Building Electrification: ULI NEXT Program Workshop

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25 years providing strategic advisory services and utility program delivery

Experience, partnering with commercial (utility, oil and gas, power, industry, financial services and law firms) and government (federal, state, municipal and international) clients to design and implement programs, provide professional services and technology solutions in the areas of energy, environment and sustainable value creation.

Agenda

- ✓Regulatory and Policy Context
- ✓GHG Emissions Abatement Target and Plan
- ✓Building Electrification Learnings

Regulatory and Policy Context

Regulatory Big Picture for Maryland DSM Programs

- BGE's energy efficiency and demand response programs are implemented under the EmPOWER MD legislation originally signed into law in 2008.
- Under the current legislation, BGE is required to cost-effectively meet a 2% energy efficiency reduction target based on 2016's energy sales.
- EmPOWER is currently scheduled by statute to sunset after the end of the 2021-2023 program cycle.
- In December 2020, the Maryland Public Service Commission established the EmPOWER Future Programs Work Group.
- Report from EmPOWER Future Programs Work Group (WG) is to be submitted to Commission by April 15, 2022.
- WG will influence Commission report to legislature due July 2022.

EmPOWER Future Programs Work Group

- Led by a Public Utility Law Judge
- Initial schedule and six ‘topics’ outlined by Judge in April 2021 filing.

- ✓ New Goal Structure.
- ✓ Low Income Programs/ Goals/Measurement Protocols, Expanding EmPOWER, and Energy Equity.
- ✓ Energy Efficiency and Demand Response Programs, Distributed Energy Resources, and Fuel Switching.
- ✓ Measurement Protocols and Cost Effectiveness.
- ✓ Legislation, Third-party Opportunities, and Funding.
- ✓ Cost Recovery (Performance Incentive Mechanisms) and Bill Impacts.

Goal Structure: Recommendation to Shift to GHG Abatement Goals

- Recommendation to shift from traditional kW, kWh and therms goals to greenhouse gas abatement goals.
- New, broader goal structure includes energy reduction, greenhouse gas reduction, electrification, and distributed energy resources.

- Goal examples
  - ✓ No less than x% of the individual utility's total GHG abatement goal shall be achieved through behind-the-meter resources and front-of-meter community resources funded through EmPOWER.
  - ✓ No less than x% of [TBD] shall be focused on the individual utility's LMI customers and communities.
  - ✓ Goal measurement will be done on a gross lifecycle basis with a pre-defined GHG abatement trajectory (i.e., tons GHG per kWh for each year over the lifetime) and measure lifetime.
  - ✓ Maryland GHG Abatement Potential Study replacing typical potential studies.

