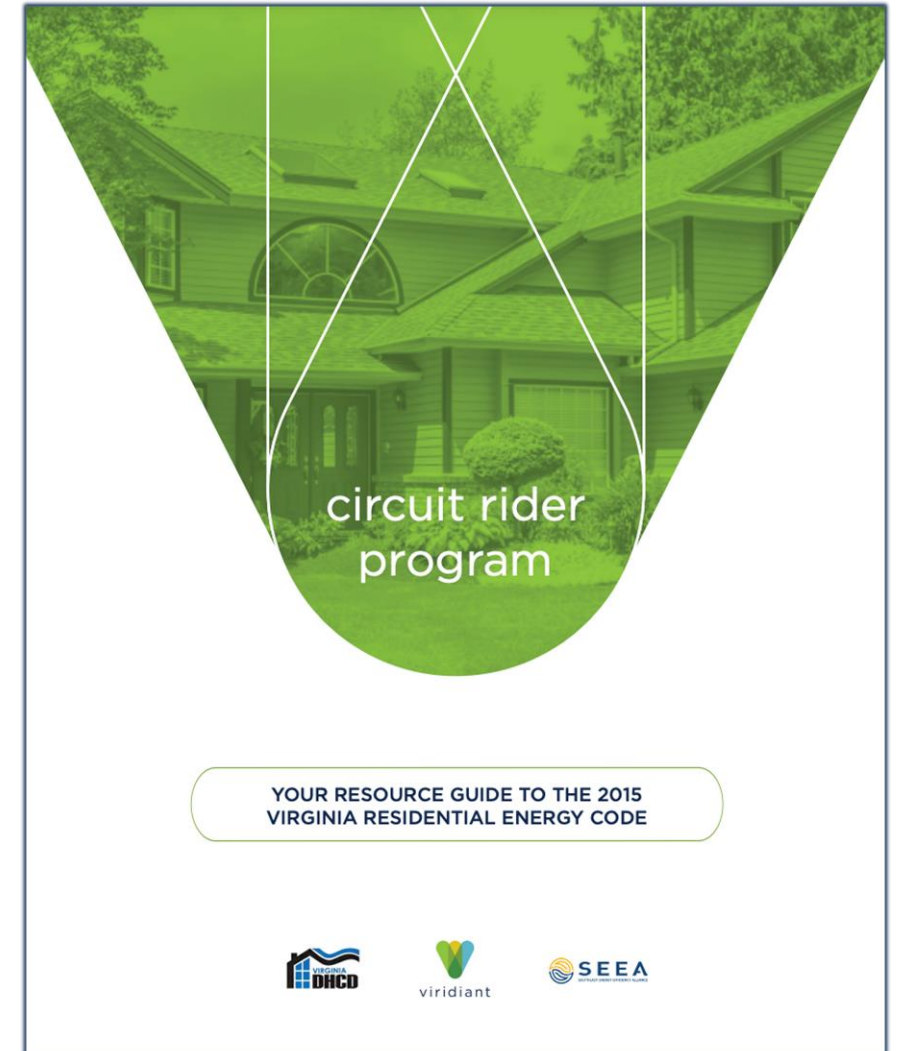
Circuit Rider Energy Code Implementation Program

2015 USBC: (original 2019 grant)

- Curriculum & resources developed in consultation with code enforcement staff & construction professionals
- Formal participation by 10 local gov't jurisdictions; extensive engagement with code enforcement staff across Virginia
- Trained 1000+ industry professionals in 2019-20; on-demand training continues
- All resources on-line; hard copies sent to every jurisdiction in Virginia

