State and Local Climate and Energy Program

Get Pumped! Using Heat Pumps to Meet State and Local Climate Goals

October 25, 2021 | 2 PM Eastern

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Adding Panels

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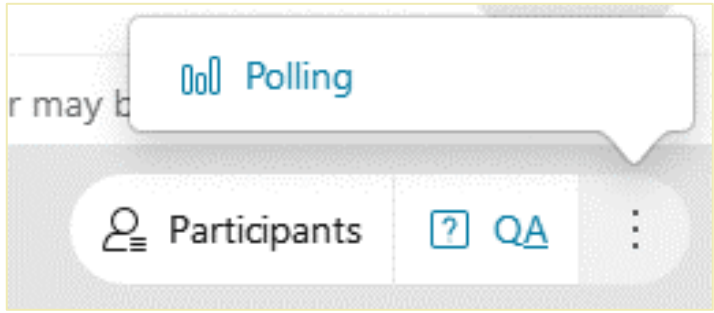

Participants **Q&A** **More Options**
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Polling and Feedback

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- We'll ask several poll questions during the webinar
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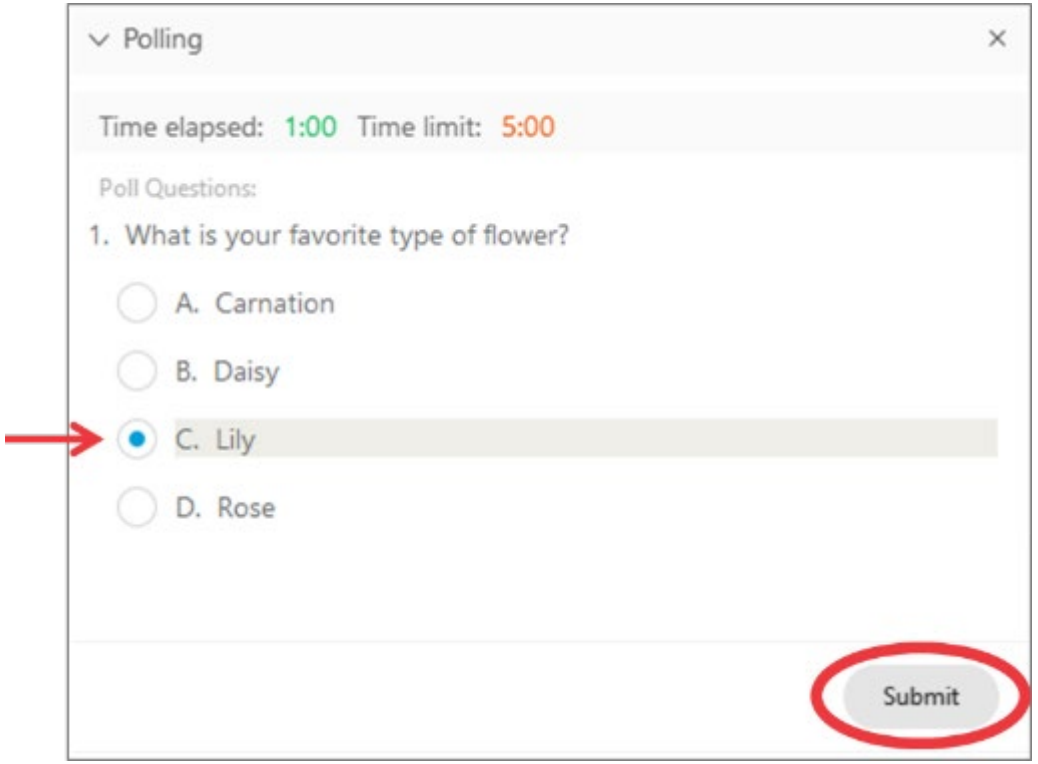


Webinar Feedback

- A feedback form will pop-up when you exit today's webinar

Q&A

- Participants are muted
- Questions will be moderated at the end
- To ask a question:
  1. Select “All Panelists” from the drop-down menu
  2. Enter your question in the Q&A box
  3. Hit “Send”

- EPA will post responses on the Webinar Series page: www.epa.gov/statelocalenergy/state-local-and-tribal-webinar-series

Today's Agenda

- **Andrea Denny** – Office of Atmospheric Programs, U.S. Environmental Protection Agency (EPA)
- **Dan Lawlor** – ENERGY STAR, U.S. EPA
- **Donovan Gordon** – New York State Energy Research and Development Authority (NYSERDA)
- **Lindsay Speer** – Alliance for a Green Economy

  Chris Carrick – Central New York Regional Planning and Development Board (CNY RPDB)
- Question and Answer Session

The views expressed by speakers on this webinar are solely those of the participants and EPA does not endorse any products or commercial services mentioned in this webinar.

State and Local Climate and Energy Program

INTRODUCTION

Andrea Denny
Local Climate and Energy Program Lead
U.S. EPA

U.S. EPA's State and Local Climate and Energy Program

- We offer free tools, data and technical expertise about energy strategies, including energy efficiency, renewable energy and other emerging technologies, to help state, local and tribal governments achieve their environmental, energy and economic objectives

- Access these resources at: www.epa.gov/statelocalenergy

- Electrification Webinar Series
  - Get notifications by subscribing to our newsletter:
    - www.epa.gov/statelocalenergy/state-and-local-energy-newsletters
  - Past Webinars:
    - www.epa.gov/statelocalenergy/state-local-and-tribal-webinar-series

Select State and Local Resources

- **Electrification Toolfinder:** screen tools and resources to evaluate environmental and economic benefits of electrification programs
  www.epa.gov/statelocalenergy/tool-finder-local-government-clean-energy-initiatives
- **Avoided Emissions and geneRation Tool (AVERT):** quantifies the emissions benefits of energy efficiency and renewables
  www.epa.gov/avert
- **Co-Benefits Risk Assessment Health Impacts Screening and MappingTool (COBRA):** calculates health impacts of emissions changes and their economic value
  www.epa.gov/cobra
- **Benchmarking and Building Performance Standards Policy Toolkit:** informs policies for commercial and multifamily buildings
  www.epa.gov/statelocalenergy/benchmarking-and-building-performance-standards-policy-toolkit

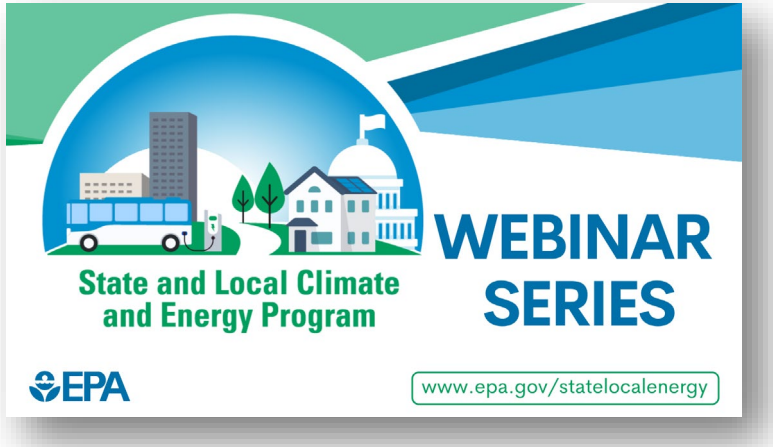
Upcoming Webinar

December 6, 2021

Whole Building Approaches to Electrification

Register Today!

https://abtassociates.webex.com/abtassociates/onstage/g.php?MTID=e152ef3f8a6 6b62f00ad963452c5b7e9d



Contact Information

Andrea Denny
denny.andrea@epa.gov

State and Local Climate and Energy Program

Visit Our Website | www.epa.gov/statelocalenergy
Sign Up for Our Newsletter | www.epa.gov/statelocalenergy/state-and-local-energy-newsletters

Which best describes your organization's experience with heat pump programs?

- We have a city, county, or regional heat pump incentive program
- We have a state-wide heat pump incentive program
- We are launching a heat pump incentive program
- We are considering a heat pump incentive program in the future
- We are not considering a heat pump incentive program

Poll 1

State and Local Climate and Energy Program

ENERGY STAR® CENTRAL AIR CONDITIONER (CAC)/ AIR SOURCE HEAT PUMP (ASHP) UPDATES

Dan Lawlor
ENERGY STAR
Heating Ventilation, and Air Conditioning (HVAC) Program Lead
U.S. EPA

ENERGY STAR® Central Air Conditioner/Air Source Heat Pump Updates

The ENERGY STAR Brand

SAVE TODAY. SAVE TOMORROW.
SAVE FOR GOOD.