GHG Emissions Abatement Target and Plan

GHG Abatement Target and Plan: Regulatory Context

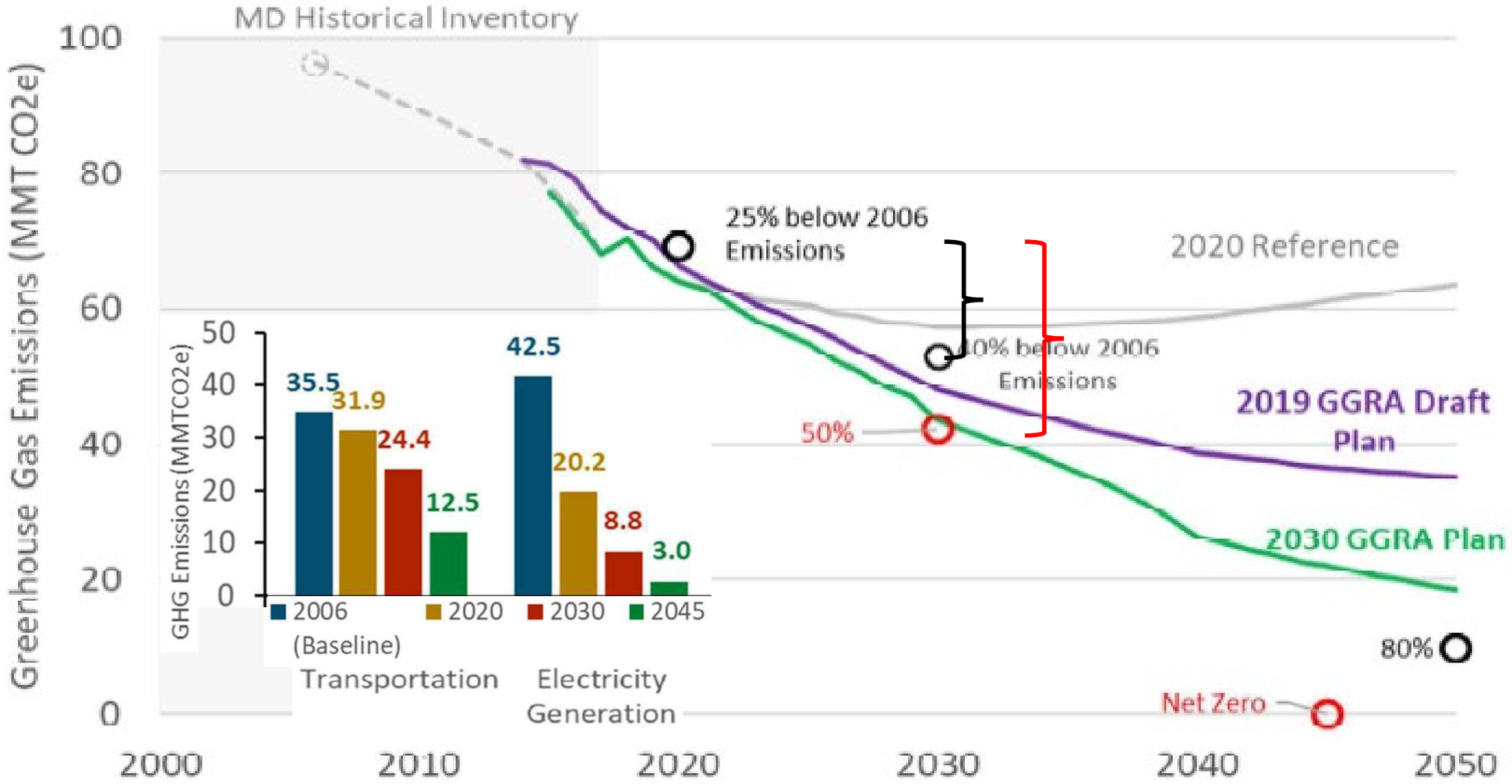
- On April 4, 2016, the Greenhouse Gas Emissions Reduction Act–Reauthorization (GGRA of2016) was signed into law and requires a 40% reduction in statewide GHG emissions from 2006 levels by 2030.
- The Maryland Department of the Environment (MDE) was tasked with the development of a statewide GHG reduction plan (2030 GGRA Plan), solicit public comment and to adopt a final plan by Dec. 31, 2019.
- The state is also required to demonstrate that the new reduction goal can be achieved in a way that has a net positive impact on Maryland's economy, protects existing jobs and creates new "green" jobs.

https:/ /mde.maryland.gov /programs/ Air/ClimateChange/MCCC/Documents/MCCCAnnualReport2020.pdf
https:/ /mde.maryland.gov/programs/ Air/ClimateChange/MCCC/Pages/index.aspx

GHG Abatement Target and Plan: Regulatory Context

- The Maryland Commission on Climate Change (MCCC) recommended that Maryland update the GGRA of 2016 and adopt a more ambitious reduction goal of 50% reduction from 2006 levels by 2030.
- The 2030 GGRA Plan treats the more ambitious 2030 recommendation as a stretch goal and includes a series of measures that will reduce emissions more than required by the goal in current law.
- MDE's emissions analysis shows that the 2030 GGRA Plan will come very close to achieving a 50% reduction by 2030 with anticipated federal government policies aimed at improving vehicle efficiency, reducing the cost of electric vehicles (EVs), deploying more clean and renewable electricity, and investing in energy efficiency and electrification.