2018 USBC: (new 2022 grant)

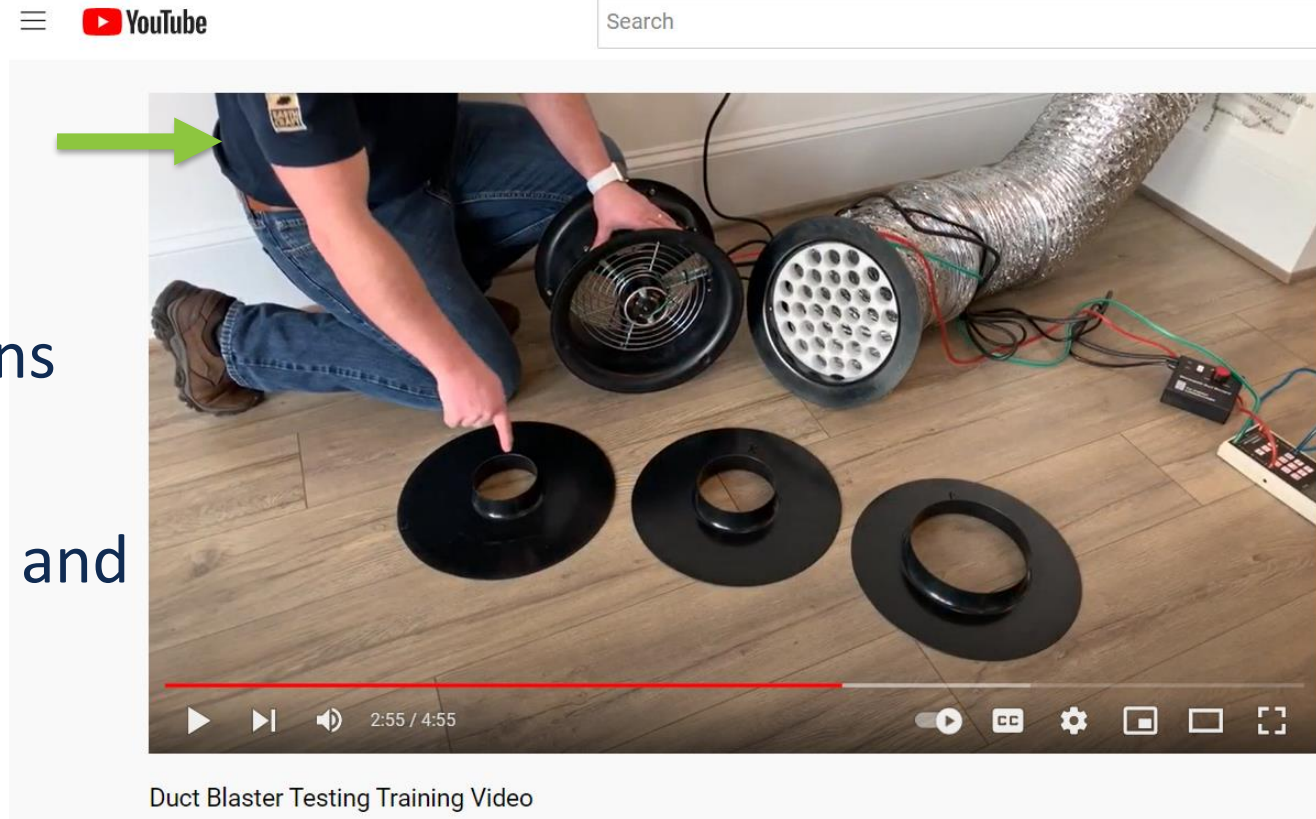
- Update of all resources
- 10 jurisdictions to receive tailored technical assistance



Circuit Rider Resources:

- Duct tightness training video
- HVAC plan review cheat sheet
- Best practices for remote inspections
- Insulation inspection guide
- Indoor air quality guide: ventilation and filtration
- Air barrier inspection guide
- and more!

viridiant.org/vacircuitrider



Consumer Access to Home Energy Services

Viridian's Community Energy Services Division

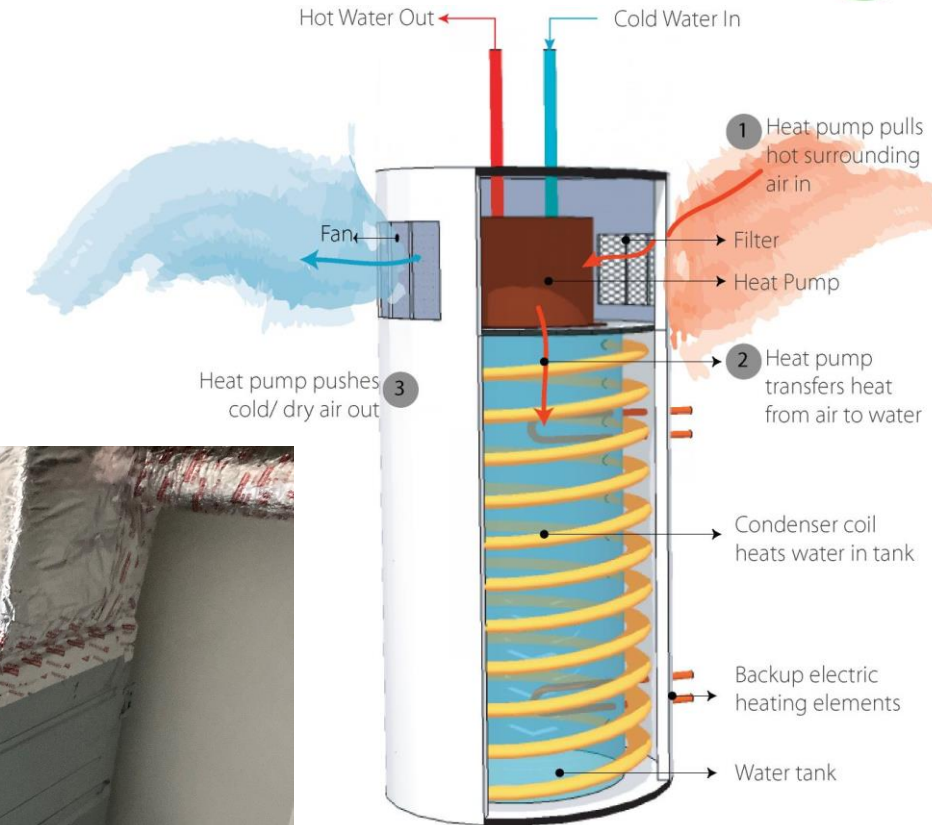
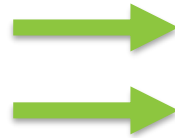
- Target market: Richmond-area single-family households
- Services: public education; consulting and inspections for EE, solar, financing options, technology, etc.
- Core service: \$65 for a walk-through audit, detailed report, contractor referrals, and installation of products
 - Tracked results Q3 2020 – Q1 2022 via direct install products in 238 Dominion RHEA rebate program clients:
 - 1284 KWH avg annual savings per home (\$147.65/year)
 - 297.9 MWH total annual savings