ENERGY STAR Household Awareness

MORE THAN **90%** RECOGNIZE THE ENERGY STAR® LABEL

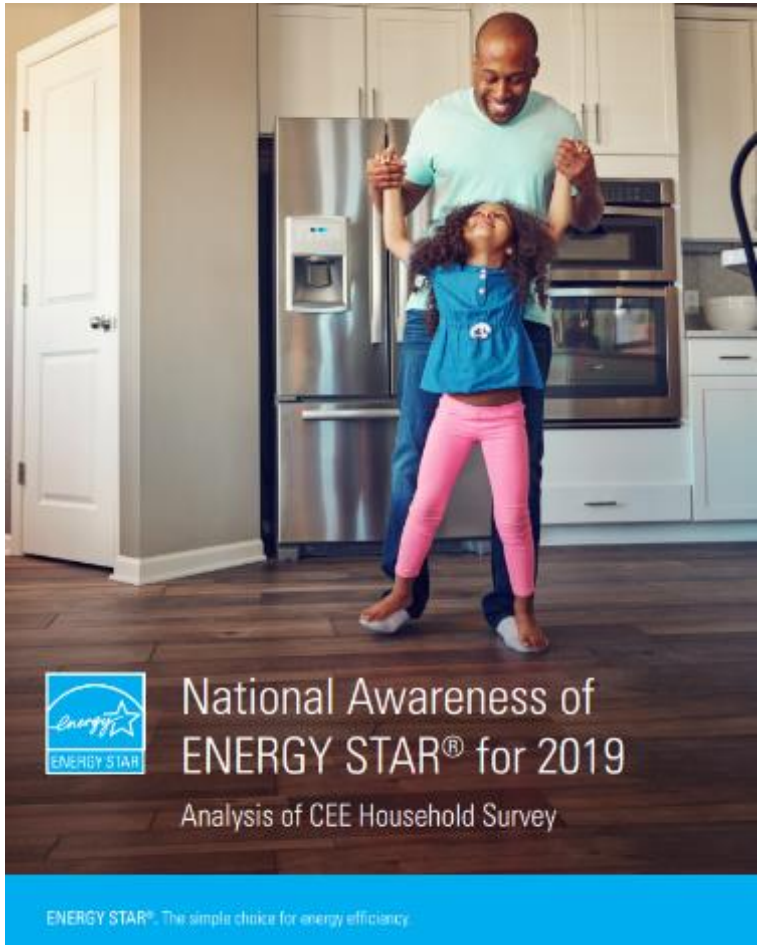
MORE THAN **80%** UNDERSTAND WHAT IT MEANS

IN THE PAST YEAR, **56%** PURCHASED ENERGY STAR-LABELED PRODUCTS

OF THESE PURCHASERS

68% were influenced by the label in their decision

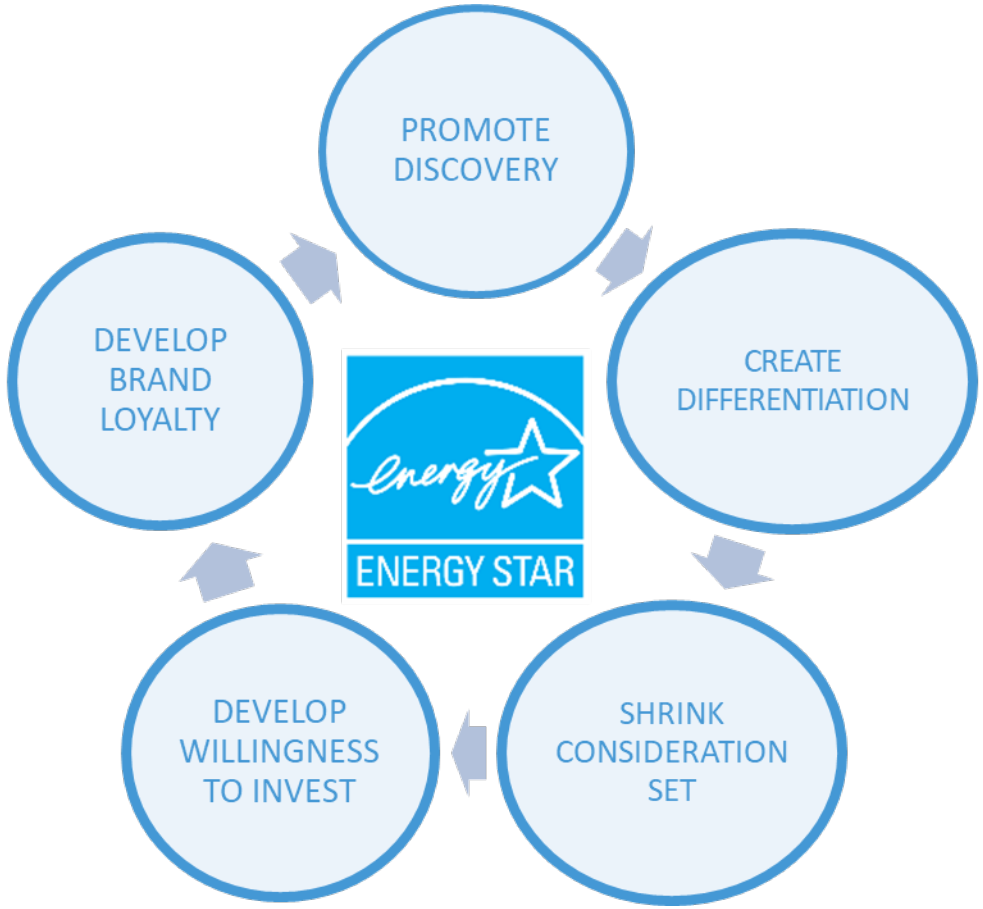
71% are likely to recommend ENERGY STAR to a friend



Source: EPA Office of Air and Radiation, Climate Protection Partnerships Division. National Awareness of ENERGY STAR® for 2019: Analysis of 2019 Consortium for Energy Efficiency (CEE) Household Survey. U.S. EPA, 2020.

ENERGY STAR: The Quintessential Ingredient Brand

- Proven impact on partner marketing efforts
- Serves as implicit seal of approval
  - Enhances Partner brand through association
- Provides shortcut to understanding your brand's full value proposition
  - Differentiates product
  - Builds consumer willingness to invest in premium product
- Forges deeper connection with customers
  - Functional: quality, performance
  - Emotional: confidence, trust, loyalty



ENERGY STAR CAC/ASHP Specification Updates

New Initiatives Reflected in V6 Specification

1. **Climate differentiated AHSP criteria and marks** help consumers and contractors easily identify units optimized for cold climates
2. **Installation capabilities** identify features that help ensure that excellent equipment will be installed well
3. **Optional connected criteria** focus on harnessing the potential of staged and variable capacity units to balance grid needs and consumer comfort

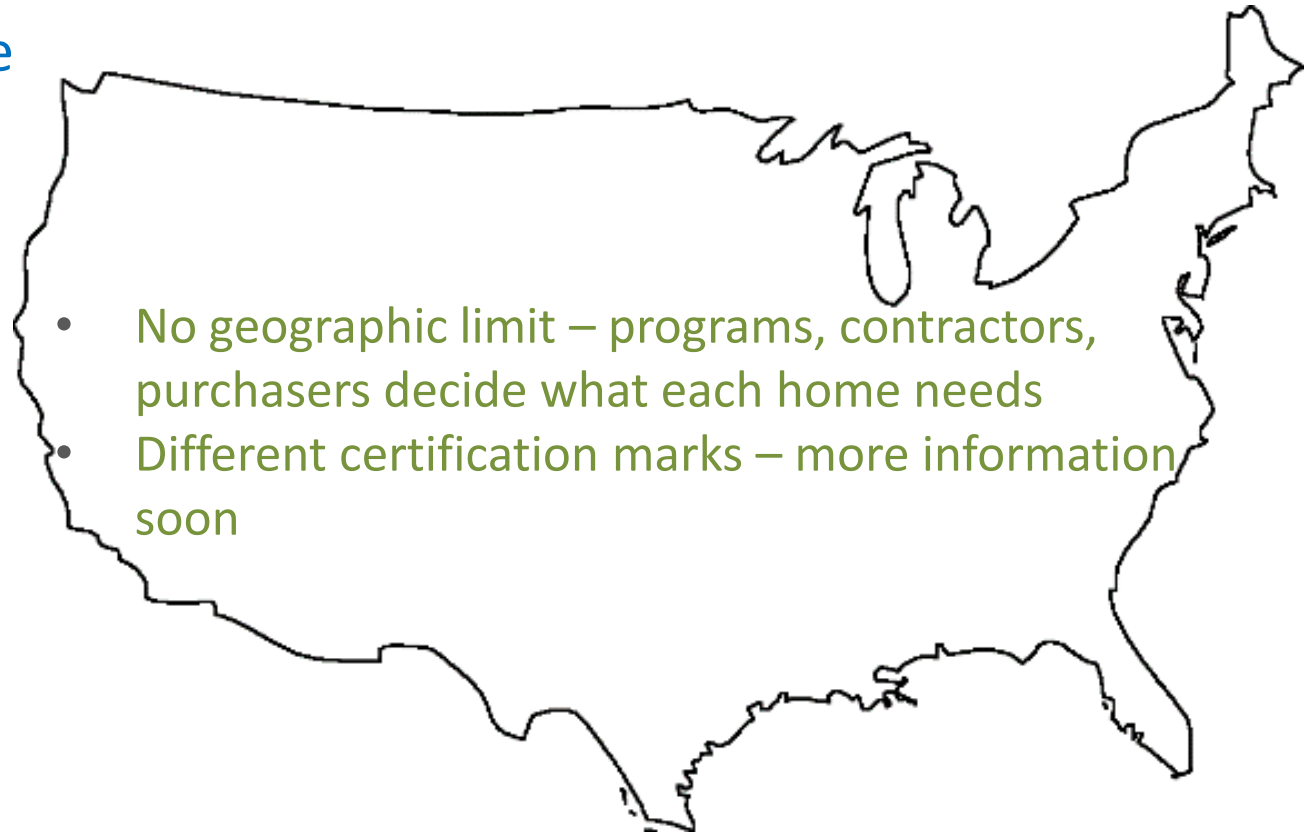
Air Source Heat Pumps: Different Climates, Different Needs

