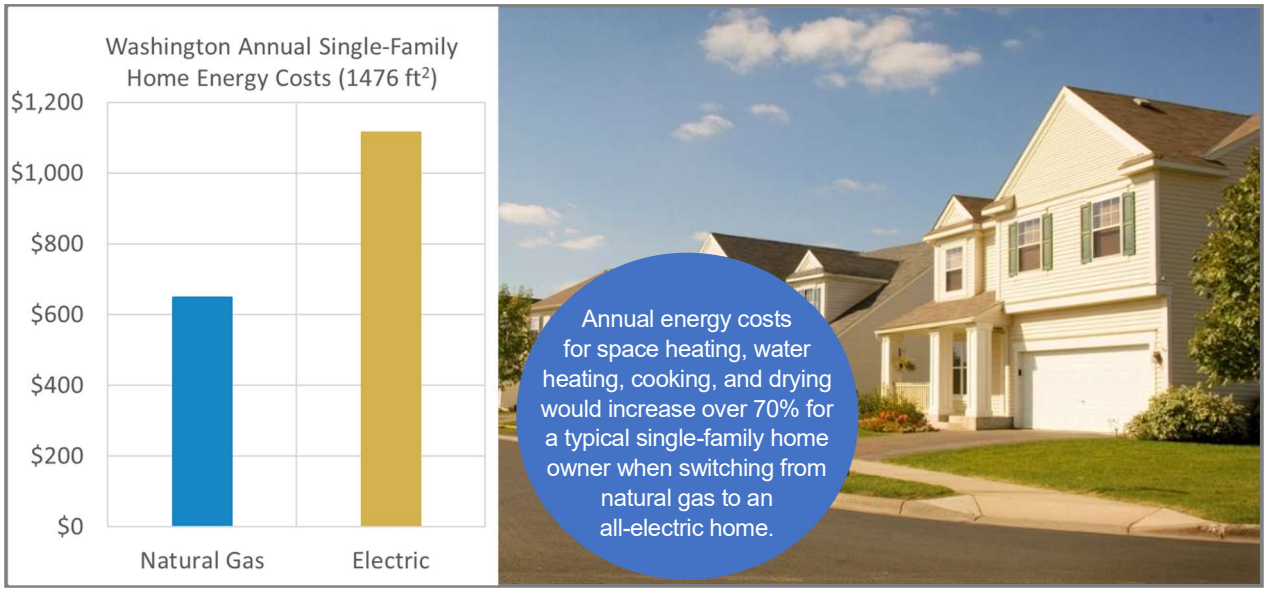
Comparison of Residential Natural Gas and Electricity Use in the State of Washington

Residential electrification is likely to lead to significant increases in annual energy bills for homeowners. The figure below shows changes in today's energy costs for a typical single-family home in Washington when shifting from natural gas space heating, water heating, cooking, and clothes drying to an all-electric home. Homeowners are also likely to face other upfront investments in more expensive electric heat pumps as well as electric service to and inside their home to handle additional electric loads. Electric space heating also has higher lifecycle costs when using more expensive electric heat pumps that need more frequent replacement than natural gas furnaces.



Across all types of gas homes in Washington, residential electrification increases homeowner annual energy bills and lifecycle costs. Electric heat pumps (HSPF 9) and other electric appliances would increase annual consumer energy costs by 41% for all gas homes in the state – $338 million per year for the nearly 1.1 million Washington homes now using cost-effective and reliable gas service.

Natural gas pathways for greenhouse (GHG) emission reductions have lower costs (measured in $/metric ton of CO_2) than residential electrification (see table). Available high-efficiency gas equipment is a very cost-effective GHG abatement option, followed by approaches using renewable gas blends and/or next-generation natural gas heat pumps. Further reductions are possible with home envelope improvements (e.g., insulation, air sealing, high-efficiency windows).

Future Washington decarbonization efforts may lead to lower grid carbon intensity, but consumer costs for all-electric homes are higher than comparable natural gas GHG reduction pathways. Further, residential electrification – in particular, space heating – has significant impacts on power generation sources and electric transmission and distribution lines leading to cost and grid reliability risks as well as the likelihood of lower than anticipated GHG reductions.

See full report for more scenarios, considerations, and details at www.gti.energy/GHG/Res

GHG Reduction and Cost Examples	% CO_2 Reduction	$/Metric Ton
Natural Gas High-Efficiency Gas Equipment	-22%	-$37
High-Efficiency Gas Equipment with Renewable Gas Blends	-50%	$62
Emerging Gas Heat Pumps with Renewable Gas Blends	-63%	$160
Conventional Electric Heat Pumps (HSPF 9)/Appliances and Future Grid Power Improvements	-84%	$170