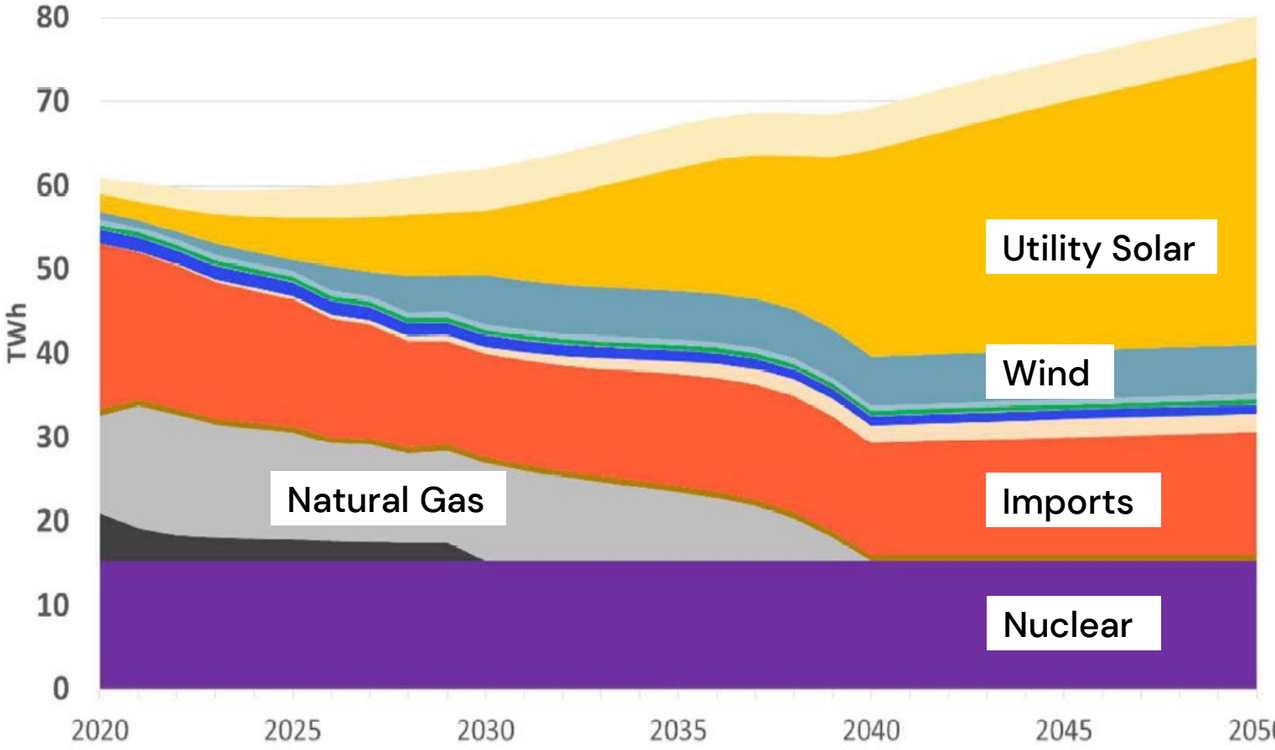
GHG Abatement Target and Plan: Requires Reductions of 15 MMT to 25 MMT CO2e by 2030