Cold Climate

- Excellent seasonal heating performance
- Maintains performance at low ambient temperatures

Moderate and Hot Climate

- Excellent seasonal peak cooling performance
- Good seasonal heating performance



- No geographic limit – programs, contractors, purchasers decide what each home needs
- Different certification marks – more information soon

Specifics of cold climate recognition

- High seasonal heating efficiency addresses annual energy use
- Requirement for capacity and efficiency at low ambient temperature reduces use of less efficient and/or fossil fuel powered backup heat sources
- Newly developed Controls Verification Procedure (CVP) ensures that lab-tested performance is achieved in the field
- Differentiated label

Installation Capabilities

- Over 65% of residential HVAC systems have suboptimal performance resulting in 20-30% increased energy consumption
- The National Renewable Energy Laboratory recently estimated:
  - US wastes over 20-Terawatt hour (TWh)/year on improper indoor airflow and incorrect refrigerant charge
  - Automatic fault detection and diagnostics (AFDD) could save 2/3 of that
- Measures in the CAC/HP Version 6.0 specification advance this work
  - Products must meet specific installation capabilities to certify
  - Coordinated with recent Air Conditioning Contracts of America (ACCA)/Residential Energy Services Network (RESNET) Standard 310: HVAC Installation Grading (which the ENERGY STAR Homes team spearheaded)
- Eventually, feedback to utility/state programs would allow incentivizing excellent installation, driving transformation of installation and maintenance practices

Standardizing "connected" for a future of flexible loads

- Opportunity:
  - Cooling (and heating, increasingly) drive peak electricity demand
  - Equipment that can temporarily reduce energy use when requested can help stabilize the electric grid
  - This type of responsiveness will become more important
- Connected criteria in ENERGY STAR specifications combine consumer amenity from smart products (e.g., remote operation) with this type of grid response
- For large energy users like heating and cooling, connected criteria focus on grid response
- For small loads like light bulbs, less so

Watch this space: V6.1 Proposal

- Takes into account detailed feedback on the influence of specification that we received after finalizing, characteristic of info we typically get during drafting-redrafting cycle.
- Considering three types of change:
  - Installation criteria: Intended to identify capabilities in the market now, but apparently missed. Adjust accordingly.
  - EER: Review peak cooling requirements, specifically for cold climate heat pumps, but more generally as well.
  - HSPF for ducted coal climate heat pumps.
- Expect to share draft by end of October; hope to finalize by end of 2021
- Will supersede version 6.0 and go into effect 1/1/23 in its place; products may by certified to it as soon as it is final.

EER: energy efficiency ratio

HSPF: Heating Seasonal Performance Factor

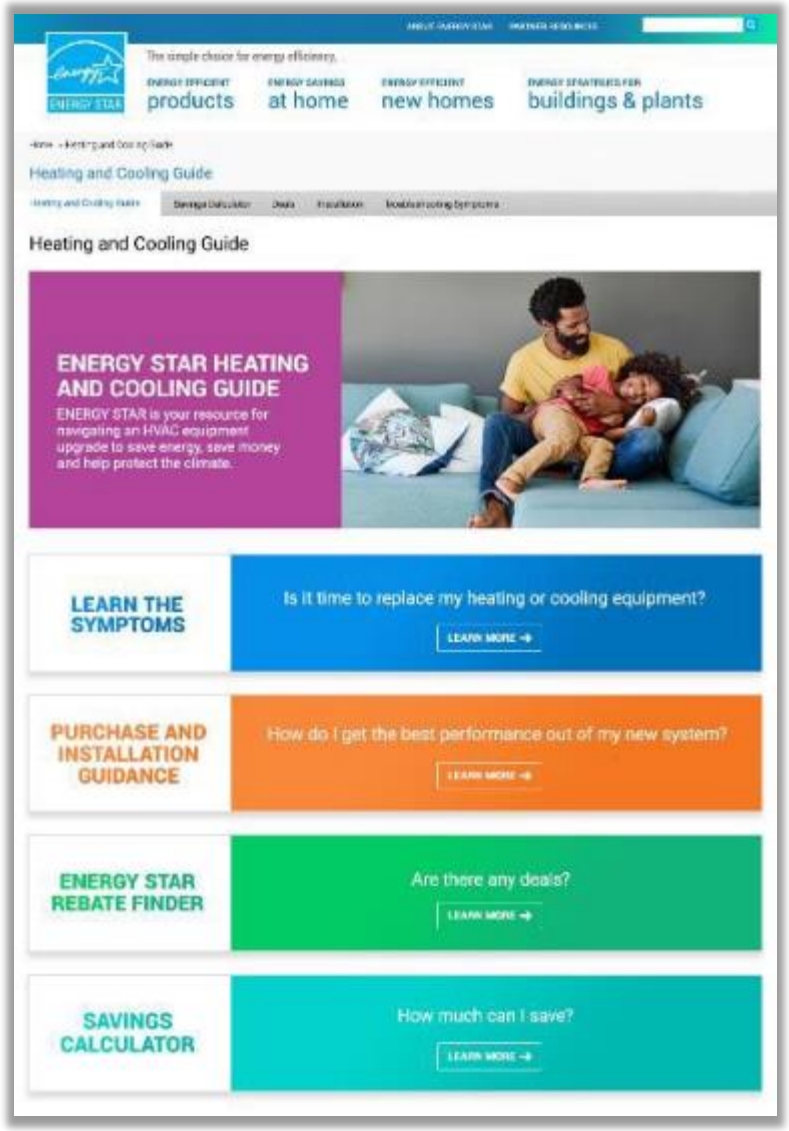
ENERGY STAR CAC/ASHP Marketing Resources

Heat Pump Guide

Overcome barriers to generate consumer demand and adoption of ENERGY STAR certified air source heat pumps

