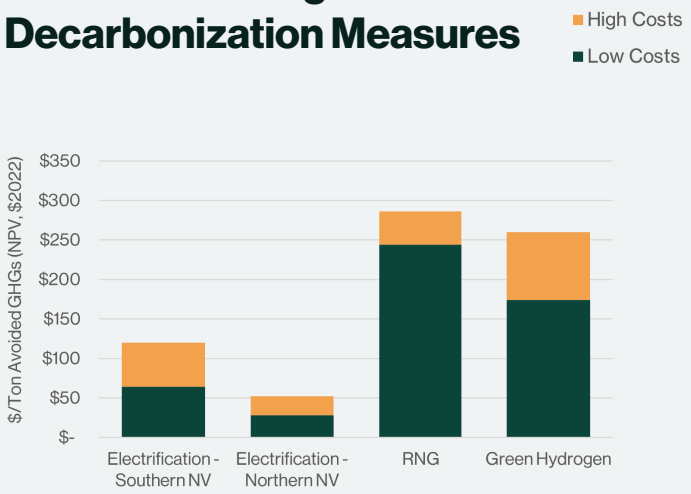
Costs of Building Decarbonization Pathways: Nevada

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

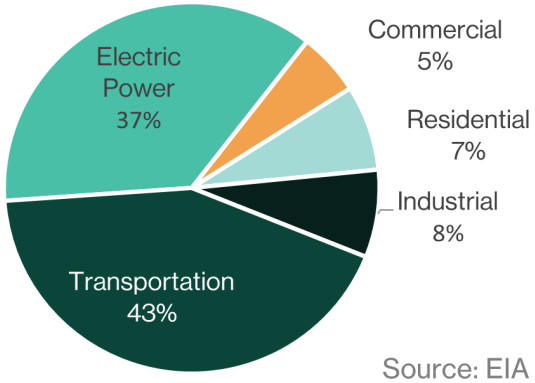
Nevada has ambitious, science-based economy-wide goals to reduce carbon pollution; meeting those goals will require all sectors to reduce emissions. Today, approximately 12% of Nevada's energy-related emissions stem from energy used in residential homes and commercial buildings, and most of this comes from burning fossil methane gas for space- and water-heating. Legislation passed in 2023 established a requirement for gas utilities to develop resource plans that identify the utility's future investments in demand-side and supply-side resources and the expected greenhouse gas emissions associated with portfolios, among other elements.

Achieving Nevada'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 utilities.

SCENARIO ANALYSIS

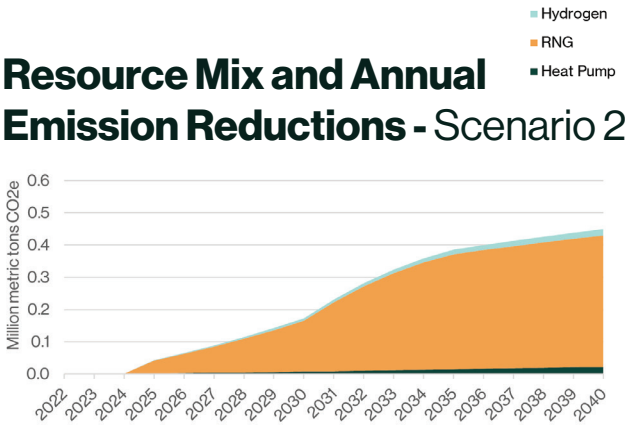
The BDA tool can be used to evaluate portfolios of resources. In the example below, we compared two scenarios for Southwest Gas. Scenario 1 prioritizes heat pumps and heat pump water heaters and models high costs/low availability for green hydrogen and RNG. Scenario 2 assumes low costs/high availability of RNG and hydrogen, and minimal adoption of beneficial electrification. In both scenarios, we model rebates for heat pumps and heat pump water heaters of $2,000 and $600, respectively. Both scenarios achieve roughly the same level of cumulative emissions reductions. The average annual cost of emission reductions is higher for Scenario 2 for each time period.

Nevada's Energy-Related Emissions, 2020

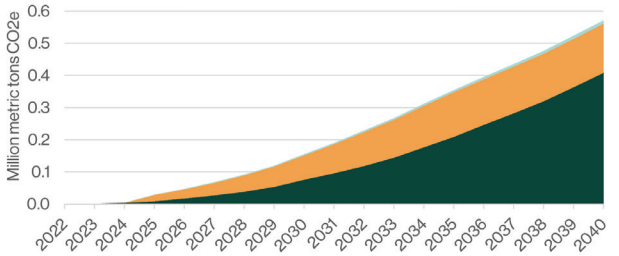


Source: EIA

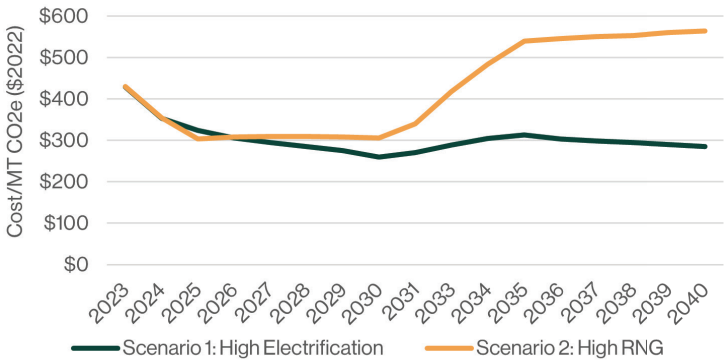
Resource Mix and Annual Emission Reductions - Scenario 2



Resource Mix and Annual Emission Reductions - Scenario 1



Average Annual Cost of Emission Reductions Southwest 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 Nevada. Conventional heat pumps operate well down to approximately 20° F and can displace 100% of a household's gas use for space heating in southern Nevada. 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% by volume; because hydrogen has a lower energy content than natural gas, that volume could reduce emissions by a maximum of 7%. 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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