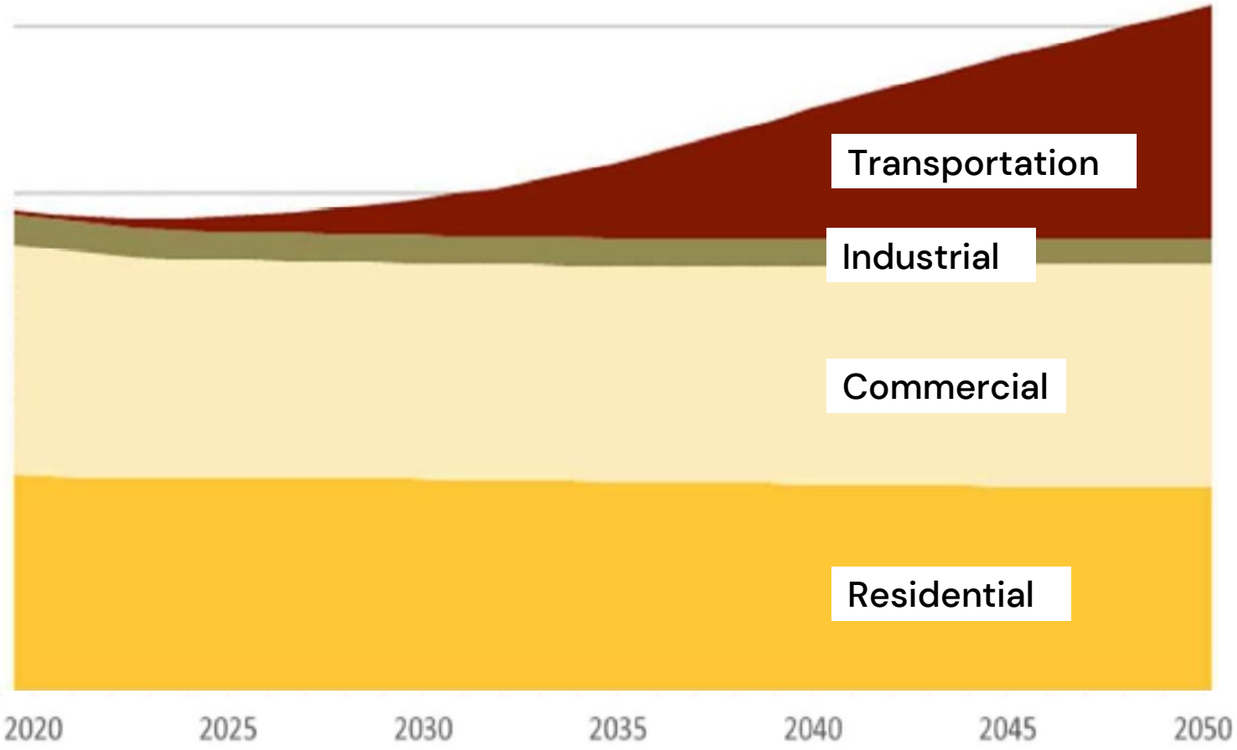
https://mde.maryland.gov/programs/Air/ClimateChange/Documents/2030%20GGRA%20Plan/2030GGRAPlanExSum01272021.pdf

GHG Abatement Target and Plan: Electricity GHG Intensity will Decline, and Demand will Increase

Forecast Electricity Demand by Source



Forecast Electricity Demand by End Use



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EmPOWER Future Programs Work Group