1. Complexity and Cost Barrier

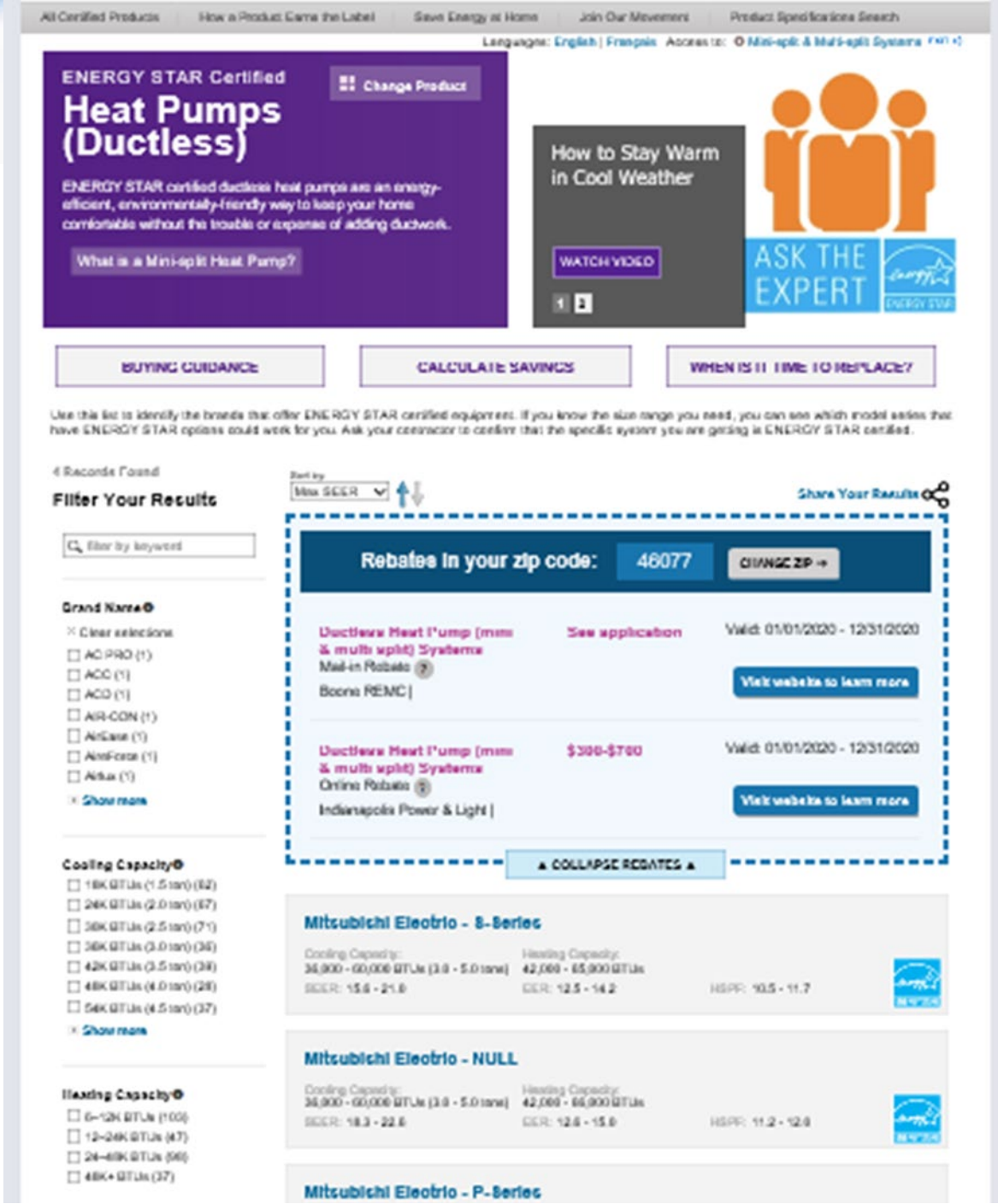
- Developed an ENERGY STAR Heating & Cooling Guide to give consumers access to the replacement guidance they need:
  - Information on equipment replacement
  - Purchase and installation guidance
  - Available Rebates
  - Replacement savings calculator



www.energystar.gov/HVACGuide

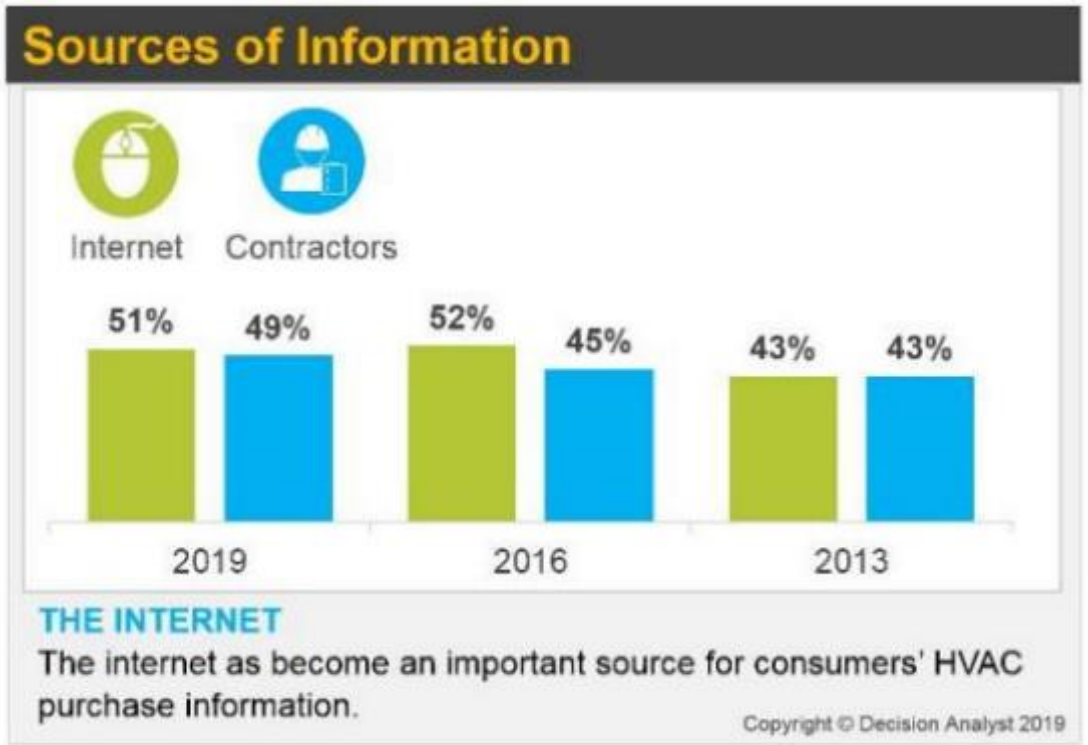
SAVE TODAY. SAVE TOMORROW.
SAVE FOR GOOD.

2. Product/Contractor Information Barrier
   - Developed a Product Finder that connects customers to brands and ENERGY STAR certified product lines that facilitate contractor support.
   - Updated CEE/Air Conditioning, Heating, and Refrigeration Institute (AHRI) links on existing product finder with an ENERGY STAR-focused experience that caters more to the end-use consumer.



3. Consumer Awareness Barrier

– Implement awareness campaign that drives traffic to heat pump resources and Product Finder.
  - Campaign highlights benefits of ENERGY STAR certified heat pumps:
    - Energy bill savings
    - Comfort
    - Rebates & Tax Credits
    - Environmental benefits



Heat Pump Promotion

- Goal: Raise awareness of the benefits of ENERGY STAR certified heat pumps.
- Targets: Markets with active utility programs and significant rebates for heat pumps
- Utility Partner Engagement Opportunity
  - Feature ENERGY STAR certification and mark at point-of-sale (online marketplaces, retail).
  - Drive traffic to heat pump content utilizing web button.

THANK YOU

Dan Lawlor
Lawlor.daniel@epa.gov

What are the greatest benefits of a heat pump program (select up to three)?

- Workforce development
- Opportunity to assist low to moderate income residents
- Meeting climate goals
- Meeting energy goals
- Increased awareness of heat pumps
- Coordination between local, state, and federal partners
- Other (enter in the Q&A box)

Poll 2

Using Heat Pumps to Meet New York State Climate Goals

Donovan Gordon
Director of Clean Heating & Cooling
New York State Energy Research and Development Authority

Get Pumped!

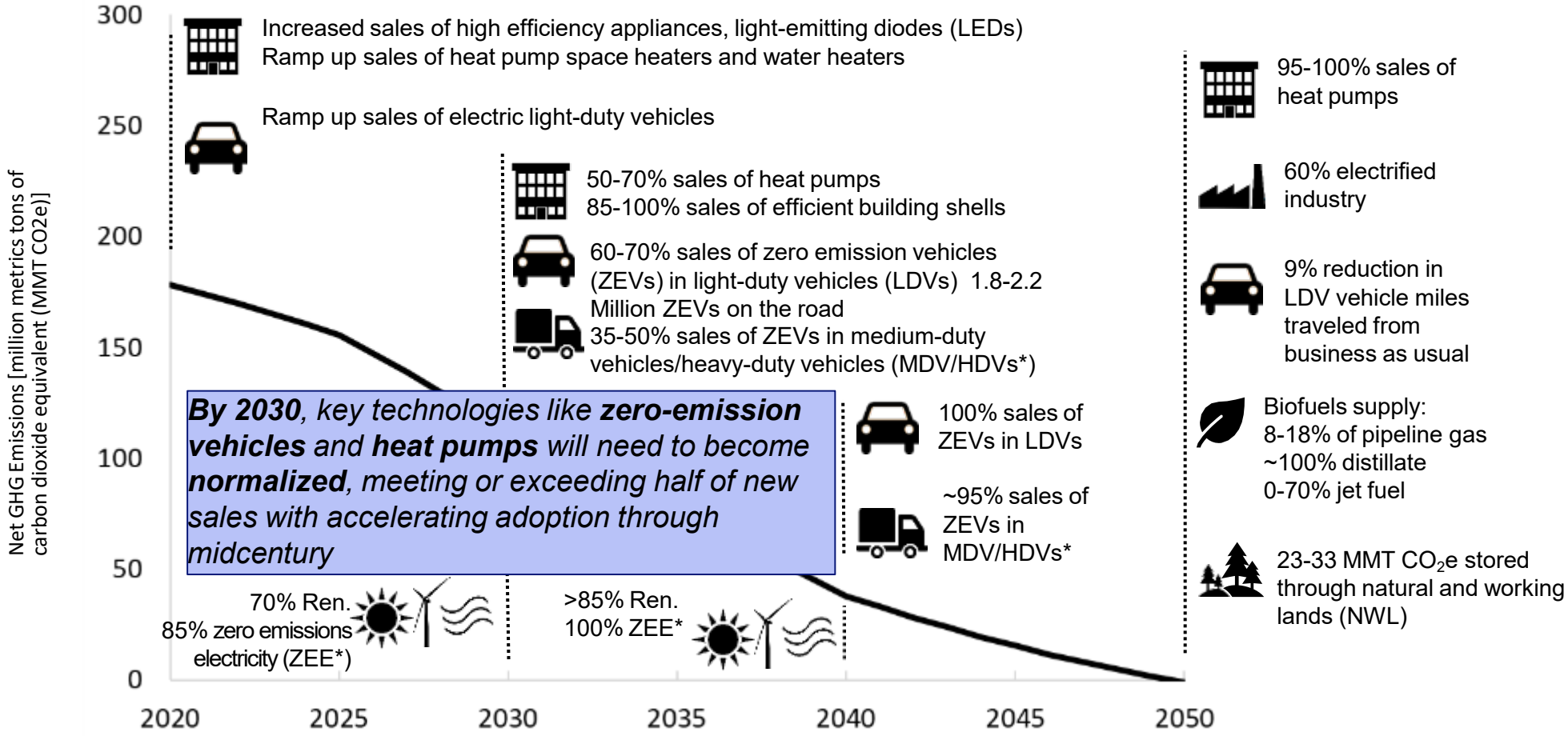
Using Heat Pumps to Meet State and Local Climate Goals