Advanced Technology: Available Today

“New” Technology:

- Energy-conscious design
- Air-tight, super-insulated buildings with advanced ventilation
- Cold-climate heat pumps
- Heat pump water heaters
- Advanced controllability of building systems – for savings, comfort, and grid services
- Integration with on-site generation and storage



Green Building Certification Options

Viridiant's Certification Pathways:

- Single-Family, Multi-Family, Commercial

Certification, at any level

- improves cost-effectiveness of design
- ensures performance as designed



Thanks from Viridiant

Contact:

Andrew Grigsby, Energy Services Director

andrew.grigsby@viridiant.org

804-252-1486

www.viridiant.org



viridiant

PUSHING THE BOUNDARIES OF WEATHERIZATION

VAEEC SPRING FORUM

MAY 5, 2022



ENERGY
SOLUTIONS



+



?

Ben Knopp, CEM
Project Manager II
Community Housing Partners (CHP)
Energy Solutions
ben.knopp@chpc2.org

CHP ENERGY SOLUTIONS – OVERVIEW



Weatherization &
Contracting

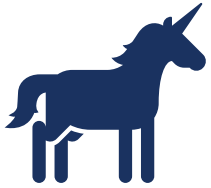


Utility & Leveraged
Funding Program
Administration



Research & Training
Center

WEATHERIZATION + (OVERVIEW)



Unicorns?



WX Readiness



**Decarbonization
+ Energy Security
+ Health**



Filtration



Dehumidification



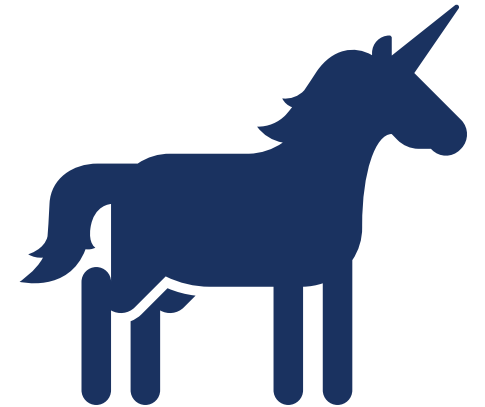
HPWHs



Solarization

WX + UNICORNS?

- DOE asked CHP Energy Solutions for a Unicorn
 - WX client
 - Heat pump replaced gas furnace
 - HPWH replaced gas water heater
 - Rooftop Solar PV
 - All funded by WX
- CHP response: “We are pretty sure that doesn’t exist but, with your help, we can make it happen.”



WX + WDR (RGGI)

- Weatherization Defferral Repair Program
 - Unlocks potential for serving homes with greatest need
 - Proof of concept... It Works!
 - Fighting for its survival (RGGI) & searching for alternatives
 - Launching pilot WDR program with large solar developer



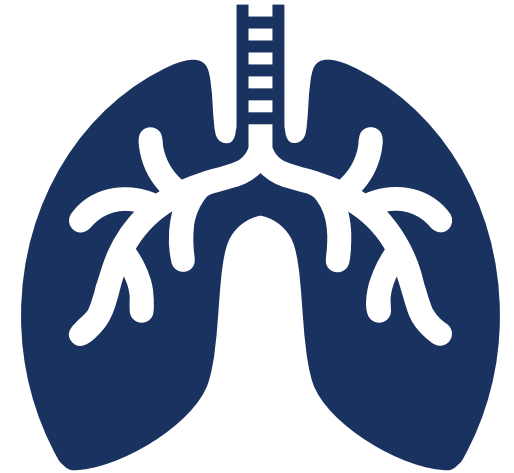
WX + DECARBONIZATION

- Braiding funding sources: WDR, Wx, Utilities, Healthcare, etc.
- Leveraging technology: Heat pumps, High-efficiency filtration
- Improving resiliency and energy security
- Improving health outcomes
- Lowering carbon emissions



