VIRGINIA IRA ENERGY REBATE PROGRAM

Market Assessment
May 2024

VIRGINIA Energy

VIRGINIA IRA ENERGY REBATE PROGRAM

MARKET ASSESSMENT - KEY QUESTIONS

Thorough assessment of market potential is intended to identify opportunities and constraints in the market and make data-driven decisions on program delivery.
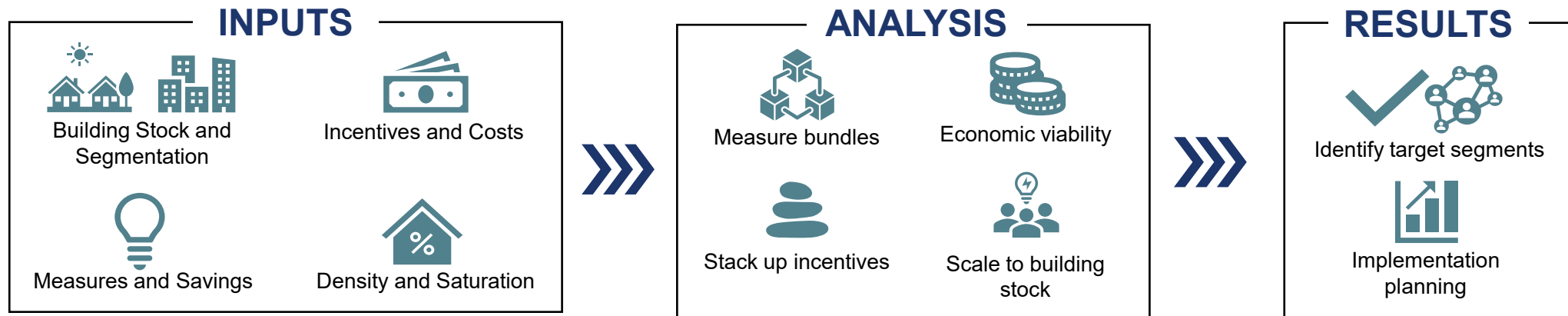

1. Which combination of measures and segments have the greatest potential for savings?
2. Are the incentives sufficient to make the measure install economically viable for participants? If so, which segments?
3. How would decisions around measured and modeled savings approach, braiding with utility and federal programs be beneficial to participants?
4. What incentive levels will make the measures and offerings viable to program participants [recognizing that below certain income levels, no out of pocket cost is the only viable path to customer adoption]?
5. How long will it take to exhaust all funds based on design and scenarios?
6. Is the level of uptake required to disburse all funds sustainable?

Answers to these questions will help Virginia Energy identify target markets, processes, measures, delivery channels, and market actors to inform program design.

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MARKET ASSESSMENT - ECONOMIC AND TECHNICAL POTENTIAL ANALYSIS

INPUTS

- Building Stock and Segmentation
- Incentives and Costs
- Measures and Savings
- Density and Saturation

ANALYSIS

- Measure bundles
- Economic viability
- Stack up incentives
- Scale to building stock

RESULTS

- Identify target segments
- Implementation planning

SAMPLE OF ANALYSIS PARAMETERS

BUILDING STOCK SEGMENTATION

- Single-family detached
- Single-family attached
- Mobile home
- Multi-family 2-4 units
- Multi-family 5+ units

PROGRAMS AND INCENTIVES

- HOMES and HEAR
- Weatherization Assistance Program
- Increased rebates for low-income participants
- Measured and modeled rebates

MEASURE BUNDLES

- Space/water-heating electrification
- Whole-home electrification with and without building envelope
- Gas upgrades with and without building envelope (HOMES only)

ECONOMIC VIABILITY CHECK

- Positive bill savings
- Net benefit on a participant cost test
- Simple payback period <5 years

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MARKET ASSESSMENT - MARKET SEGMENTATION

SEGMENTATION

Building Stock

Income Level

Heating Fuel

Ownership

MEASURE MIX

Heat Pump Upgrades
Heat pump with/without weatherization

Gas Upgrades
Gas furnace, gas water heater, gas furnace + central AC, with/without

Whole Home Electrification
Heat pump, heat pump water heater, heat pump clothes dryers with/without weatherization

PERFORMANCE PARAMETERS

- Incentives disbursed
- Participation
- Performance compared to low-income allocations
- HOMES/HEAR incentive per participant
- Participant Out of pocket cost
- Energy burden reduction
- Implementation forecast

ASSUMPTIONS

➤ WAP rebate is limited to full cost of weatherization upgrades for households with annual income less than 60% of AMI.

➤ Service upgrades and wiring costs are included by default for all upgrades involving heat pumps, except for households with electricity as heating fuel.

➤ Households are only considered qualified for the incentive if they have positive bill savings, payback-period less than 10 years and have net-benefit on participant cost test.

➤ Results are agnostic of programmatic interventions to target specific segments.
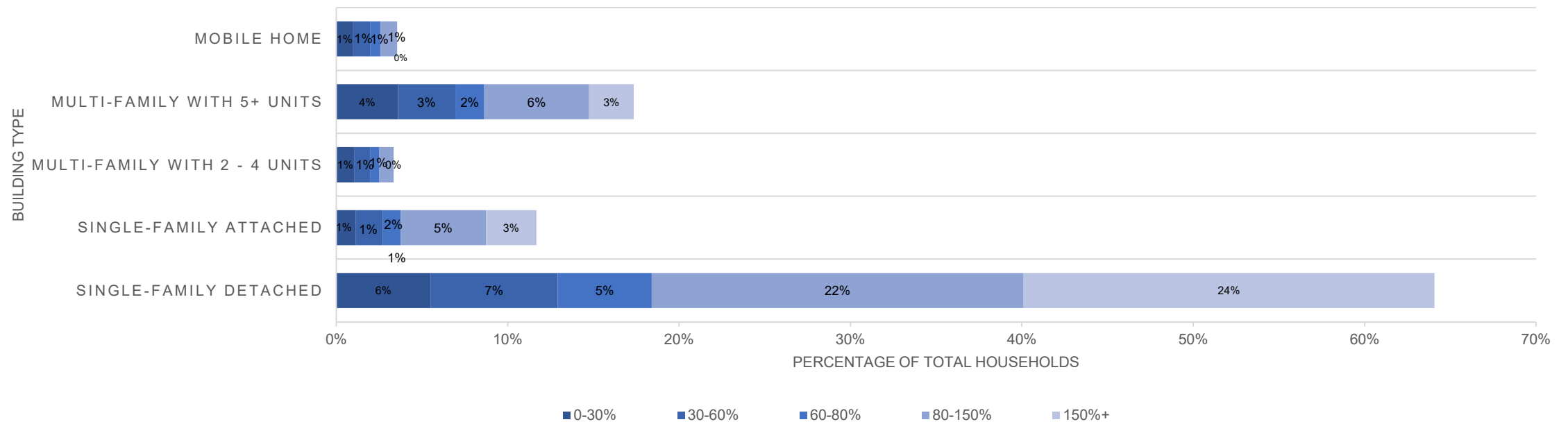
➤ Does not include installer incentives.