Donovan Gordon

Director of Clean Heating & Cooling

New York State (NYS) Decarbonization Pathways

+ **Achievement of emissions reductions to meet state law requires action in all sectors**
+ **A 30-year transition demands that action begin now**



*ZEE includes wind, solar, large hydro, nuclear, carbon capture and storage, and bioenergy; MDVs includes buses

NYS Clean Heat Program Funding Through 2025

- **$454M** in Statewide Heat Pump Incentive Program
  - Consumer incentives
  - Led by: NYS Utilities
  - NYS Clean Heat Statewide Heat Pump Program Implementation Plan
  - NYS Clean Heat Statewide Heat Pump Program Manual

- **$230M** in Market Development Plan
  - Initiatives to develop the NYS heat pump market
  - Support the goals of the Statewide Heat Pump Incentive program
  - Led by: NYSERDA
  - Plan details: Appendix 1 in the Implementation Plan

NY Clean Heat Market Development Plan - $230M Building Electrification Investment

Initiatives funded through the Heat Pumps "Phase 2" Investment Plan			
Critical Market Need	**Total Funding $M**	**Initiative**	**Budget $M**
TRAIN AND DEVELOP THE NEEDED CLEAN HEATING AND BUILDING ELECTRIFICATION WORKFORCE	$38.2	WORKFORCE DEVELOPMENT	$38.2
BUILD CONSUMER DEMAND AND MARKET CONFIDENCE AND REDUCE CUSTOMER ACQUISITION COSTS	$60.9	**MARKETING**	**$19.2**
		COMMUNITY CAMPAIGNS	**$10.0** [1a]
		CRITICAL TOOLS	**$4.0**
		TECHNICAL ASSISTANCE	$27.7
DRIVE PERFORMANCE IMPROVEMENTS, REDUCE COST, AND DELIVER NEW ECONOMIC SOLUTIONS THROUGH TECHNOLOGY INNOVATION AND DEMONSTRATIONS	$60.0	**CLEAN THERMAL DISTRICT SYSTEMS**	**$15.0**
		HVAC TECHNOLOGY CHALLENGES	$15.0
		EMPIRE BUILDING CHALLENGE	$15.0
		MULTIFAMILY BUILDING DEMONSTRATIONS	$5.0
		COST REDUCTION STRATEGIES	**$10.0**
MAKE ELECTRIFICATION SOLUTIONS AVAILABLE FOR LOW AND MODERATE INCOME (LMI) CONSUMERS	$31.0	**LMI**	**$31.0** [1b]
MAKE PRODUCTS AVAILABLE WHEN AND WHERE CONSUMERS NEED THEM BY BUILDING THE CLEAN HEAT SUPPLY CHAIN	$12.0	**SUPPLY CHAIN**	**$12.0**
MINIMIZE WINTER ELECTRICAL PEAK BY INVESTING IN DEMAND REDUCING "HEAT-PUMP READY" SOLUTIONS	$26.5	COMFORT HOME	$26.5
DEVELOP A LONG-TERM BUILDING ELECTRIFICATION ROADMAP TO GUIDE THE TRANSFORMATION OF HOW NEW YORKER'S HEAT AND COOL THEIR BUILDINGS	$1.0	**BUILDING ELECTRIFICATION ROADMAP**	**$1.0**
Sub-Total (representing the Heat Pump Phase 2 sub-initiatives in this Investment Plan			**$98.2**
TOTAL (representing totality of NYSERDA's Investments in the NYS Clean Heat Market Development Plan			**$229.6**

NYSERDA Clean Energy Communities

NYSERDA's Clean Energy Communities program provides grants, coordinator support, and a clear path forward to local governments that demonstrate leadership by completing NYSERDA-selected high-impact actions.

Who is eligible:

- City, town, village, and county governments

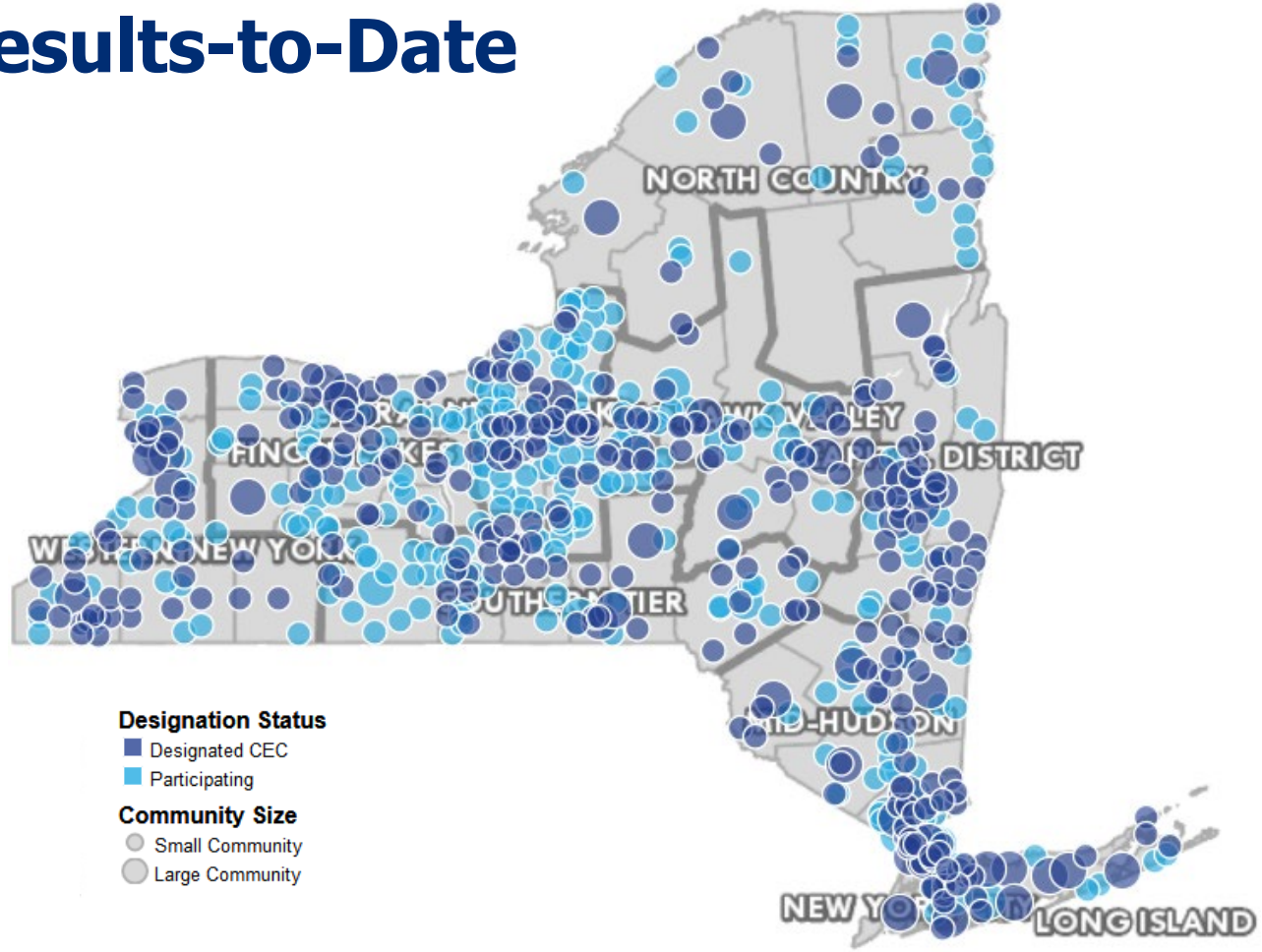
Easy to participate:

- Local governments complete high-impact actions to earn grants and recognition

Key advantages include:

- Flexible grant funding with no local cost share
- Free coordinator support
- Recognition for your community's leadership

Clean Energy Communities (CEC) Results-to-Date



365

Clean Energy Communities

representing 16.5 million New Yorkers

641

Participating Communities

representing 18.2 million New Yorkers

2,235

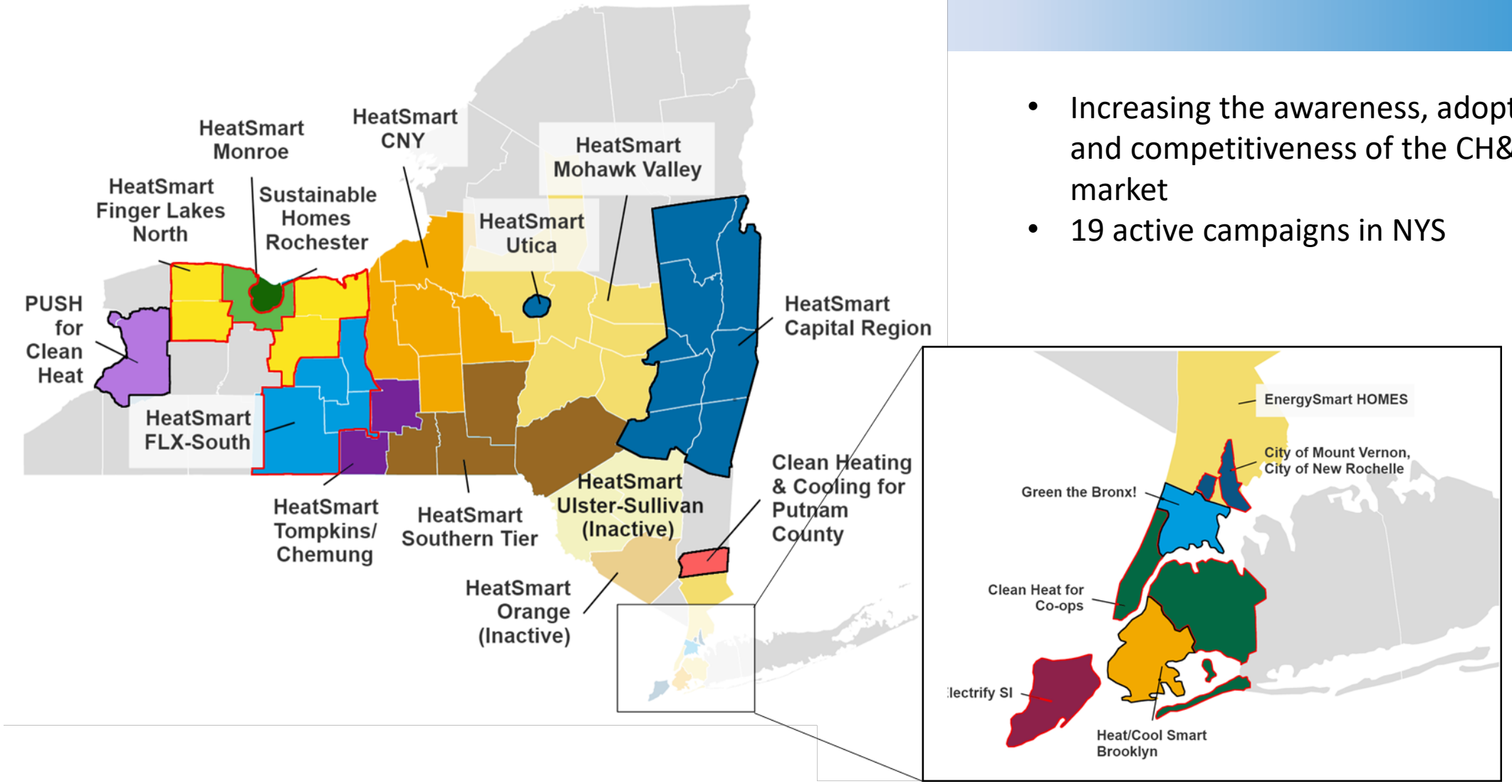
High-Impact Actions Completed

Clean Heating & Cooling (CH&C) Community Campaigns

The Campaign Director and staff:

- Help navigate programs and financing options to minimize installation costs
- Improve heat pump awareness and what option is best for a given home
- Connect residents with a local, vetted installer that will provide a quality installation at a fair market price
- Introduce residents to others in the community that have installed heat pumps

CH&C Community Campaigns ("HeatSmart")



- Increasing the awareness, adoption, and competitiveness of the CH&C market
- 19 active campaigns in NYS

ElectrifyNYC

NYC Mayor's Office of Climate and Sustainability

- First NYC program with partnerships between local housing organizations, minority/women-owned business enterprises (MWBEs) & Mayor's Office of Climate & Sustainability (MOC&S) to support 1-4 family energy upgrades and heat pump installations.
- Focused on Staten Island
- Program goals include heat pump installs, energy efficiency upgrades, and energy audits
- Program will help existing HVAC contractors expand their offerings to include new technologies, qualify for incentive programs, and connect them to leads from interested homeowners.
- The program will also support business development, with a focus on M/WBEs, small businesses, veterans, and other priority populations.

KINETIC COMMUNITIES CONSULTING

NHS of Staten Island
Creating Sustainable and Resilient Communities

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

Heat pumps

ADOPT CLEAN ENERGY

Training

Financing

The Energy Revolution is Here!
All Hands-on Board!

Installers

www.adoptcleanenergy.com

NYSERDA Clean Energy Hub Activities

- **Outreach & Awareness** – conduct outreach focused on disadvantaged communities, to provide access to available programs and resources, with the goal of increasing participation within programs and access resources.
- **Campaigns –** conduct targeted community campaigns with the goal of aggregating demand to reduce soft costs and to move toward a more integrated approach to community campaigns and a more robust, technology agnostic model that will promote a range of clean energy technologies and solutions.
- **Energy Education -** Conduct energy literacy and energy education opportunities as part of events, campaigns, or as stand-alone events.
- **Partnerships –** Through existing relationships, or the ability to form relationships with, external entities and partners currently operating in disadvantaged communities to increase access to and accelerate participation in clean energy programs and solutions.

NYSERDA Clean Energy Hub Activities

- **Project Coordination** - Provide program and loan application assistance, work with partner organizations to refer customers and coordinate NYSERDA -funded projects with other local, state, or federal programs and resources.
- **Equitable Engagement & Regional Capacity Building** - Implement strategies for comprehensive stakeholder engagement in the form of a Regional Equitable Engagement Plan. Use a variety of methods to collect feedback and share information that ensures awarded funds provide direct, meaningful, and measurable benefits to disadvantaged communities.
- **Workforce and Small Business Development** - Work with local training partners and clean energy businesses, to contribute to increased workforce development and economic opportunity for people and businesses in disadvantaged communities to fully participate in the clean energy economy.
- **Local Project Support** - address barriers to engagement in the clean energy economy or other needs in disadvantaged communities.

Community Thermal Strategy

"A community thermal strategy accelerates the decarbonization of New York's building stock – moving from a building-by-building approach to a block-by-block and community-by-community model."

Increase scale.

Decrease costs.

CLEAN THERMAL DISTRICT SYSTEMS $15M

Activities

- Provide technical assistance funding for initial scoping
- Provide technical assistance (for design)
- Provide installation incentives (for construction)
- Use multibuilding aggregation to load smooth across different building demands
- Advance related outreach, tools, and training

Target Market Impacts

- 20 scoping studies (2021), 8 detailed design studies (2022), and the launch of 2 demonstration projects (2023)

Neighborhood in City of Troy Category A Feasibility Study NYSERDA PON 4614

Rensselaer County

Technical Lead: CHA Consulting & Siemens Industry, Inc.

Anticipated completion of study/availability of final report: October 2021

V2 7/2021

The Site & Beneficiaries

Two groupings of existing/new construction mixed-use buildings near the downtown section of the City of Troy with 16 buildings. The Northern Node will be anchored by new construction of a mixed-use building and serving numerous adjacent existing buildings. The Southern Node will be anchored by redevelopment of existing buildings at a college and redevelopment of three affordable housing sites. The two nodes are separated by approximately 1,000 feet and subsequent phases will explore in-fill to possibly connect the two. The target buildings currently are a mix of existing water source heat pumps, natural gas steam systems and natural gas furnaces. These 16 buildings, collectively over 700,000 square feet, will be analyzed to explore district-style heat pumps with additional supplemental heating and cooling systems. These 16 buildings have diverse occupancy patterns and thermal load profiles, consisting of multifamily-residential, dormitories, and office buildings. The analysis will quantify the peak of the composited thermal load and compare it to the sum of the individual peaks in order to assess the load-flattening benefits of aggregating into a district. The study will additionally explore the feasibility of expansion of the system to include 23 additional downtown buildings and future mixed use development in a brownfield development area.