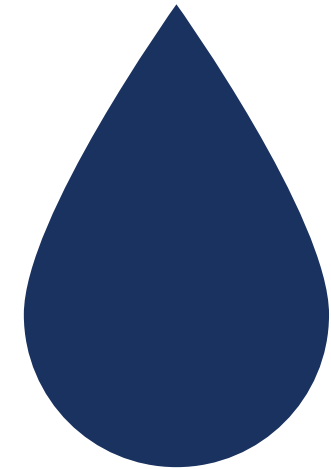
WX + CLEAN AIR

- Making MERV-13 standard across CHPs operations
 - Lowers PM2.5
 - Lowers airborne viruses
 - Improves long-term health
 - Preserves system efficiency and reliability



WX + MOISTURE CONTROL

- Our emerging approach:
 1. Predictive moisture load analysis
 2. Right-size equipment
 3. Supplemental dehumidification
 4. Humidity monitoring



WX + HPWHS

- Heat Pump Water Heaters:
 - Most economical
 - Lowest carbon
 - Demand-response ready
- Actively working with DOE and VA DHCD
- Goal: HPWHs allowed in Wx by summer 2022



WX + SOLAR PV

- Solar Photovoltaics:
 - Rooftop
 - Community Solar
- Clean energy + lower energy burden
- Dominion has program expected this year
- Seeking alternative funding sources as well



VAEEC SPRING FORUM

PUSHING THE BOUNDARIES OF WEATHERIZATION

MAY 5, 2022



550 Industrial Drive
Christiansburg, Virginia 24073
Phone: 540-260-9081 Fax: 540-260-9084
www.CHPEnergySolutions.org



Follow CHP Energy Solutions
@chp_energy



Subscribe to our Newsletter
www.chpenergysolutions.org



Ben Knopp, CEM

Project Manager II
CHP Energy Solutions

ben.knopp@chpc2.org

LinkedIn: [benjaminknopp](#)

Twitter: [@benknopp](#)



Energy Efficiency through a TRUEsustainability Framework

May 5, 2022

TRUE SUSTAINABILITY

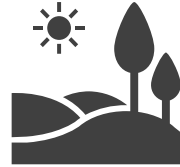
WE DESIGN
EFFICIENT, HEALTHY,
RELIABLE BUILDINGS.