Virginia's housing market is primarily single-family housing stock (attached and detached) and large multi-family buildings.

Mobile homes and small multi-family are a small part of the market however each has a diversity of residents across the AMI spectrum

DISTRIBUTION OF HOUSEHOLDS BY BUILDING TYPE AND AMI

Chart: Distribution of households by building type and AMI (percentage of total households). Legend: 0-30%, 30-60%, 60-80%, 80-150%, 150%+

- MOBILE HOME: 1%, 1%, 1%, 1%, 0%
- MULTI-FAMILY WITH 5+ UNITS: 4%, 3%, 2%, 6%, 3%
- MULTI-FAMILY WITH 2 - 4 UNITS: 1%, 1%, 1%, 0%
- SINGLE-FAMILY ATTACHED: 1%, 1%, 2%, 5%, 3%, 1%
- SINGLE-FAMILY DETACHED: 6%, 7%, 5%, 22%, 24%

Total Number of Households in Virginia: 3,353,035 (67% own the home they occupy)
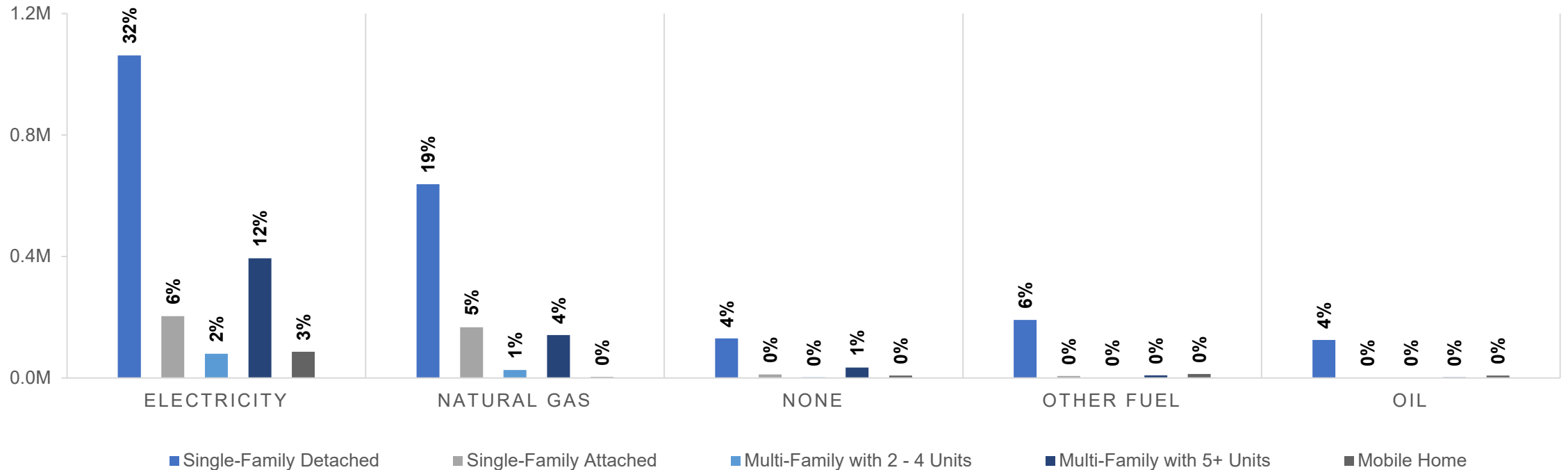
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MARKET ASSESSMENT – MARKET POTENTIAL ANALYSIS

Using market potential analysis, Guidehouse evaluated six program design scenarios to inform VA Energy market and implementation strategy.

Scenario#	Modeled/Measured	Rebate Levels	Braiding	Limit Income-Eligibility	Programs Considered
MO	All Modeled	Default, aligned with DOE	No braiding	No	HOMES & HEAR
ME	All Measured	Default, aligned with DOE	No braiding	No	HOMES
Max LI	Single-Family/Mobile Homes - Modeled; Multi-Family - Measured	Maximize for Low-Income	No braiding	No	HOMES
Braid	Single-Family/Mobile Homes - Modeled; Multi-Family - Measured	Maximize for Low-Income	Braiding with utility and WAP rebates	No	HOMES
LIE	Single-Family/Mobile Homes - Modeled; Multi-Family - Measured	Maximize for Low-Income	Braiding with utility and WAP rebates	Yes, limited to 0-60% AMI	HOMES
LIE+	Single-Family/Mobile Homes - Modeled; Multi-Family - Measured	Maximize for Low-Income	Braiding with utility and WAP rebates	Yes, limited to 0-60% AMI for measured, not for modeled	HOMES & HEAR

Low-Income (0-80% AMI) Rebate Levels

Description	Incentive - Project Cost Limit (Measured and Modeled)	Modeled Incentive 20-34% savings	Modeled Incentive >=35% savings
Default-DOE	80%	$4,000	$8,000
Maximize	100%	$10,000	$16,000

HOMES PROGRAM

Target Segments –

- Homes heated with Oil or Electricity which account for about 2 million (out of 3.2 million) households in the Commonwealth, are most likely to participate in the program.