Potential Thermal Resources

The primary opportunity anticipated will leverage ground-coupled boreholes to provide a year round heat source and sink for all connected buildings with several potential supplemental sources, such as air-source heat pumps, thermal storage, water body thermal resource (Hudson River), and/or sewage water.

Potential Configuration

Will explore a district ambient loop design, consisting of a central ambient temperature loop, which serves a mixture of existing water source heat pump systems, upcoming new developments and major HVAC renovation projects (5G design consisting of a heat pump installed at each building where such heat pump would extract heat from, or reject heat to, the district's closed-loop ambient-temperature water pipe). Benefits of this configuration include: opportunity to integrate with existing thermal infrastructure and use the heat pumps as the first-call (reserving the fossil fuel systems as supplement to meet extreme peaks or for systemwide redundancy for resilience).

State and Local Climate and Energy Program

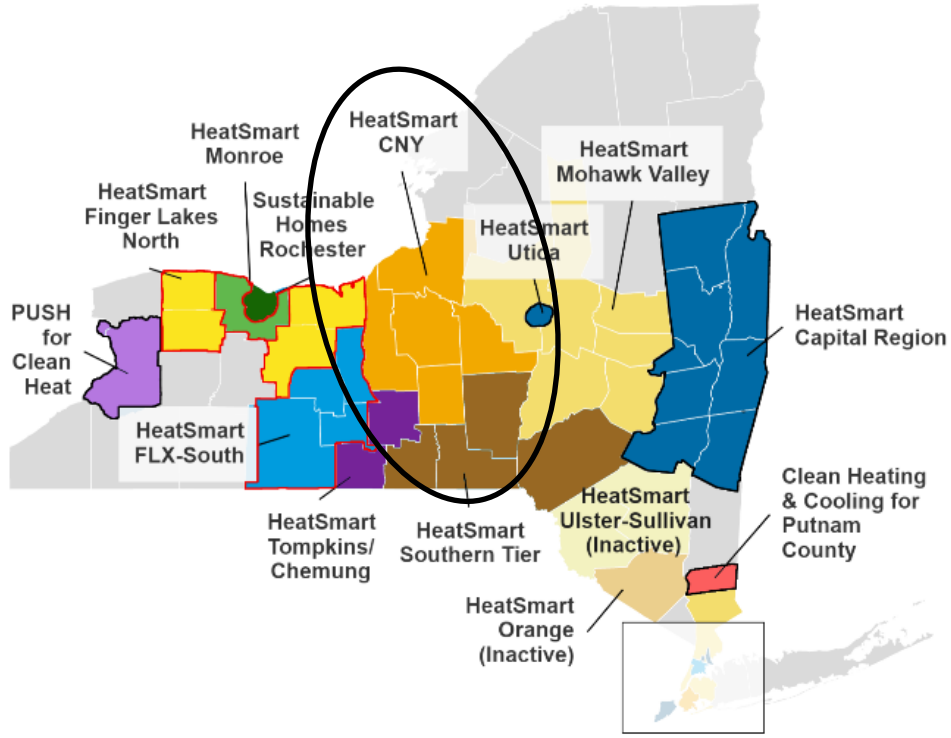
HEATSMART CENTRAL NEW YORK (CNY)

Lindsay Speer
Director of Community Programs
Alliance for a Green Economy

Chris Carrick
Energy Program Manager
Central New York Regional Planning and Development Board

HeatSmart CNY

One of NYSERDA's Clean He and Cooling Community Campaigns



Central New York Regional Planning & Development Board

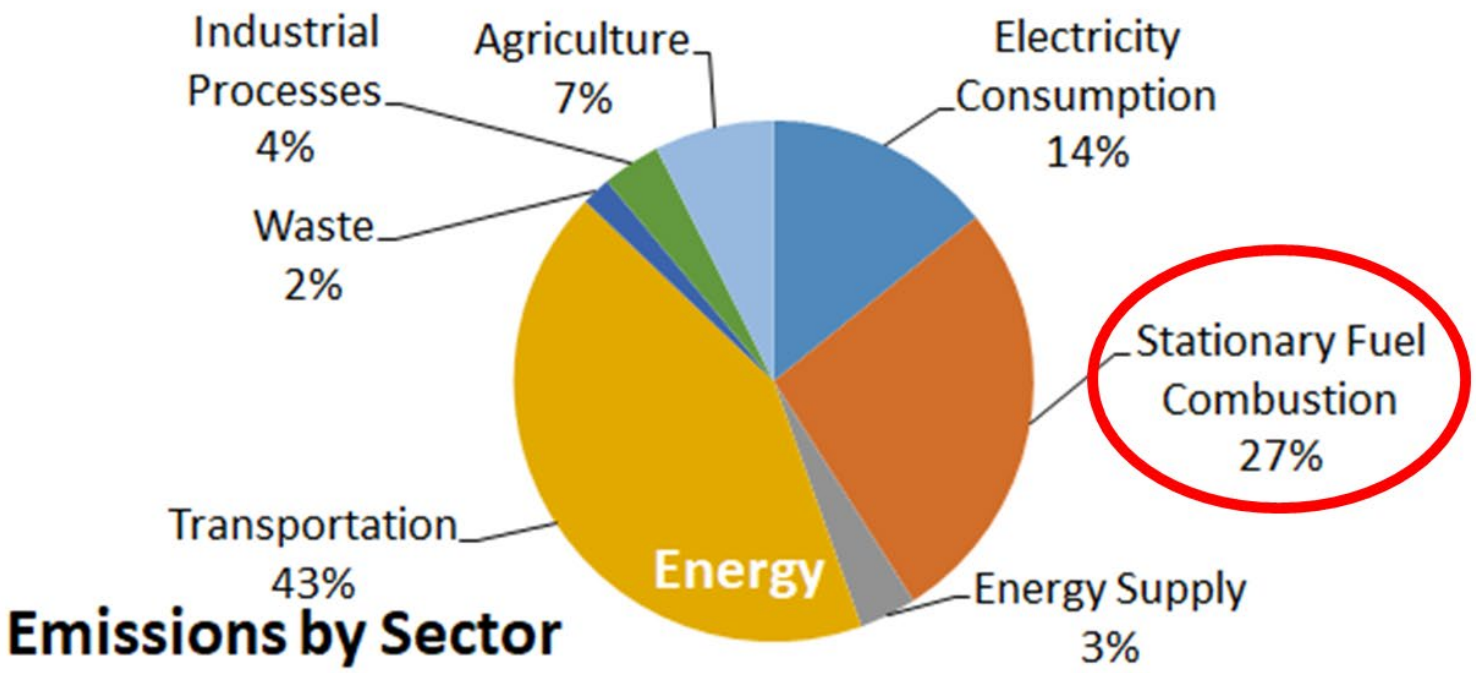
AGREE New York
Alliance for a Green Economy

NEW YORK STATE OF OPPORTUNITY.

NYSERDA Supported

Regional and State Greenhouse Gas Emissions

Central New York Regional Sustainability Plan
visioncny



Emissions by Sector

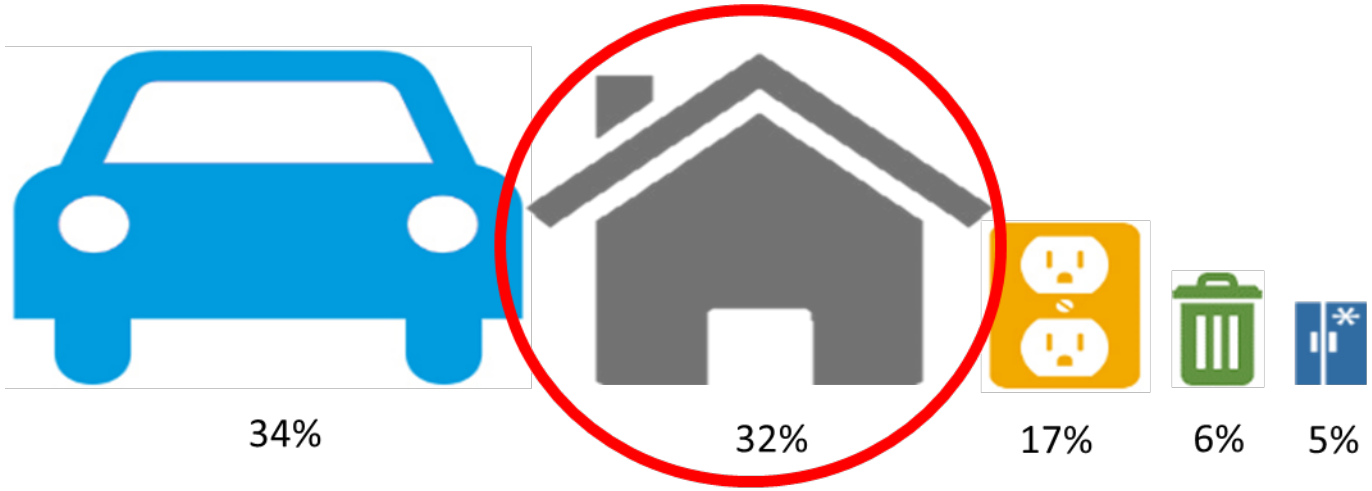
Central New York

9.9 million metric tons CO_2e

12.5 $MTCO_2e$ per person per year

CNY Energy Spending

$2.45 billion
(8% of Gross Regional Product)



