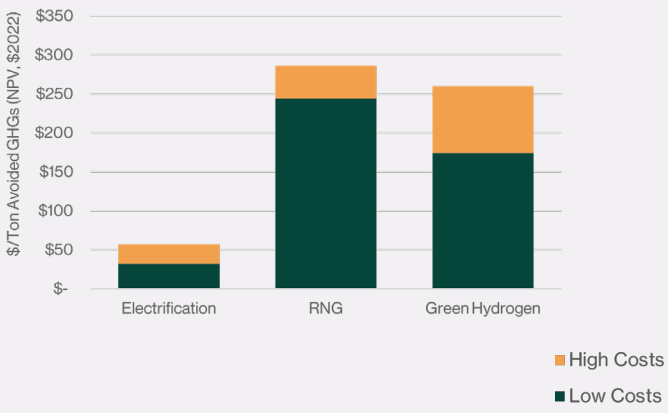
Costs of Building Decarbonization Pathways: New Mexico

KEY FINDINGS

- Beneficial electrification is the cheapest decarbonization measure that utilities can deploy, based on modeled rebates of $2,000 per heat pump and $600 per heat pump water heater.
- If beneficial electrification also reduces methane leakage from the production and distribution of natural gas, the cost per ton of GHG reductions from BE is even lower – approximately half the cost if only emissions from customers' end use is considered.
- Over the 2023–2040 modeling period, the cost of green hydrogen and renewable natural gas is more expensive, per ton, despite available federal tax credits for green hydrogen before 2033.

Costs of Building Decarbonization Measures



BACKGROUND

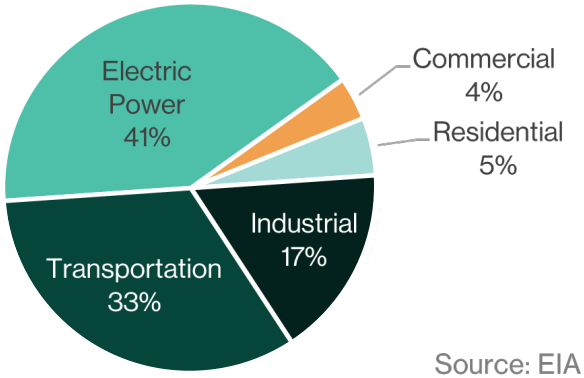
New Mexico has ambitious, science-based economy-wide goals to reduce carbon pollution; meeting those goals will require all sectors to reduce emissions. Today, approximately 9% of New Mexico's energy-related emissions stem from energy used in residential homes and commercial buildings, and most of this comes from burning fossil methane gas for space- and water-heating.

Achieving New Mexico's state-wide decarbonization goals at the lowest cost can maximize consumer benefits. The Building Decarbonization Analysis tool, developed by Synapse Energy Economics, can help decision-makers identify and promote the most cost-effective suite of resources for gas and electric utilities to tap to help residents reduce their GHG emissions.

SCENARIO ANALYSIS

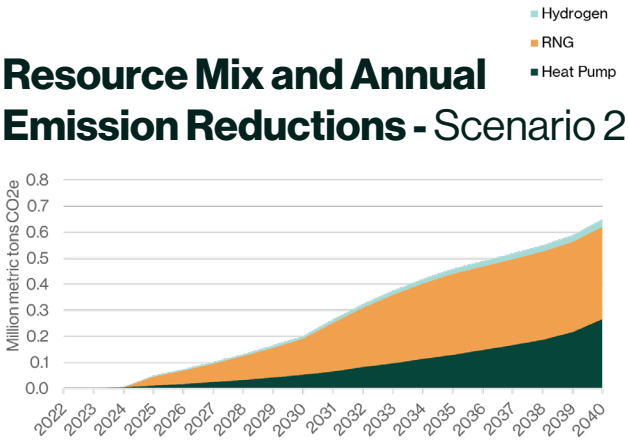
The BDA tool can be used to evaluate portfolios of resources. In the example here, we compared two scenarios for NM Gas. Scenario 1 prioritizes heat pumps and heat pump water heaters, assumes a 100% sales share for heat pumps in 2040, and models high costs/low availability for green hydrogen and low availability for RNG. Scenario 2 assumes low costs/high availability of RNG and hydrogen, and modest adoption of beneficial electrification. In both scenarios, we model rebates for heat pumps and heat pump water heaters of $2,000 and $600, respectively, and exclude upstream methane emissions. Both scenarios achieve the same level of cumulative emissions reductions. The average annual cost of emission reductions is significantly higher for Scenario 2 in each time period.