Programmatic Interventions –

- Programmatic interventions, like specifically targeting marketing and outreach to multi-family buildings, leveraging categorical eligibility etc. would be crucial to meet the low-income multi-family target allocation

Measure Mix –

- Heat Pumps and Whole home electrification upgrades account for 90% of the total rebates.
- Gas measures e.g., gas furnace and gas water heater account for ~10% of the total rebates.

Limiting Eligibility for Maximizing Rebates –

- Limiting maximum rebate threshold to participants with income less than 60% of AMI can help deliver maximum benefits, lowest upfront costs and sharpest reduction in energy burden to households who need it the most.
- E.g., 0-60% at 100% of project cost, 60-80% at 80% of project cost and >80% at 50% of project cost

Braiding –

- Braiding has a big impact in lowering out of pocket costs for participants in the 0-60% AMI category.
- These benefits must be weighed against increased administrative burden and complexities.
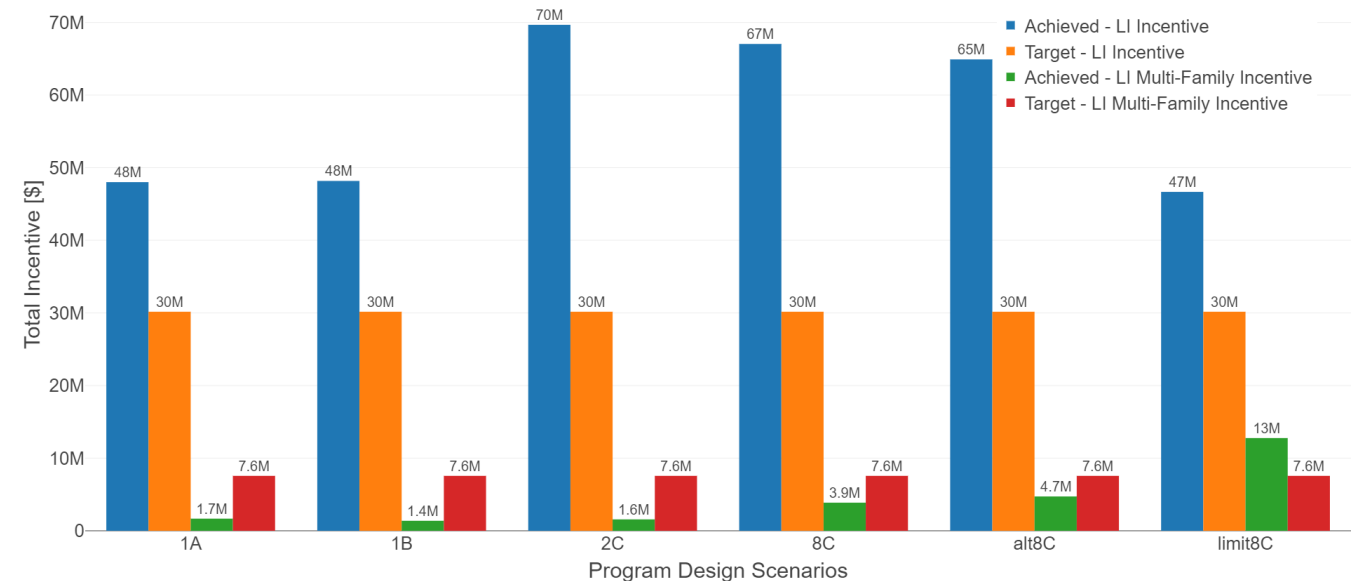
HOMES – LOW INCOME TARGETS

- Program is likely to meet and outperform low-income allocation

- Limiting income eligibility to 0-60% could help improve program performance relative to target

- Modeled vs. measured approaches don't have significant impact on low-income rebate levels

Challenges

- Based on NREL data, meeting low-income multi-family allocation would pose a challenge for most scenarios

- <u>Programmatic interventions may be needed to offset imbalance</u>

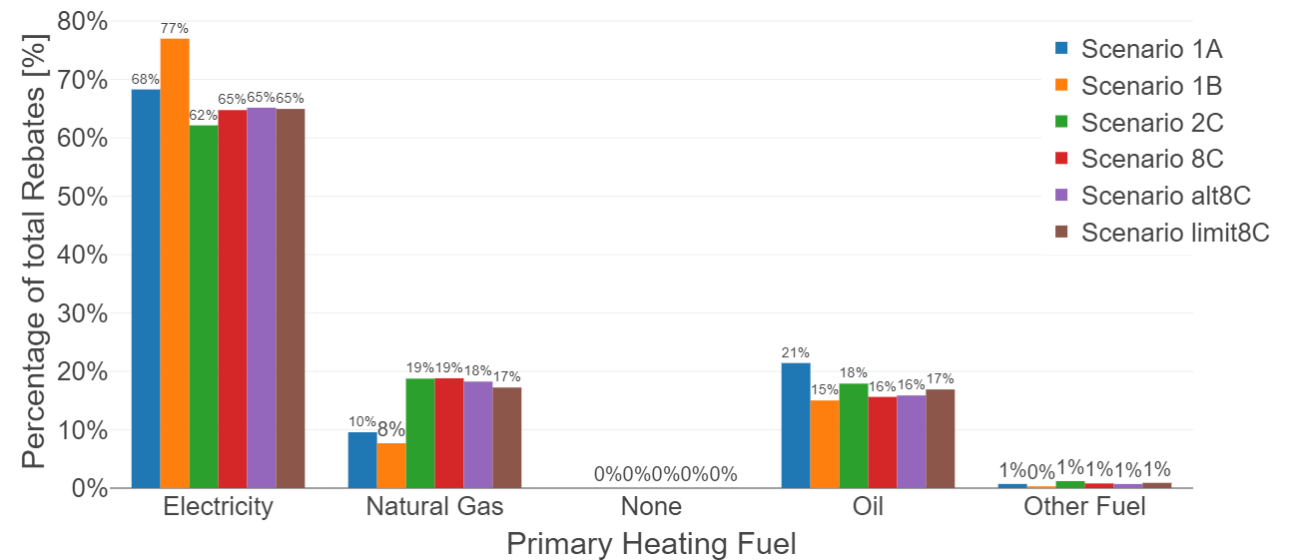**Incentive Levels Achieved Relative to Target Allocations for Each Scenario**