New York State

212 million metric tons CO_2e

10.7 $MTCO_2e$ per person per year

NYS Energy Spending

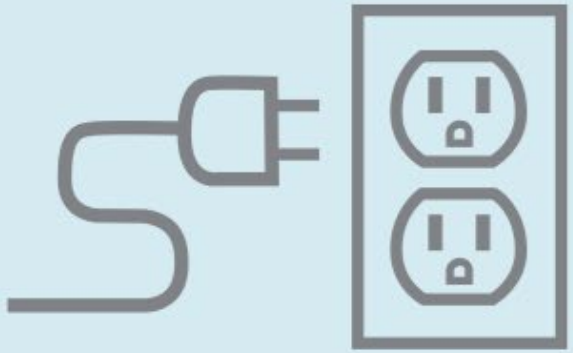
$66 billion
(5.5% of state Gross Domestic Product)

Renewables

70% by 2030

Offshore Wind

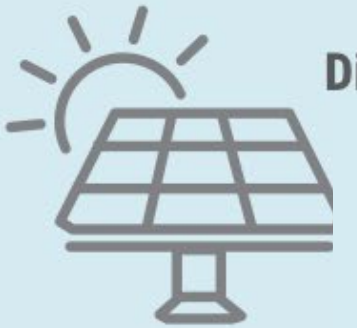
9,000 MW by 2035



Energy Efficiency

185 trillion British Thermal Units (BTU) reduction by 2025

Zero-Emission Electric Sector by 2040



Distributed Solar Energy

10,000 MW by 2030

Battery Storage

3,000 MW by 2030

Image credit: New York Independent System Operator (NYISO) 2020 Power Trends Report

NY's Climate Leadership and Community Protection Act (CLCPA)

5+ Installers

5+ Options

1200+ Participants

120+ Events

Key elements:

- Independent source of info
- Sharing local examples
- Q&A resources
- Help understand incentives
- Emphasize comfort
- Advertising
- Collaboration!

Challenges & Lessons Learned

1. It takes time
2. Educating about cold climate air source heat pumps is key
3. Make it easy for installers
4. Equity, access and affordability
5. COVID-19

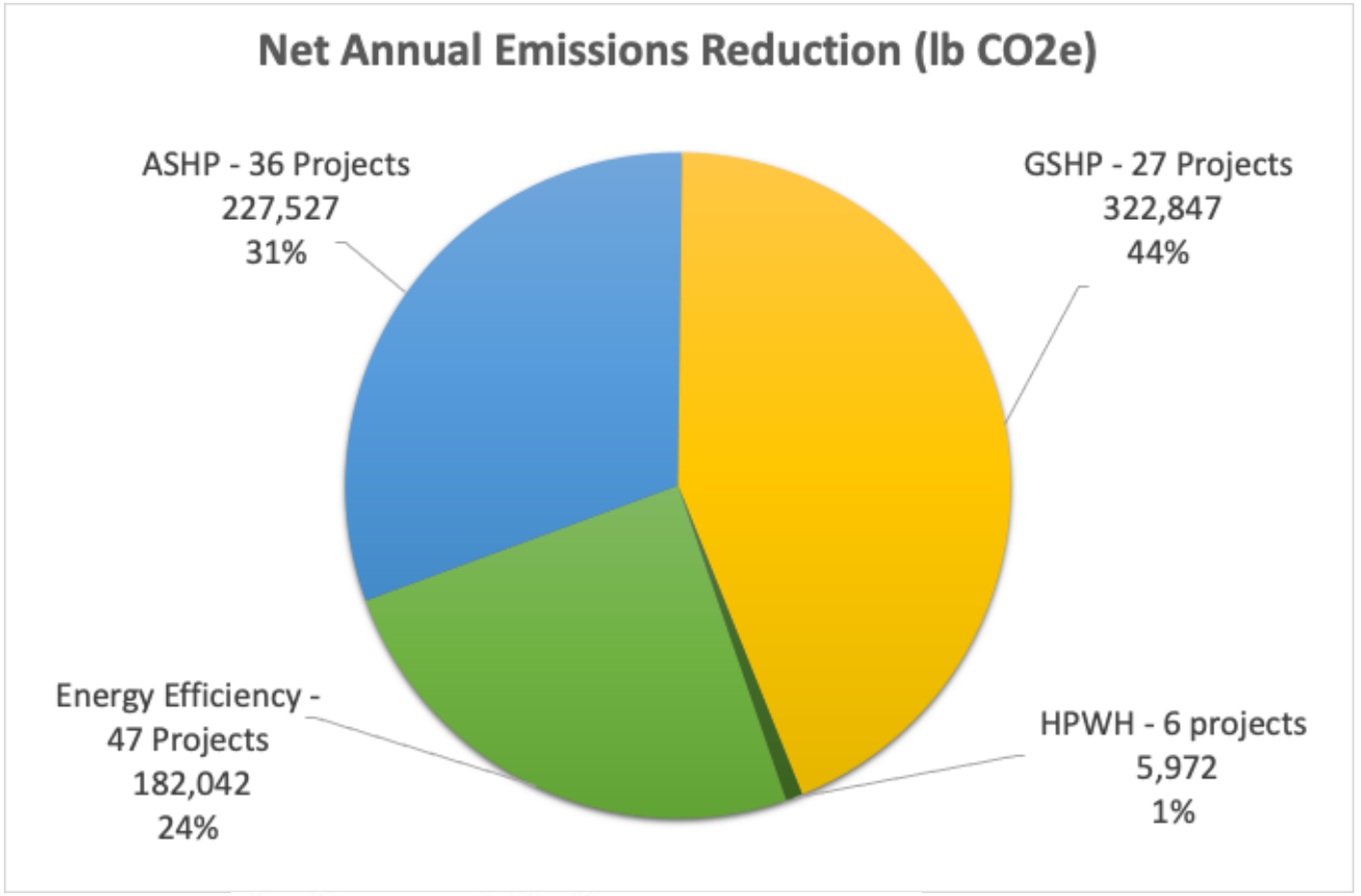
1. Office hours, individualized attention
2. Address myths head-on, provide testimonials
3. Workforce development, information technology (IT) support, streamline reporting
4. “Affordability grants”
5. Virtual events, more paid marketing

Considerations for Starting a Program

- Many roles to be filled, so funding for staff and marketing - as well as volunteer recruitment, training and engagement - are key
- Tailor messages to specific audiences; emphasize the many benefits and co-benefits
- Testimonials, case studies and open houses so people can “see” that the technology works
- Creative approaches are needed to addressing high first costs and soft costs
- Take a regional approach

Results to date

- 116 Projects
  - 40 low and moderate income households [ASHPs and Heat pump water heaters (HPWHs)]
  - 2 churches
- Annual reduction of 335 tons of CO_2/year
- 6,475 tons CO_2e over the lifetime of the systems



Geothermal Home in Manlius, NY: Annual Stats

Before: Heating with Gas

- 893 therms
- $995
- 4.7 tons CO_2e

After: Heating with Geothermal

- 3400 kilowatt hours (kWh)
- $340
- 0.5 tons CO_2e

Making a difference in people's lives

Lindsay Speer, Campaign Director
HeatSmart Central New York
Website: www.heatsmartcny.org
Email: Lindsay@HeatSmartCNY.org
Phone: (315) 313-5050
Social Media: @HeatSmartCNY

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Chris Carrick, Energy Program Manager
Website: www.cnyenergychallenge.org
Email: ccarrick@cnyrpdb.org
Phone: (315) 422-8276 x. 1213
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Central New York Regional Planning & Development Board

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December 6, 2021

Whole Building Approaches to Electrification

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Andrea Denny
U.S. Environmental Protection Agency
Denny.Andrea@epa.gov

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