TRUE SUSTAINABILITY

If it degrades human
or environmental health,
it's not sustainable





ENVIRONMENTAL HEALTH

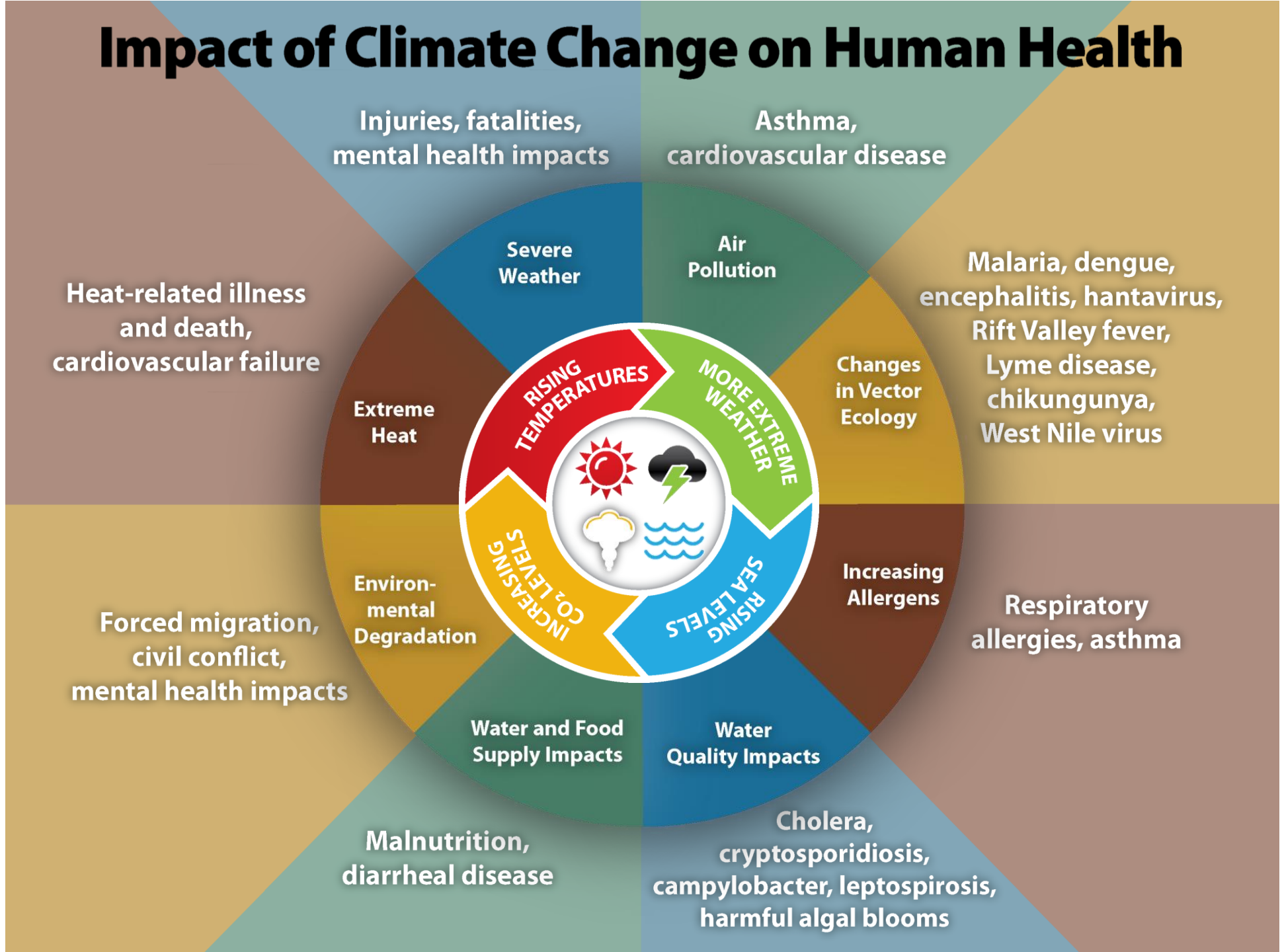
- ▶ Habitat protection
- ▶ Soil restoration
- ▶ Tree protection/canopy expansion
- ▶ Increased biodiversity
- ▶ Reduced rainwater runoff
- ▶ Improved on-site water quality
- ▶ Reduced vehicular impact
- ▶ Heat island reduction



HUMAN HEALTH

- ▶ Quality daylight
- ▶ Access to views
- ▶ Thermal comfort
- ▶ Acoustics
- ▶ Sufficient ventilation
- ▶ Low VOC materials/no red list materials
- ▶ Equitable design
- ▶ Safety/CPTED

Impact of Climate Change on Human Health



Materials Pledge

From improving indoor air quality to reducing construction waste, the materials architects and designers specify matter. Our choices represent an enormous opportunity to improve the health of the planet and the people who live on it.

The **Architecture & Design Materials Pledge** was developed to inspire a shift in how we evaluate the products and finishes that we specify on a daily basis. Participants commit to five overarching statements that will lead to more intentional product specification across their portfolios over time.

Participating firms pledge to:

- support **human health** by preferring products that support and foster life throughout their life cycles and seek to eliminate the use of hazardous substances.
- support **social health & equity** by preferring products from manufacturers that secure human rights in their own operations and in their supply chains, positively impacting their workers and the communities where they operate
- support **ecosystem health** by preferring products that support and regenerate the natural air, water, and biological cycles of life through thoughtful supply chain management and restorative company practices
- support **climate health** by preferring products that reduce carbon emissions and ultimately sequester more carbon than emitted.
- support a **circular economy** by reusing and improving buildings and by designing for resiliency, adaptability, disassembly, and reuse, aspiring to a zero-waste goal for global construction activities.

There's no right or wrong way to implement the pledge in your practice, provided you're constantly working toward our long-term vision. By becoming an early adopter, you'll have the opportunity to help us establish reliable, consistent metrics for propelling our industry forward.