Legend:
- Achieved - LI Incentive
- Target - LI Incentive
- Achieved - LI Multi-Family Incentive
- Target - LI Multi-Family Incentive

Y-axis: Total Incentive [$]
X-axis: Program Design Scenarios

Scenario	Achieved - LI Incentive	Target - LI Incentive	Achieved - LI Multi-Family Incentive	Target - LI Multi-Family Incentive
1A	48M	30M	1.7M	7.6M
1B	48M	30M	1.4M	7.6M
2C	70M	30M	1.6M	7.6M
8C	67M	30M	3.9M	7.6M
alt8C	65M	30M	4.7M	7.6M
limit8C	47M	30M	13M	7.6M

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HOMES – HEATING FUEL AND MEASURE MIX

- About 54% of VA households use electricity for heating

- **Switching from electric resistance heating to heat pump could save significant energy and reduce bills**

- Households with fuel oil for heating fuel have a high likelihood of participating in the program
  - Savings relative to oil are substantially higher than gas
  - Oil rates are greater than electricity rates per unit of heating output

- **VA Energy could consider households with electric and oil heating as key target segments**

Incentive Levels Achieved by Heating Fuel

Legend:
- Scenario 1A
- Scenario 1B
- Scenario 2C
- Scenario 8C
- Scenario alt8C
- Scenario limit8C

Electricity: 68%, 77%, 62%, 65%, 65%, 65%
Natural Gas: 10%, 8%, 19%, 19%, 18%, 17%
None: 0%, 0%, 0%, 0%, 0%, 0%
Oil: 21%, 15%, 18%, 16%, 16%, 17%
Other Fuel: 1%, 0%, 1%, 1%, 1%, 1%

Y-axis: Percentage of total Rebates [%]
X-axis: Primary Heating Fuel

MEASURE MIX

➢ Heat pump upgrades are likely to have the highest adoption rate. Ranging between 50% - 70% of the incentives could be due to heat pump upgrades.
➢ Whole home electrification is the likely to have the second highest adoption rate. 24% - 42% of the incentives could be due to whole home electrification.
➢ Gas upgrades are likely to have low adoption. Ranging from 4% - 10%.
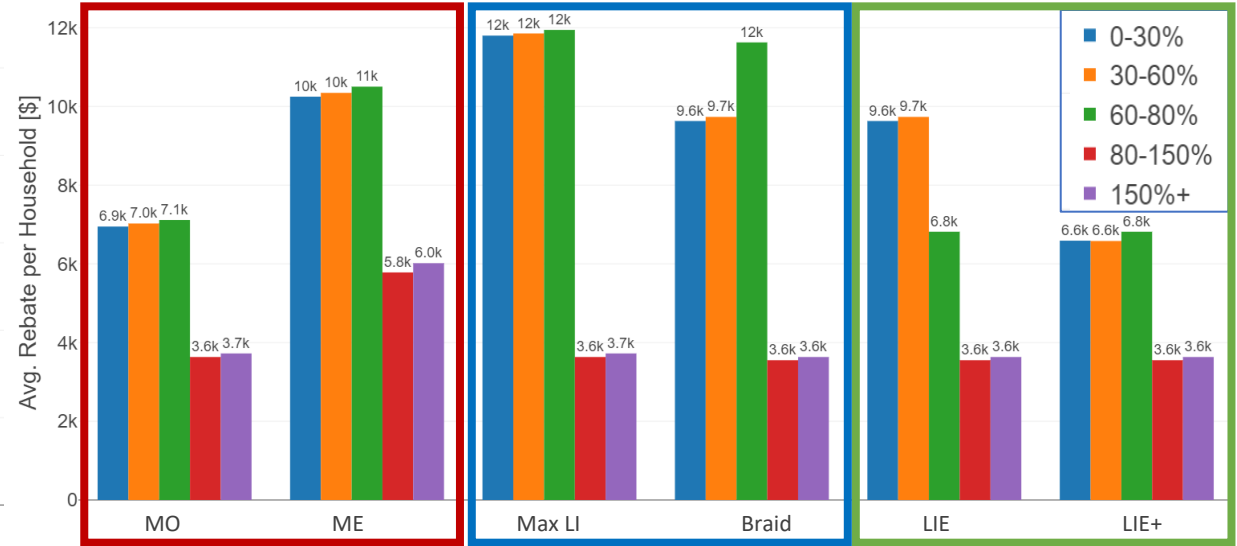
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HOMES – PARTICIPANT-LEVEL METRICS

Out of pocket cost per Participant for Each Scenario
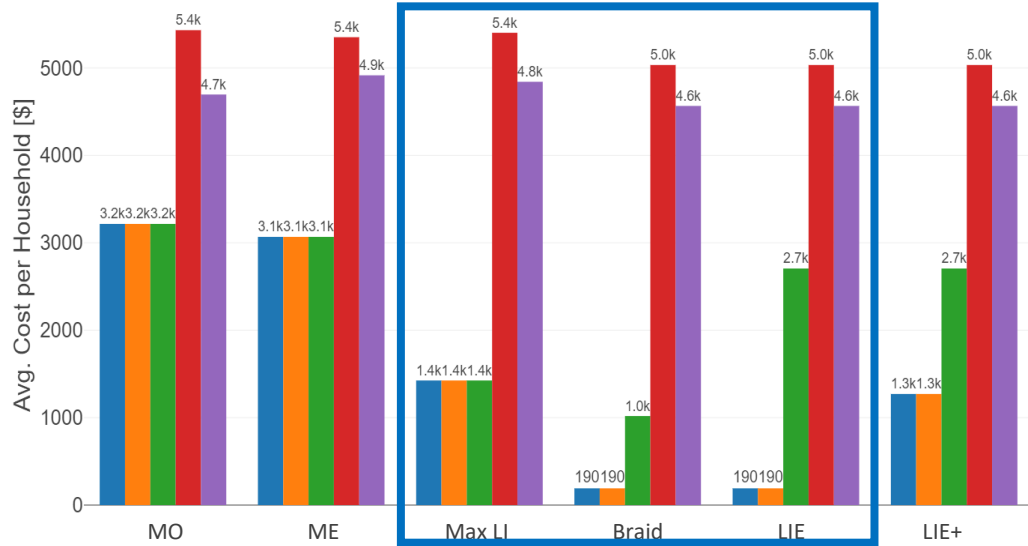
Avg. Incentive per Participant for Each Scenario