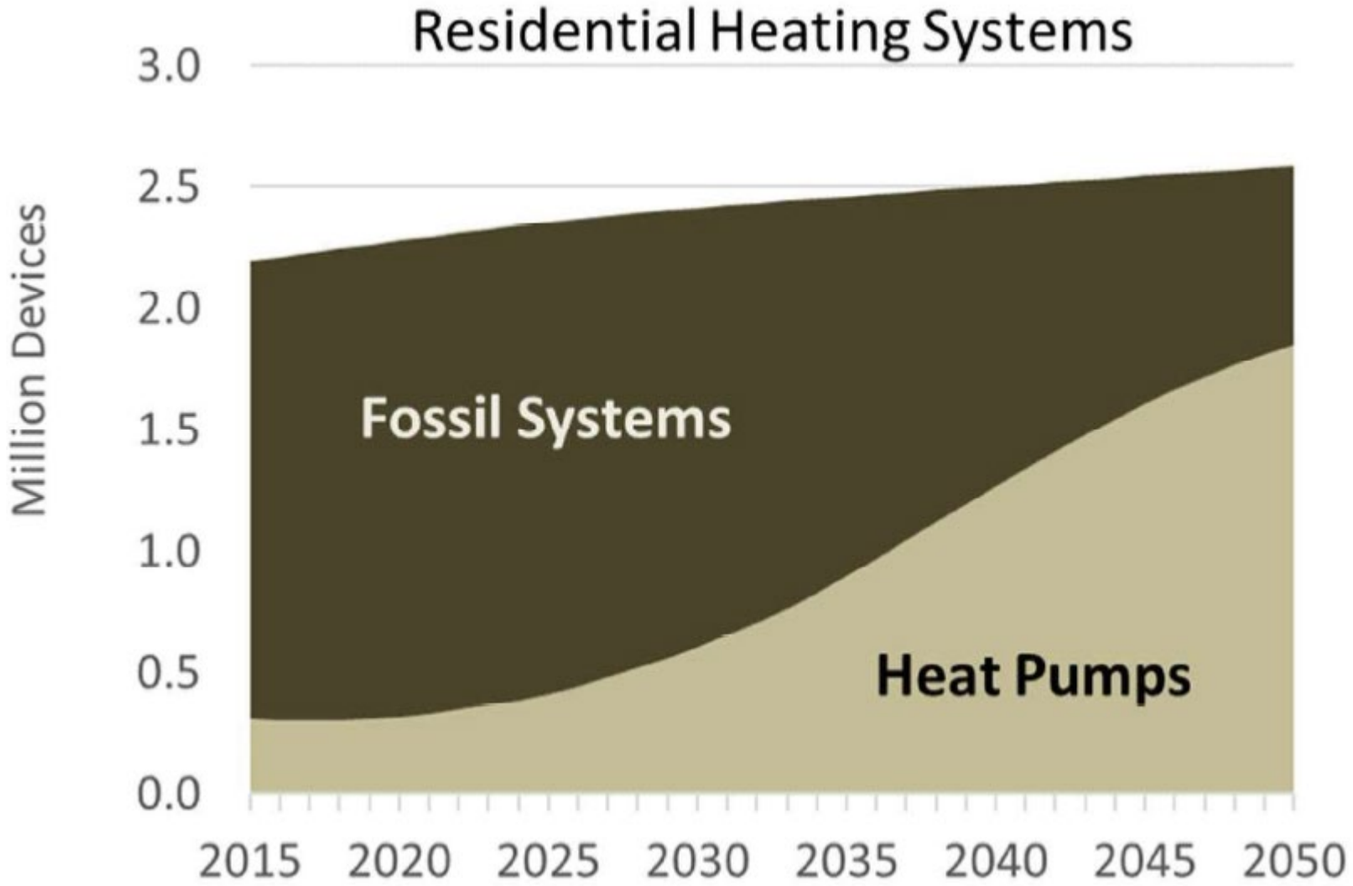
- Parties discussed various program design concepts including:
  - Solar/Battery Storage
  - Converting equipment (including port/heavy equipment/ lawncare) from oil/propane/gas to electric including battery storage/solar, electrifying
  - Electrifying road and non-road transportation
  - Grid interactive buildings
  - Elimination or strict limitation of EmPOWER incentives for gas furnaces, boilers, and water heaters (significant opposition)

EmPOWER Future Programs Work Group

- What this may mean for participants in the future (beginning in 2024):
  - Continued rebates for high efficiency electric and gas equipment as well as building shell measures
  - Additional rebates for battery and solar integration
  - Additional cost-benefit credit for converting to all electric
  - Incentives for grid-interactive building controls

GHG Abatement Target and Plan: Heat Pumps Reduce Demand for Energy and Fuel Switch to Lower Emitting Source of Energy

- Building heat makes up over 15% of Maryland's emissions
- Heat pumps are more energy-efficient than furnaces or boilers
- Electricity is a lower GHG emissions-intensive form of energy than natural gas, propane, or oil
- The 2030 GGRA Plan illustrates the adoption of over 1M heat pump systems in Maryland by 2040
- Capital and operating costs may rise for customers
- Important to drive reinforcing goals: GHG reductions, energy savings, customer benefits, and underserved communities
- Beware the PEAK (potentially 2X current)



