Implementation Options for Home Energy Performance-Based Whole-House Rebate Program – National Propane Gas Association

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Category 2: Program Elements

I. Introduction

On August 16, 2022 President Joe Biden signed the Inflation Reduction Act (IRA) into law, providing $369 billion for "energy security and climate change," including $8.8 billion in rebates for home energy efficiency and electrification projects. Throughout this RFI, NPGA will be addressing opportunities accessible to state energy officials within the Home Energy Performance-Based Whole-House Rebate Program (HOMES), and ways that propane can be utilized to help achieve increased residential energy efficiency. The provision in the IRA that outlines the HOMES Rebate Program relies upon Building Performance Institute (BPI) 2400, which is a standard that uses model simulations to predict home energy use before and

after upgrades. LP-Gas (propane) is included in the Normative Annex B of BPI 2400, under the definition of delivered fuels.[1] Simply put, this code does not discriminate against fuel gas appliances, meaning propane homes are eligible for this rebate.

As such, NPGA seeks to provide recommended program elements and best practices for state energy officials to consider when applying for and utilizing the HOMES rebate program. The purpose of this rebate program is to provide state energy officials with the funds to help the residential sector increase energy efficiency and decarbonize. Propane can aide in both of these objectives.

II. Program Elements & Best Practices for Consideration

Element 1:

In numerous states there are homes that are heating with more carbon intensive delivered fuels, such as fuel oil. Fuel oil produces 163.45 pounds of carbon dioxide (CO_2) per million Btu (British thermal unit). Propane, however, produces only 138.63 pounds of CO_2 per million Btu.[2] Across the country, the emission reduction opportunities are real and substantial, as 5.2 million households still use fuel oil as their primary heating source.[3] Not only are homes heating with fuel oil more carbon intensive, but they are also a hard to electrify segment given the infrastructure required to implement an all-electric retrofit.

Propane provides a solution that is ready today and provides tremendous equity for the homeowner. The price of propane has remained steady at roughly $2.50 per gallon, whereas the price for heating oil, which has been much more volatile recently, has remained around $4.00 per gallon.[4] Urban and rural low-income households spend roughly three times as much of their income on energy costs as non-low-income households.[5] In March 2022, the Energy Information Administration reported that electricity was 58.5% more expensive per million Btu than propane.[6] We would encourage state energy officials to consider utilizing the HOMES rebate dollars to conduct propane retrofits of homes heating with fuel oil. This approach would achieve both greater energy efficiency and progress towards decarbonization, and would provide a cost-effective alternative to consumers.

[1] *BPI-2400-S-2015, Standard Practice for Standardized Qualification of Whole-House Energy Savings Predictions by Calibration to Energy Use History,* Building Performance Institute Inc., (December 7, 2015), https://www.bpi.org/sites/default/files/BPI-2400-S-2015%20%28The%20Delta%20Standard%29%202015-12-07.pdf
[2] *Carbon Dioxide Coefficients,* Energy Information Administration, (October 5, 2022), https://www.eia.gov/environment/emissions/co2_vol_mass.php
[3] *House Heating Fuel,* United States Census Bureau, (2021), https://data.census.gov/table?q=home+heating+fuel&g=010XX00US
[4] *Heating Oil and Propane Update,* Energy Information Administration, (March 29, 2023), https://www.eia.gov/petroleum/heatingoilpropane/#itn-tabs-2
[5] *Recognition of and response to energy poverty in the United States,* Nature Energy, (March 23, 2020), https://www.nature.com/articles/s41560-020-0582-0
[6] *Energy Conservation Program for Consumer Products: Representative Average Unit Costs of Energy,* Federal Register, (March 2, 2022), https://www.federalregister.gov/documents/2022/03/07/2022-04765/energy-conservation-program-for-consumer-products-representative-average-unit-costs-of-energy

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Element 2:

Large swaths of the U.S. experience harsh winters and endure subfreezing temperatures for long periods each year. The case for utilizing rebate funds on oil to propane conversions makes even more sense in these areas. These cold weather states represent millions of residents for which an all-electric retrofit simply would not be sensible. Residents in colder climate states require reliability as well as efficiency.