Impact of WAP and utility braiding

Impact of modeled vs. measured

Impact of WAP and utility braiding

Impact of limiting income eligibility

Legend:
- 0-30%
- 30-60%
- 60-80%
- 80-150%
- 150%+

➢ Average incentives per participant for low-income households increase from modeled to measured but, decrease when including braiding from WAP.
➢ Limiting income eligibility will help in increasing rebate levels for households with income less than 60% of AMI.
➢ Out of pocket costs decrease substantially with braiding especially for households with income less than 60% of AMI.
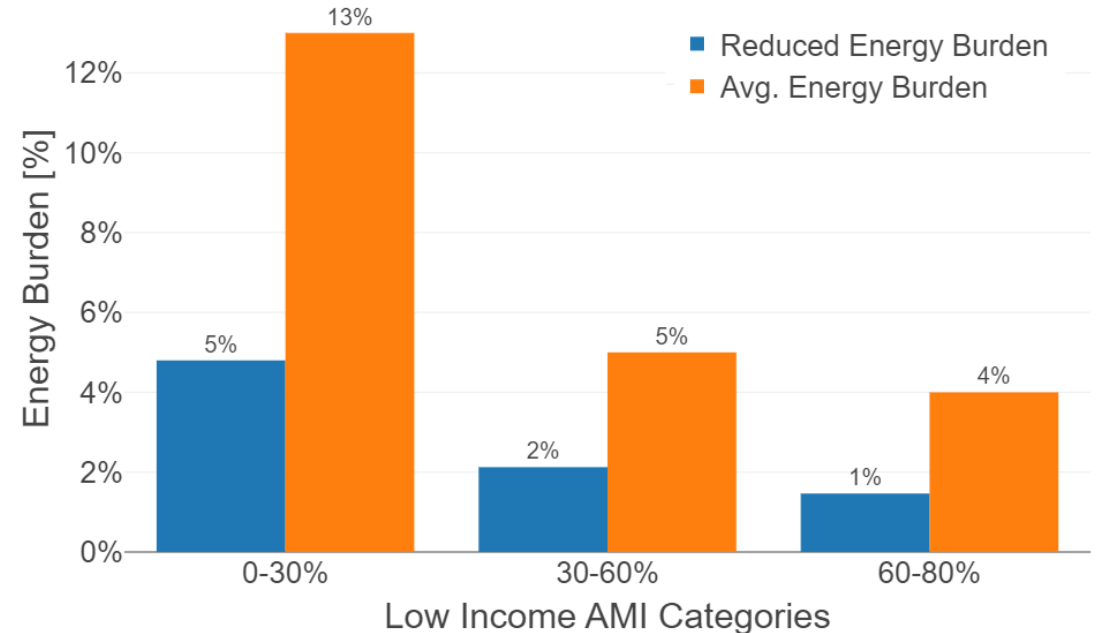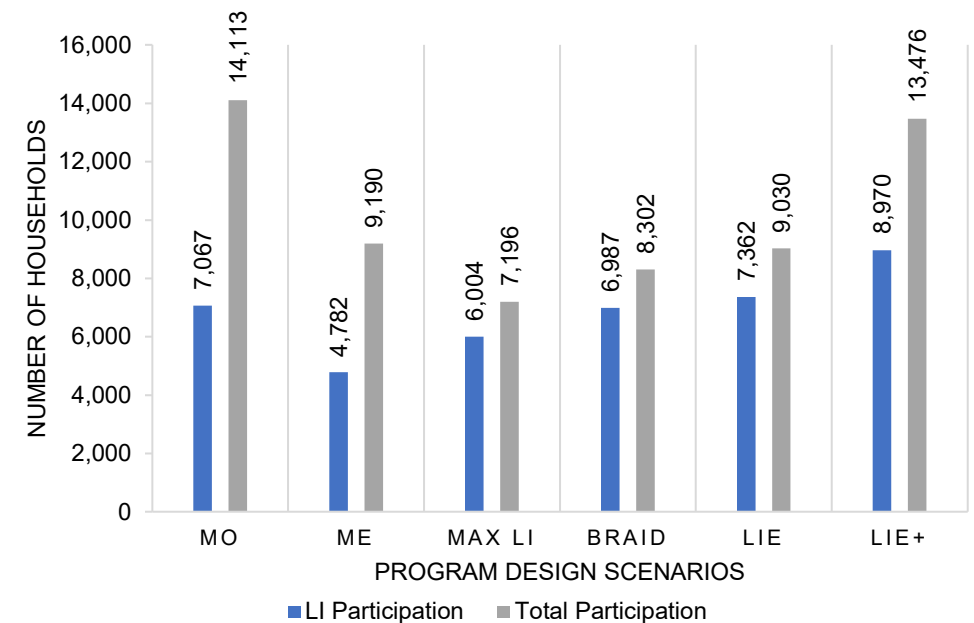
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HOMES – PARTICIPATION AND IMPLEMENTATION FORECAST

- VA Energy's implementer will help in identifying the optimum design approach in line with your North Star.

- While DOE's guidance offers flexibility in design choices, some options may have conflicting impacts.

- For example, braiding with utility, WAP and other programs could help reduce out-of-pocket costs, but it could also reduce the HOMES incentive and increase participation required to disburse all the funds.

Description	Total	Year 2025	Year 2026	Year 2027	Year 2028
All Low-Income	8,970	1,794	2,243	2,243	2,691
Low-Income Multi-Family	1,810	362	453	634	362
Non-Low-Income	4,506	676	1,127	1,577	1,127
Total Participation	**13,476**	**2,470**	**3,370**	**3,820**	**3,818**
Total Rebate Funds	**$75,641,409**	**$14,316,686**	**$18,912,907**	**$20,530,573**	**$21,881,243**
Total Admin Funds	**$18,895,701**	**$4,723,925**	**$4,723,925**	**$4,723,925**	**$4,723,925**
Total Program Funds	**$94,537,110**	**$19,040,611**	**$23,636,833**	**$25,254,498**	**$26,605,168**

EXPECTED HOMES PROGRAM PARTICIPATION FOR EACH SCENARIO

Bar chart — NUMBER OF HOUSEHOLDS vs PROGRAM DESIGN SCENARIOS:

Scenario	LI Participation	Total Participation
MO	7,067	14,113
ME	4,782	9,190
MAX LI	6,004	7,196
BRAID	6,987	8,302
LIE	7,362	9,030
LIE+	8,970	13,476

HEAR PROGRAM

Target Segmentation –
- Households with electricity and oil as heating fuel are expected to have the most benefit in terms of bill savings and as a result, have a high likelihood for participating in the program.