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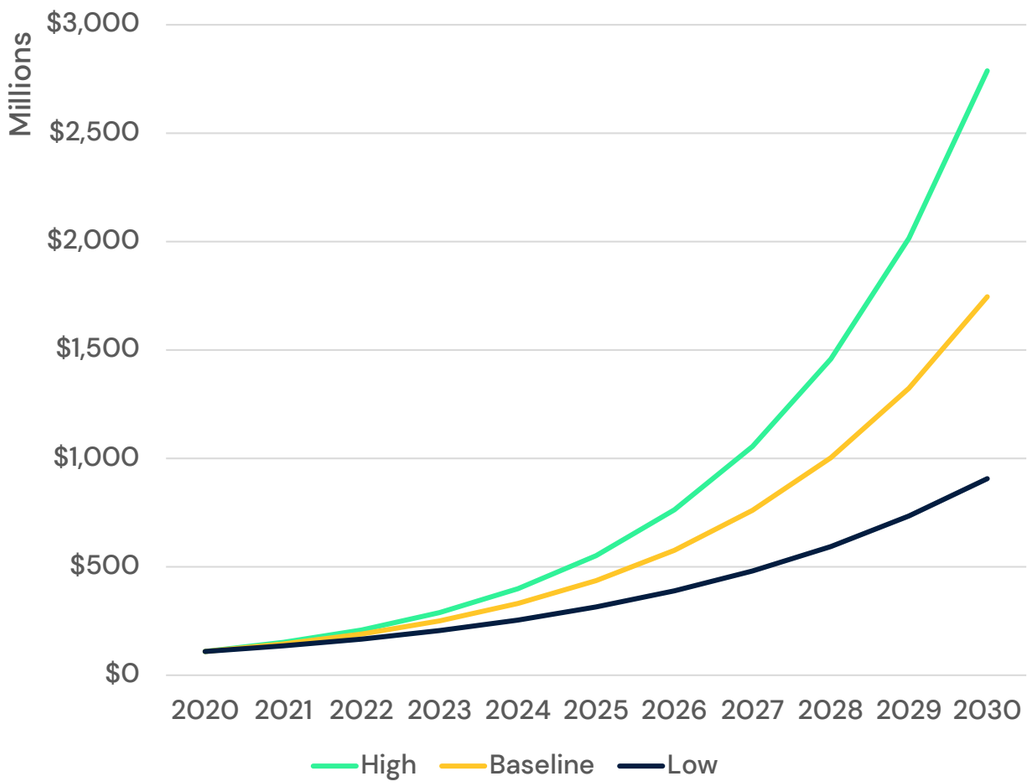
Building Electrification: Driven by decarbonization goals, revenue opportunity, load management, and equity

Building Program Spend - Incentives

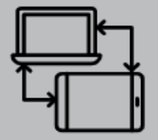


Estimated baseline, high and low scenarios for Building program Incentive spending 2020 – 2030.

- $7B incentive budget in Baseline in incentive budget allocations through 2030
- Near-term potential in States with decarbonization ambition and allocated appropriate $s
- Key states – NY, CA, MA, CO, NJ, etc…
- Program budgets may be found stacked with EE in DSM portfolio filings
- Driven by decarbonization goals, revenue opportunity, load management, and equity
- Programs will be incentive heavy and aimed at driving uptake up to the point the electric system moves from summer to winter peak
- More and more local commitments (municipal and regional) to GHG reductions and can go beyond State level commitments (e.g. Howard County and Baltimore)

Building Electrification Learnings

Considerations in Designing Cold Climate Heat Pump Programs



1. The propensity of the market to adopt this new electrification technology.

2. The readiness of trades to embrace and deploy cold climate heat pumps for heating.

3. The ability of electrical systems to handle the additional electrical load required to cover peak winter demand—without having to rely on a backup fossil fuel system.