New Mexico's Energy-Related Emissions, 2020

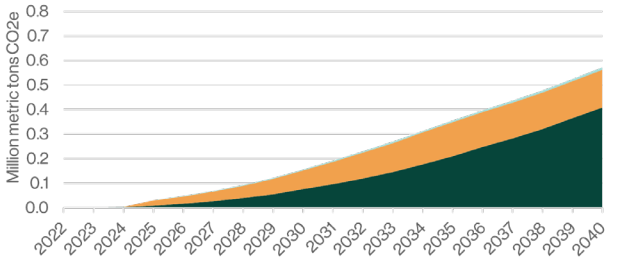


Source: EIA

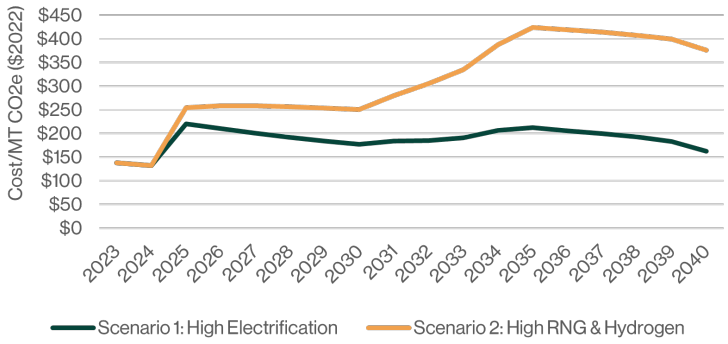
Resource Mix and Annual Emission Reductions - Scenario 2



Resource Mix and Annual Emission Reductions - Scenario 1



Average Annual Cost of Emission Reductions NM Gas



Beneficial Electrification Heat pumps and heat pump water heaters are efficient electric appliances that can displace conventional gas furnaces and water heaters. Newer, cold-climate heat pumps can meet home heating demands in cold climates, such as northern New Mexico. Conventional heat pumps operate well down to approximately 20° F and can displace roughly over 90% of a household's gas use for space heating. Heat pumps also provide cooling, which can improve home comfort and health, particularly in households that lack access to cooling today.

Green Hydrogen is produced using electrolysis; to be "green", the electrolyzer must be powered with renewable electricity. For existing gas distribution systems, hydrogen may be integrated up to at most 20 percent by volume; because hydrogen has a lower energy content than natural gas, that volume could reduce emissions by a maximum of 7 percent. Hydrogen is likely to be in high demand by other sectors, such as industry.

Biomethane, or so-called renewable natural gas is produced through the anaerobic digestion or thermal gasification of organic waste, such as animal manure, municipal wastewater, and trash; energy crops; and non-biogenic waste such as construction debris. The potential for RNG use in buildings is limited by the availability of feedstocks and demand from other sectors such as the transportation, electric generation, and industrial sectors. The modeled costs for RNG increase over time, as more expensive sources of RNG are developed.

The Building Decarbonization Analysis tool, a full report, and the detailed methodology can be found at:
WesternResourceAdvocates.org/publications/building-decarbonization-strategies-and-tools

Building Decarbonization Strategies for the Southwest

Analysis of the costs and emissions reduction potential of space and water heating decarbonization

FOR MORE INFORMATION

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