Programmatic Interventions –
- Programmatic interventions, like specifically targeting marketing and outreach to multi-family buildings, leveraging categorical eligibility etc. would be crucial to meet the low-income multi-family target allocation

Braiding –
- Braiding reduces out-of-pocket costs for households with income less than 60% of AMI.
- Braiding may also help increase the likelihood of households participating in the program e.g., some natural gas households may not experience a large dip in their bills post-upgrade. Reducing upfront costs further through braiding could increase the likelihood of participation for such homes.
- Additional programs and financing mechanisms may be required to reduce upfront costs.
- These benefits must be weighed against increased administrative burden and complexities.

Making Measures Cost-Effective –
- While estimating energy and bill savings is not a requirement for HEAR. It would be important to identify measure bundles that provides significant economic benefit and reduces bills for the household.
- Aligning with industry best practices of combining weatherization and HVAC would be an important pathway.
- Measures bundled with weatherization account for ~60% of the incentives.

HEAR – LOW INCOME TARGETS

- The HEAR program includes fewer levers and design options as compared to the HOMES program.
  - Rebate thresholds are already set to 100% of the project cost for low-income households.
  - Program is restricted to households with income levels less than 150% of AMI
  - No additional savings calculation or design approaches that would impact participation.

- Braiding significantly increases total incentive achieved for low-income multifamily households.

- **Additional programmatic intervention may be required to offset imbalance and meet multi-family targets.**

Incentive Levels Achieved Relative to Target Allocations for Each Scenario
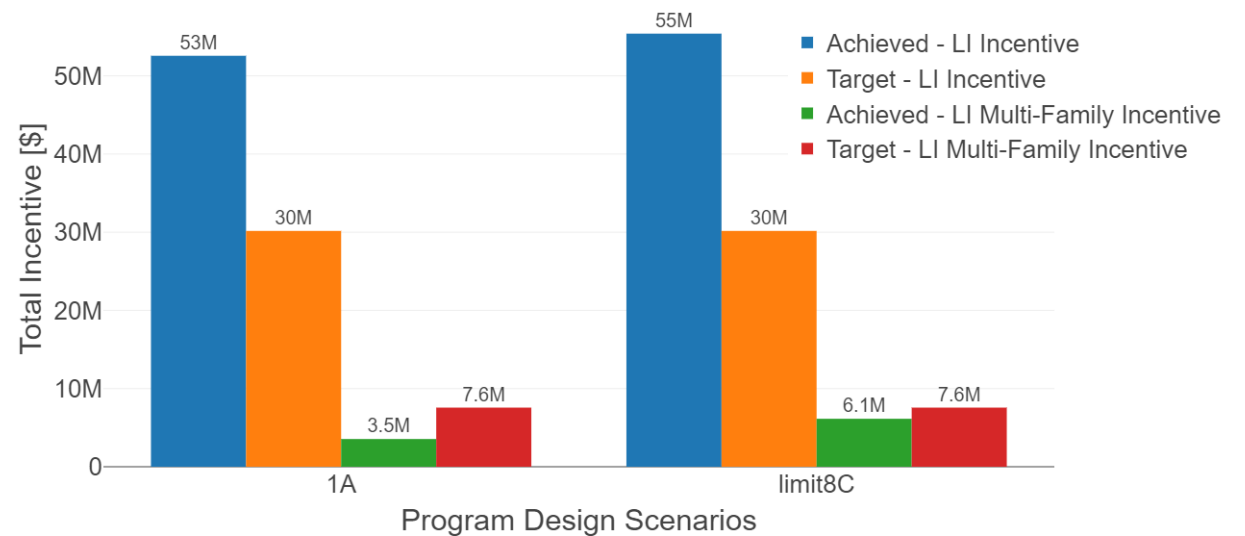
HEAR – HEATING FUEL AND MEASURE MIX

- Like the HOMES program, households that use electricity or oil for heating are likely to see most uptake in the HEAR program.

- These households are likely to have lower energy bills which increases their likelihood of participating in the program.

- Braiding with other programs (e.g., WAP and utility) will make electrification upgrades more economically viable for households heated using Natural Gas.

- **VA Energy could consider households with electric or oil heating as key target segments covers**