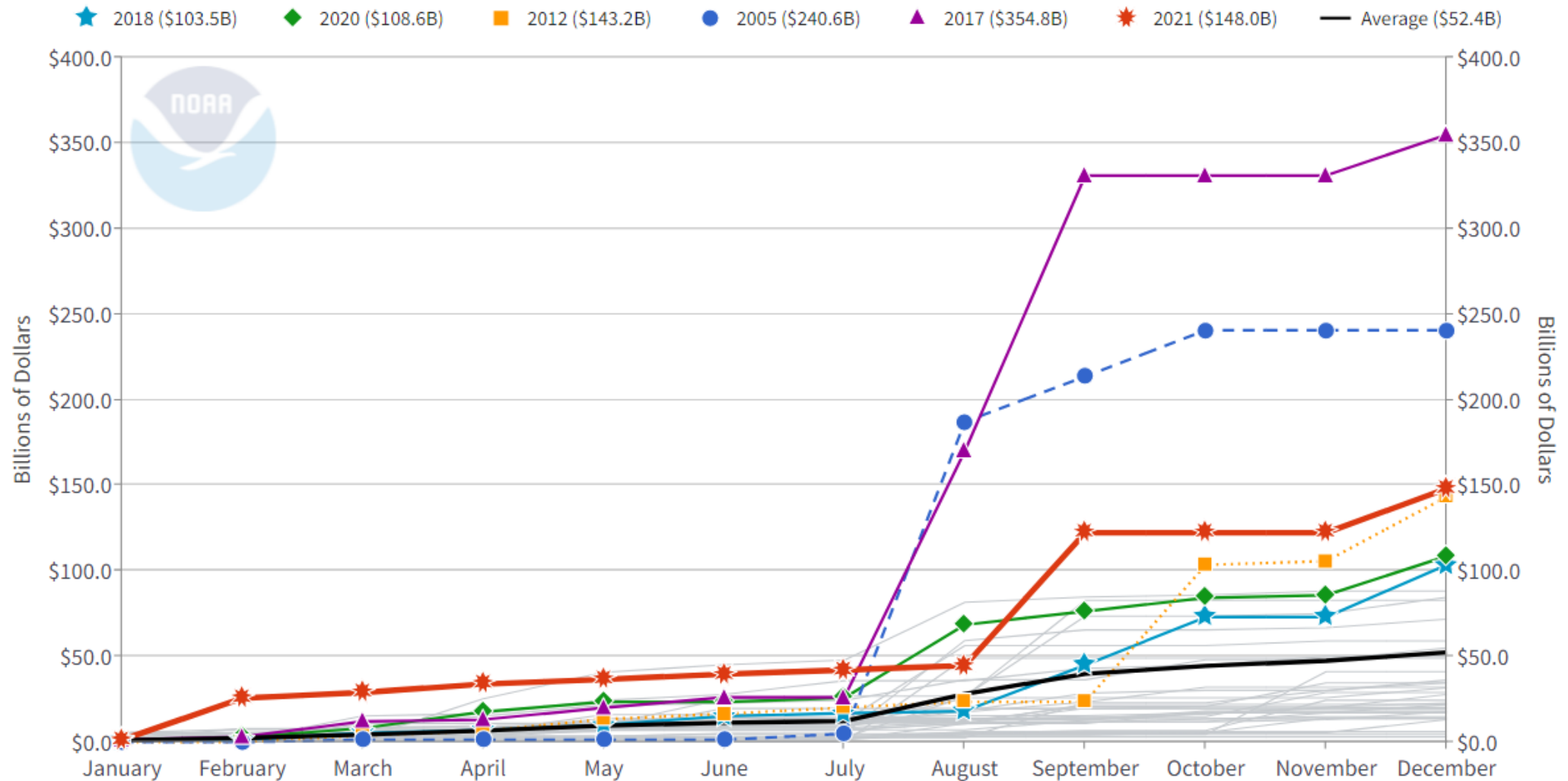
- ▶ What is your corporate policy on material health?
- ▶ Do you offer products with material transparency labels such as Declare, HPDs, EPDs, etc.?
- ▶ Does your product contribute to building energy performance? How?
- ▶ Do you have products that have an embodied carbon optimization report or action plan?
- ▶ Do you offer Red List Free or Red List Approved products?
- ▶ Do you offer take-back programs for your products (or competitor products), or offer non-landfill end-of-life solutions for your products?
- ▶ Are there parts of your process that you are working on improving, or would like to improve (e.g., packaging, transportation)?

TRUE SUSTAINABILITY

If it can't withstand
shocks or stresses,
it's not sustainable



1980-2021 United States Billion-Dollar Disaster Event Cost (CPI-Adjusted)



Updated: April 8, 2022

Event statistics are added according to the date on which they ended. Powered by ZingChart

NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2022). <https://www.ncei.noaa.gov/access/monitoring/billions/>, DOI: [10.25921/stkw-7w73](https://doi.org/10.25921/stkw-7w73)

ACTS OF NATURE

- ▶ Drought
- ▶ Heatwave
- ▶ Earthquake
- ▶ Epidemic (influenza, norovirus, coronavirus)
- ▶ Sea Level Rise
- ▶ Storm Surge
- ▶ Flood
- ▶ Hurricane
- ▶ Landslide/Unstable Soil
- ▶ Tornado
- ▶ Winter Storm

FAILURES OF SYSTEMS

- ▶ Transportation Accident
- ▶ Train Derailment
- ▶ Utility Disruption
- ▶ Industrial Accident
- ▶ Urban Conflagration