For example, an air source heat pump (ASHP) is an appliance that is often used to replace conventional fuel heating applications. These heat pumps absorb heat from the outside air into a liquid refrigerant at a low temperature then, using electricity, a pump compresses the liquid to increase its temperature. It then condenses back into a liquid to release its stored heat.[7] However, it should be noted that ASHPs produce heat below body temperature (98.6°F), whereas conventional fuel systems, such as a propane powered furnace, heats air from 130°F to 140°F and operates in short intervals to minimize operating costs. In cold climate states where all electric retrofits leave home heating applications at the mercy of inclement, and often extreme weather, propane furnaces provide the reliability necessary while keeping emissions low.

Element 3:

When evaluating what components should be considered when determining increases in energy efficiency, we would encourage state energy officials to keep the "full fuel cycle" in mind. Simply put, the "full-fuel cycle" refers to the complete fuel production chain including extraction, processing, transmission and delivery to final consumers.

The Home Energy Rebate Program encourages wide ranging incentives to reduce greenhouse gas emissions, from fuel switching to transitioning away from conventional fuel appliances to electricity. Being that nearly 60% of energy used for electric generation is lost in conversion,[8] it would be prudent to take into account the full fuel-cycle of bulk electricity versus clean alternative fuels and consider the energy loss from generation, transmission, and distribution. For example, electricity from the grid has a source-site ratio of 2.80, compared to propane which is 1.01.[9] To achieve the goal of reducing carbon it is necessary to accurately account for electricity's total carbon footprint. For context, 19.5% of grid electricity comes from coal,[10] which has a significantly greater carbon footprint than propane. We believe that taking this recommendation into account would aide state energy offices in more accurately determining emission reductions from these programs.

Element 4:

The ultimate objective of the Inflation Reduction Act and the Home Energy Rebate Program is to reduce emissions through the advancement of home energy efficiency and electrification projects. While we support the advancement of decarbonization, we would suggest that the success of these programs cannot

[7] *Air Source Heat Pumps,* U.S. Department of Energy, https://www.energy.gov/energysaver/air-source-heat-pumps
[8] *Monthly Energy Review*, Energy Information Administration, (July 21, 2020), U.S. Energy Information Administration - EIA - Independent Statistics and Analysis
[9] *Source Energy,* Energy Star Portfolio Manager, (October 2020), https://portfoliomanager.energystar.gov/pdf/reference/Source%20Energy.pdf
[10] *What is U.S. Electricity Generation by Energy Source?,* Energy Information Administration, (March 2, 2023), https://www.eia.gov/tools/faqs/faq.php?id=427&t=3

neglect the potential effect such efforts could have on the aggregate electric load. Across the U.S., the average electric transmission system outage times have roughly doubled between 2013 – 2020.[11]

The effects of adding a massive new load onto an electrical network that is already in need of maintenance should be taken into account when considering these initiatives. We would suggest that the inclusion of clean and efficient energy molecules would not only help take strain off of the grid during peak demand times, but would ultimately aide in the march towards decarbonization. In order to adequately measure the overall success of these programs, acknowledging the actual emissions of the full fuel-cycle of electricity and reviewing the ability of the grid to withstand the added demand during peak demand times is crucial.

Energy security is best achieved through a multi-pronged approach. Energy efficiency targets cannot be met if the grid is strained to a point of unreliability. The safety and security of consumers, as well as the reliability of the grid is a top concern for every state energy office. Utilizing rebate dollars for propane retrofits of homes that use more carbon intensive fuel sources, would help take additional pressure off of the grid and improve residential energy efficiency.

III. Conclusion

In conclusion, the National Propane Gas Association encourages state energy officials to take the abovementioned recommendations into account when determining elements of their rebate programs. Propane is a clean, alternative fuel under the Clean Air Act Amendments of 1990 and the National Energy Policy Act of 1992. Focusing rebate dollars on propane retrofits for single and multi-family housing would provide consumers with low-carbon, efficient energy – all while meeting the goals of this rebate program as laid out in the IRA. In short, we would encourage state energy officials to consider utilizing HOMES rebate dollars for propane retrofits in order to achieve greater residential energy efficiency, reliability and equity.

[11] *U.S. electricity customers experienced eight hours of power interruptions in 2020,* Energy Information Administration, (November 10, 2021), U.S. Energy Information Administration - EIA - Independent Statistics and Analysis