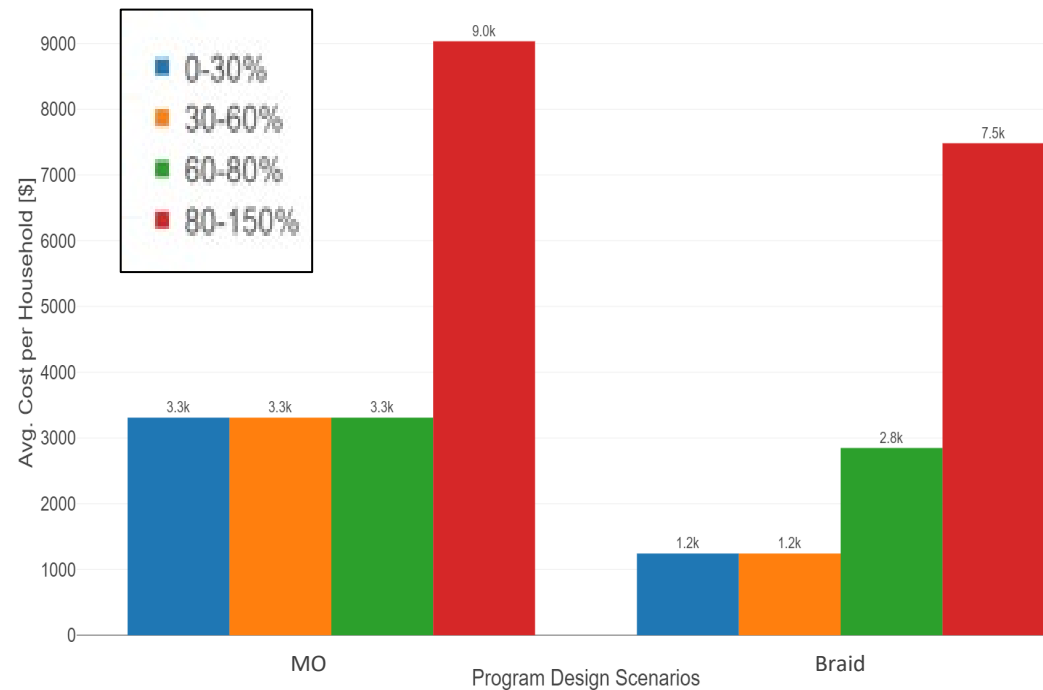**Incentive Levels Achieved by Heating Fuel**
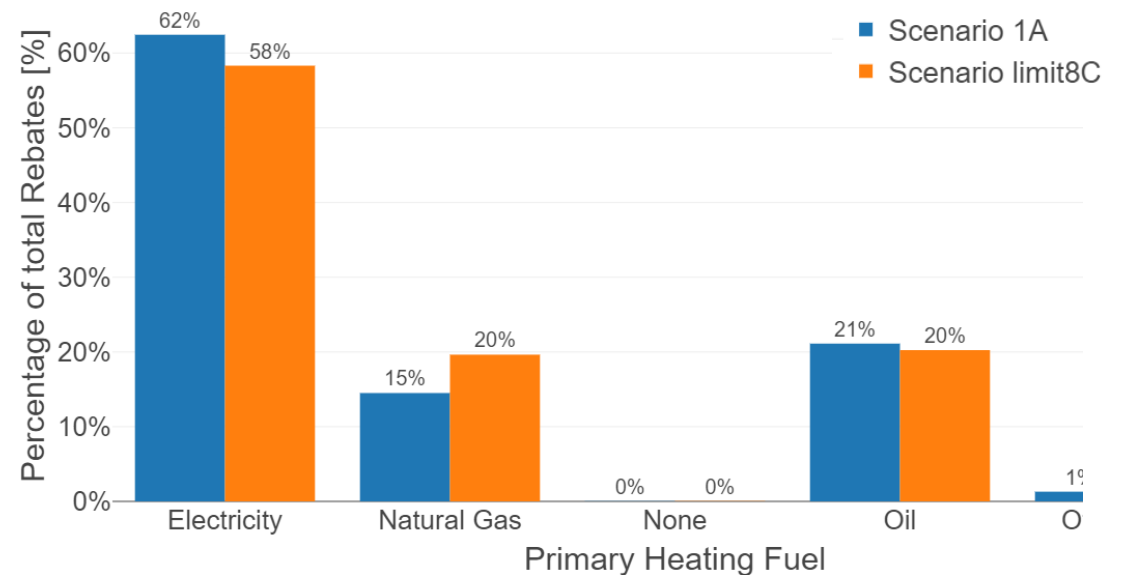
MEASURE MIX

➢ Heat pump upgrades are likely to have the highest uptake ~74%
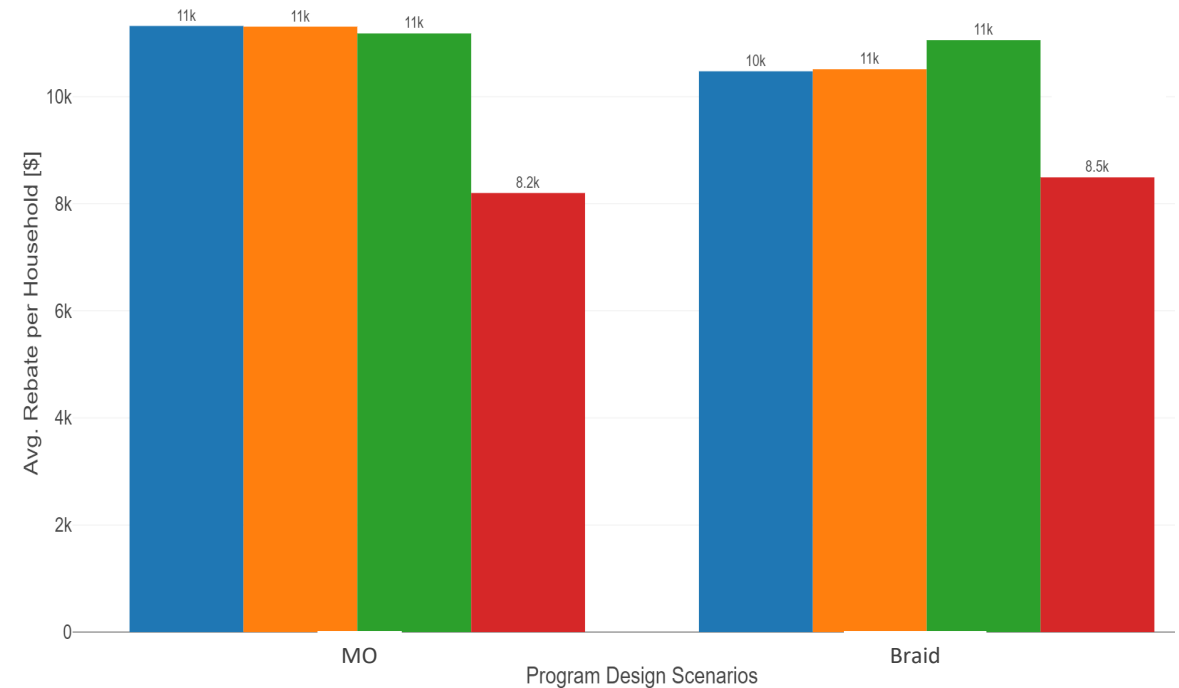➢ Whole home electrification is the likely to have the second highest uptake ~26%

HEAR – PARTICIPANT-LEVEL METRICS

Out of Pocket Cost per Participant for Each Scenario

Legend: 0-30%, 30-60%, 60-80%, 80-150%

MO: 3.3k, 3.3k, 3.3k, 9.0k
Braid: 1.2k, 1.2k, 2.8k, 7.5k

Y-axis: Avg. Cost per Household [$]
X-axis: Program Design Scenarios

Avg. Incentive per Participant for Each Scenario

MO: 11k, 11k, 11k, 8.2k
Braid: 10k, 11k, 11k, 8.5k

Y-axis: Avg. Rebate per Household [$]
X-axis: Program Design Scenarios

➢ Like the HOMES program, braiding helps in reducing the out-of-pocket costs for households with income less than 60% of AMI.