ADVERSARIAL ACTS

- ▶ Armed Assault
- ▶ Improvised Explosive Device
- ▶ Cyber Attack (against data)
- ▶ Cyber Attack (against infrastructure)
- ▶ Biological/Chemical Attack
- ▶ Nuclear/Radiological Attack
- ▶ Social Unrest (protests, riots)



PREDICT

- ▶ Perform hazard assessment(s)
- ▶ Identify most probable disruptions so building design can minimize impacts



DEFEND

- ▶ Identify strategies to keep occupants safe and productive during disruptions
- ▶ Identify strategies to protect critical systems during disruptions



RECOVER

- ▶ Equip building to rebound quickly after a disruption

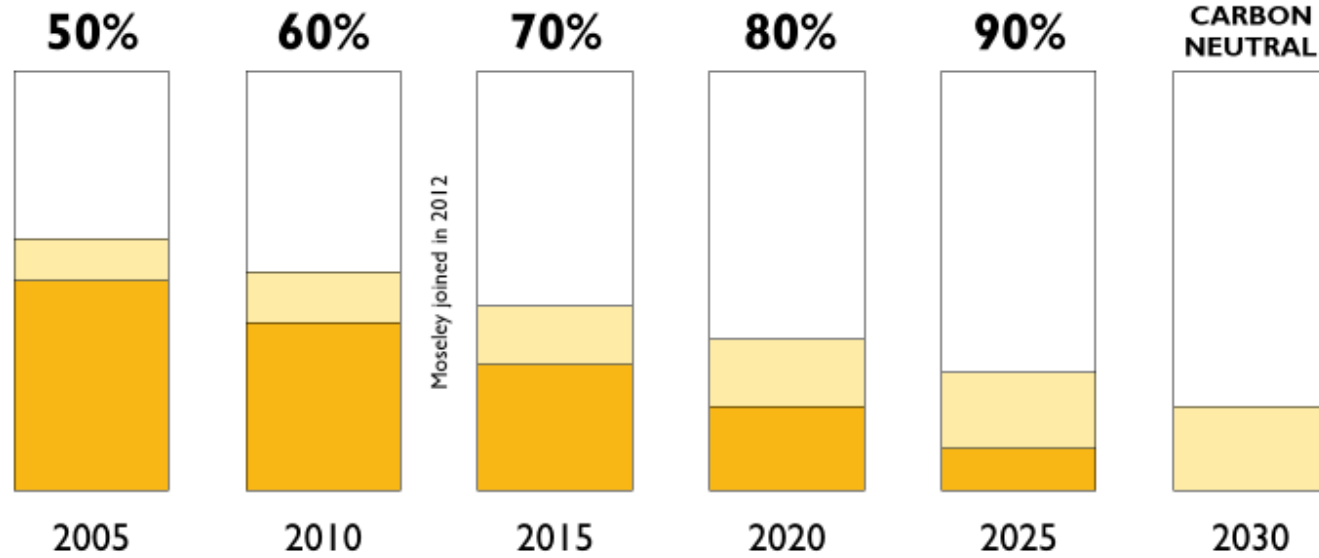
TRUE SUSTAINABILITY

If it depletes energy stores
or releases carbon,
it's not sustainable



AIA 2030: Goals

Baseline: CBECs 2003 / RECS 2001



##% = Reduction Target

Energy Efficiency

Renewable Energy

Remaining Energy Use

AIA 2030 COMMITMENT

MEP
2040

Committing to Zero

AIA
2030
COMMITMENT

YR 10 REP

SE2050
COMMITTING TO ZERO

Maximizing Energy Performance



Energy
Benchmarking



Sefaira Energy &
Daylight Analysis



2030 Palette



Rebates and Utility
Incentives



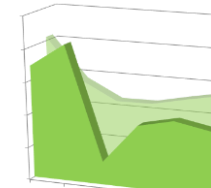
Integrative Process
Meeting



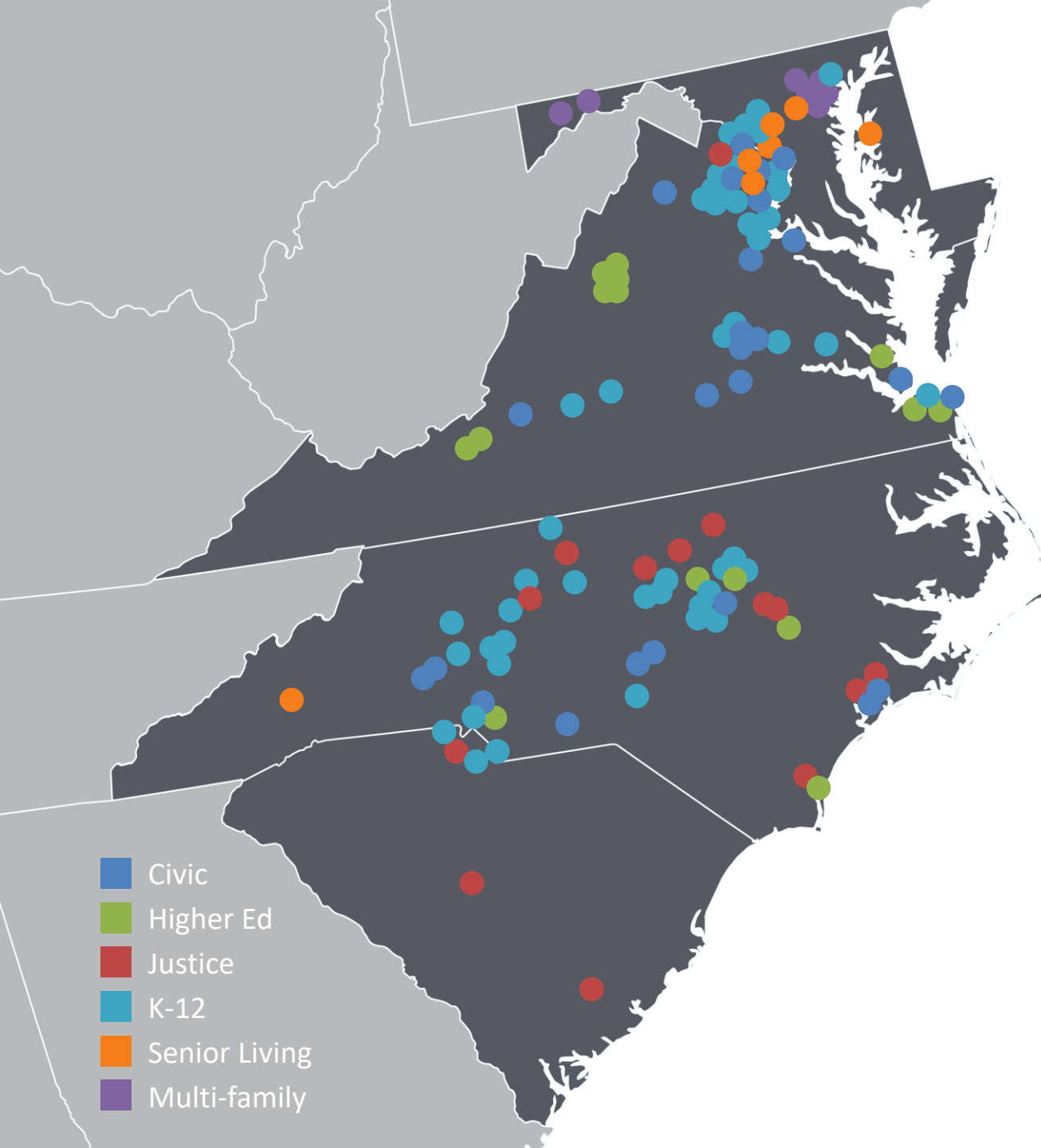
Life-cycle Cost
