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We use a global energy market (GEM) model to show that natural gas has the potential to help stabilize global carbon emissions in a span of about 50–100 years and pave the way towards low and zero carbon energy. The GEM provides a close fit of the global energy mix between 1850 and 2005. It also matches historical carbon and CO₂ emissions generated by the combustion of fossil fuels. The model is used then to forecast the future energy mix, as well as the carbon and CO₂ emissions, up to the year 2150. Historical data show relative decarbonization and an increase in the amount of hydrogen burned as a percent of fossil fuel use between 1850 and 1970. The GEM indicates that with a larger contribution of natural gas to the future energy market, the burned hydrogen percentage will increase. This decarbonization will help to advance economic and environmental sustainability.

Highlights

□ We show natural gas can help stabilize carbon emissions. □ Our model provides a close fit of historical energy mix. □ It also closely matches historical carbon and CO₂ emissions. □ We then forecast future energy mix and emissions. □ We find decarbonization has occurred and will continue.

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