



Oil and natural gas pairs well with renewable energy. In fact, many oil and natural gas companies invest in, buy, or have joint ventures in solar, wind, and other renewable fuels. Why? Because the industry believes in an all-the-above strategy for effective energy production.

A 100 percent shift to renewables is not a realistic goal, according to a coalition of 21 [leading energy researchers](#). They confirmed the best approach for transitioning to a low-carbon-emission energy system, which is both feasible and less costly than other pathways, is a “broad portfolio of energy options.” The researchers were led by Christopher Clack, chief executive of Vibrant Clean Energy in Boulder, Colorado and a former NOAA researcher, who recently said that the proposed Green New Deal in Congress would easily cost trillions of dollars.

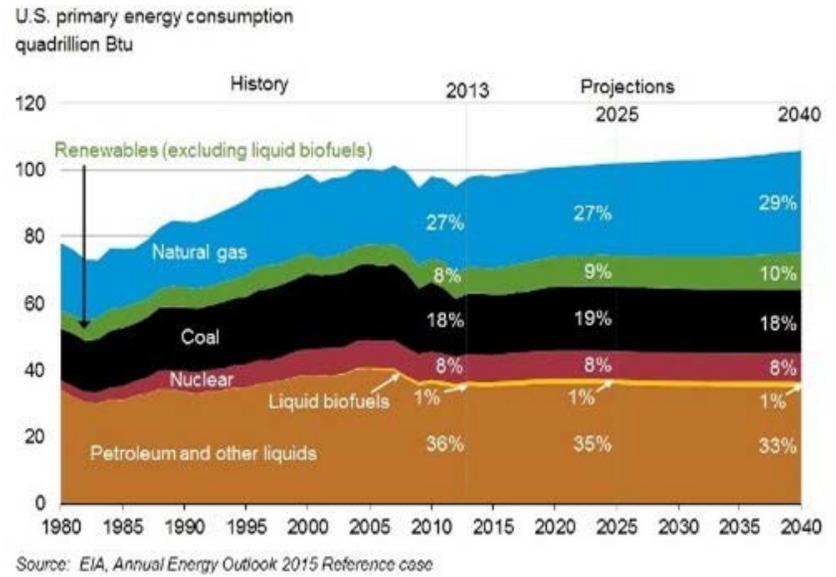
Renewable energy sources require new infrastructure, expanded grid capacity, robust transmission methods, and either natural gas pairing or storage capabilities for when the sun doesn’t shine and the wind doesn’t blow. While renewable energy can be economic, the upfront costs to construct these sources are not.

Currently, U.S. energy costs are 5 to 22 percent of a family’s total budget, with the poorest Americans, or 25 million households, paying the highest of that range. How price increases affect lower income Coloradans is one of many variables to consider when changes are made to Colorado’s energy portfolio.

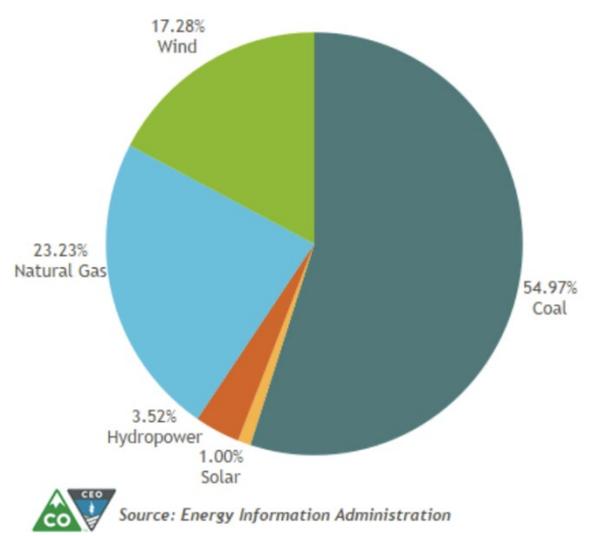
All-of-the-Above Energy Approach

To generate electricity, resources must be converted to electrical energy and delivered to Coloradans across the state through the grid, which is a network of generators, transmission lines, and distribution lines. Colorado has many available energy resources that utilize that infrastructure, including coal, hydro, natural gas, biomass, solar, and wind.

Natural gas as a resource for power generation has been on the rise nationally. Natural gas can serve as baseload power, but it also pairs well with renewables because natural gas generation facilities can cycle up or down quickly to meet wind or solar variability. As an abundant domestic resource natural gas is not only low cost, but it also has made a [significant contribution](#) to CO2 emission reductions over the past decade. An all-the-above energy future can keep costs low, support renewable energy development, and effectively combat climate change.



CO Electricity Generation (2016, Thousand MWh)



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Renewable Energy and the Need for Oil and Natural Gas



A wind turbine consists of 89.1 percent steel, 5.8 percent fiberglass, 1.6 percent copper, 1.3 percent concrete, 1.1 percent adhesives, 0.8 percent aluminum, and 0.4 percent core materials (primarily foam, plastic, and wood), according to the [U.S. Geological Survey](#). Most of these materials, as well as transportation from factory to development sight, require oil and natural gas in some capacity or another.

Solar arrays and their components are similarly constructed and made possible by oil and natural gas. And, as with wind power, it either requires energy storage or pairing with natural gas generation.

Nothing is perfect, as the solar panel manufacturing process relies on nitrogen trifluoride and sulfur hexafluoride, [some of the most potent greenhouse gases](#).

Colorado relies on a diverse [mix of energy resources](#), and while natural gas makes up only a portion of the state's electric power generation, [countless products](#) derived from oil and natural gas are used in all kinds of energy generation.



Additional Resources & Information

Sources

Natural Gas in the Transition to a Lower-Carbon Economy | www.ingaa.org

Colorado Oil & Gas Conservation Commission (COGCC) | www.cogcc.state.co.us

United States Geological Survey (USGS) | www.usgs.gov

The Colorado Energy Office | www.colorado.gov/energyoffice

U.S. Department of Energy | www.energy.gov

Proceedings of the National Academy of Sciences of the United States of America | www.pnas.org

For More Oil & Natural Gas Industry Informational Fact Sheets:

www.coga.org/factsheets

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