4. The economic impact of cold climate heat pumps on customers compared to that of conventional technology fired by fossil fuels.

5. The ability of existing electrical systems to handle the generation, transmission, and distribution of new-winter peaking demand.

6. The preparedness to address the system-level economic impact of load shifts.

7. The environmental cost and impact of these energy optimization strategies.

NY Statewide Clean Heat Program

Client

- Con Edison, Orange & Rockland, Central Hudson, NYSEG and RG&E
- Total program budget $454M
- Incentives and technical support for consumers and trade allies adopting heat pumps and HPWH

Challenges

- Help NY achieve a 40% reduction of GHG emissions by 2030 and 85% by 2050
- Make heat pumps affordable and accessible to residents and building owners
- Develop and train building electrification workforce

ICF Role

- Planning and filing support to Joint Utilities
- Turnkey implementation services
- ICF works directly with contractors and customers to promote heat pumps across residential and multi-family sectors

Results

- ~11,000 Heat Pumps in Q3. $114M in customer incentives
- 167,929 MMBTUs of savings
- Over 250 contractors working on the program

Rallying Stakeholders to Manage Change and Drive Informed Uptake

- Tools and know how to reach residential customers with electrification technology is well understood.

So, what's Missing? Education and Outreach!

Tapping into subject matter expertise

- ✓ Strong relationships with manufacturers, distributors, and contractors enable all stakeholders to stay up to speed and demystify complex technical details.
- ✓ In Massachusetts and New York, we have noted the importance of hosted technical training courses, clear information on program processes, and educational materials for contractors and distributors.
- ✓ Subject matter experts with diverse technological backgrounds are critical to managing programs and stakeholder expectations and make some of the best advocates for innovative heat pump technology.
- ✓ An ally network of subject matter experts was essential to getting recent projects in Massachusetts and New York.
- ✓ The local subject matter experts helped conceive tools to facilitate heat pump system sizing code approval, drafted policies and procedures for quality assurance, project documentation, and data requirements.

Rallying Stakeholders to Manage Change and Drive Informed Uptake

Early emphasis, frequent engagement

- ✓ Ongoing account management and positive working relationships are critical factors for success.
- ✓ Recruitment is only effective if follow-through during implementation supports contractors and provides them with positive feedback.
- ✓ Central Hudson Gas and Electric's contractor grading systems, for example, ensure a consistent, well-trained contractor base. What's more: They walk the fine line of not endorsing particular contractors.
- ✓ Inheriting an existing contractor network can be challenging. Networks can be reluctant to change, which can lead to pushback when introducing new cold climate heat pump technology. To build strong relationships with contractors, new heat pump initiatives need to engage them early and often in the process. To do so effectively, focus on time and money—new heat pump initiatives should provide contractors with tools to upsell equipment and technologies and free training sessions that they can take on their own schedules.
- ✓ Ongoing training and certification classes with trainers accredited by North American Technical Excellence and providing accessible continuing education units for contractors to retain their licensing and accreditation.

What We Can Do as Outreach Professionals in Energy Programs?

Decarbonization is an important topic to understand and have in mind when conducting outreach in the commercial & residential DSM space. Making steps toward decarbonization is a direct benefit of implementing EE and Electrification projects that should be communicated to customers and contractors

So what can we do?

- ✓ We can help position customers and contractors as sustainability leaders in their industry. In the commercial sector, more and more organizations are introducing sustainability and environmental initiatives, and are actively looking for ways to gain recognition in that space.
- ✓ Recognize that decarbonization will improve air quality and the collective health of our communities. Right now, air pollution leads to almost 250,000 premature deaths a year in the U.S. Within a decade, decarbonization could reduce that toll by 40%. Over 20 years, it could save around 1.4M American lives that would otherwise be lost to air quality.
- ✓ Take advantage of and share available resources. The Better Buildings Solution Center and DOE recently published several tech sheets with information to help guide many different building types on reducing carbon emissions.
- ✓ Plus, the ICF Climate Center has insights to help organizations on their pathway to decarbonization.

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