Analysis



Solar PV
Planning Services



Post-occupancy
Energy Analysis



Decarbonization: By the Numbers

\$6.4M of Annual Energy Savings

76 Million Pounds of Avoided CO₂

\$1.8M in Utility Rebates

4.5 MW of Solar PV Capacity

21 Geothermal HVAC Systems

MOSELEYARCHITECTS

Designing solutions. Building trust. Enriching lives.

Virginia Energy Efficiency Council
SPRING 2022 FORUM

Thursday, May 5th



ENERGY
SOLUTIONS



**Dominion
Energy**

SIEMENS



VAEEC
VIRGINIA ENERGY EFFICIENCY COUNCIL

Closing Remarks

Virginia Energy Efficiency Council
SPRING 2022 FORUM

- We want to hear from you!
 - Be sure to fill out the brief post-event survey that will be emailed to you after the event.



Save the Date

Virginia Energy Efficiency Council
SPRING 2022 FORUM

June 22nd

Webinar: The Ins & Outs of Energy Performance Contracting

July 2022

Virginia EE Leadership Awards - Application Period Opens

Oct. 20th-21st

Virginia Clean Energy Summit

Nov. 2022

2022 Energy Efficiency Forum & Awards Ceremony



Thank You, Sponsors!

Virginia Energy Efficiency Council
SPRING 2022 FORUM



ENERGY
SOLUTIONS

SIEMENS

project:HOMES

Schneider
Electric



**Dominion
Energy®**

TRC



Happy Hour Triple Crossing Fulton

5203 Hatcher Street, outdoor patio