➢ DOE's guidance on braiding recommends using WAP to cover weatherization upgrades such as air sealing and insulation and appliance rebates to cover heat pumps, heat pump water heater and wiring.

➢ Additional sources of funding or financing may be required to cover remaining out of pocket costs.
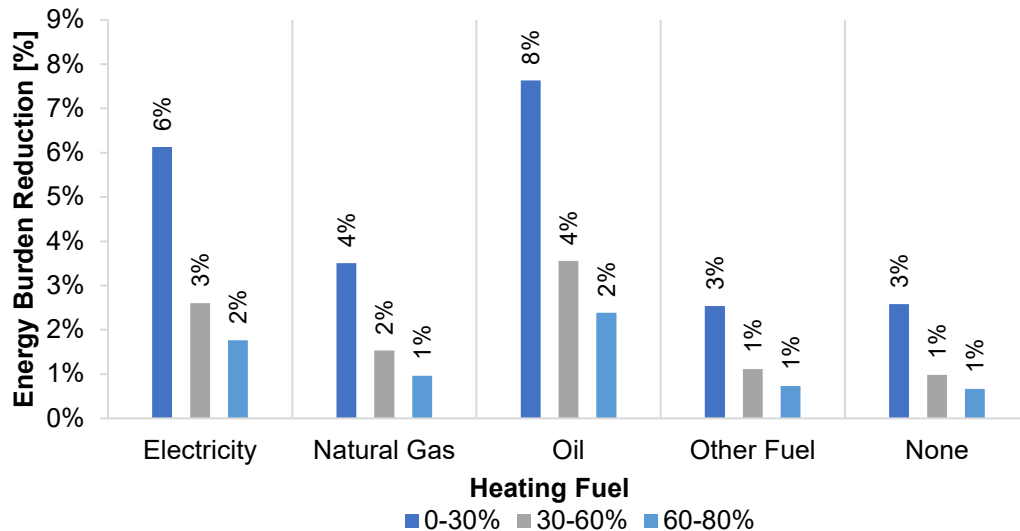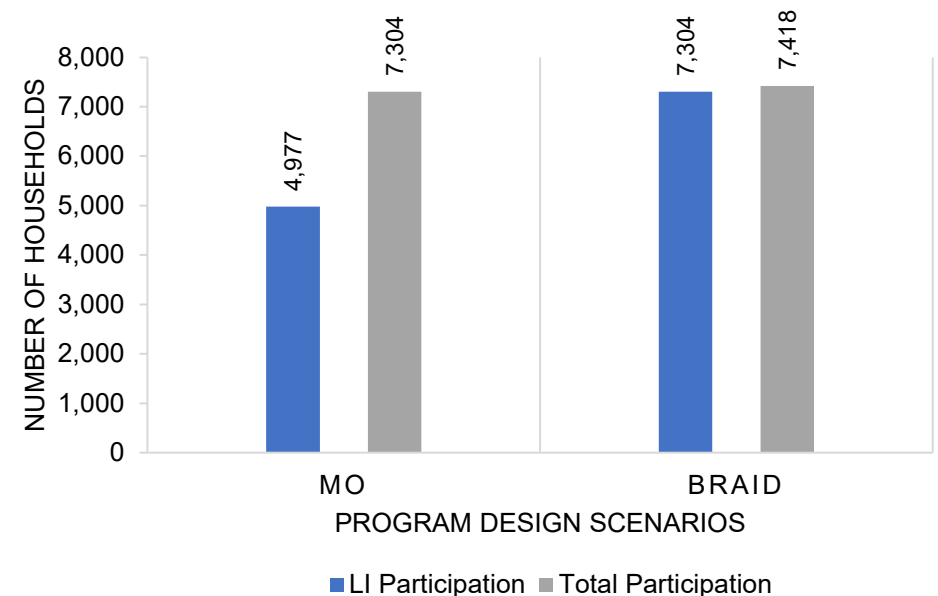
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HEAR – PARTICIPATION AND IMPLEMENTATION FORECAST

- We would expect close to 7.5k participants in the program assuming each household at a minimum installs a heat pump.

- Depending on the combinations of measures, the rebates may be range around $10k per participant.

- Some homes may need additional measures like service panel upgrades and wiring which may drive up incentive levels per participant.

- VA Energy would need to define program strategy and implementation forecast based on their goals. E.g., prioritize low-income participants first?

Description	Total	Year 2025	Year 2026	Year 2027	Year 2028
All Low-Income	5,809	1,162	1,452	1,452	1,743
Low-Income Multi-Family	608	122	152	213	122
Non-Low-Income	1,608	241	402	563	402
Total Participation	8,025	1,525	2,006	2,228	2,267
Total Rebate Funds	$75,181,421	$14,353,865	$18,792,707	$20,160,083	$21,874,765
Total Admin Funds	$18,806,009	$4,701,502	$4,701,502	$4,701,502	$4,701,502
Total Program Funds	$93,987,430	$19,055,368	$23,494,210	$24,861,585	$26,576,267

EXPECTED HEAR PROGRAM PARTICIPATION FOR EACH SCENARIO

Chart showing Number of Households by Program Design Scenarios:
- MO: LI Participation 4,977; Total Participation 7,304
- BRAID: LI Participation 7,304; Total Participation 7,418

Legend: ■ LI Participation ■ Total Participation

VIRGINIA IRA ENERGY REBATE PROGRAM

KEY TAKEAWAYS

Households with electricity or oil as heating fuel are key target segments

Braiding helps in lowering upfront costs but must be compared with the administrative complexity and burden.

Programmatic interventions may be required to specifically outreach and serve low-income multi-family segments