Fossil fuels' future

The 27 June special section on The Great Gas Boom ("The gas surge," D. Malakoff, p. 1464) about natural gas from hydraulic fracturing provided a useful update on a range of important environmental, social, and economic issues, with the exception of the elephant in the room: Natural gas is a fossil fuel. While a natural gas-fired power station has fewer CO₂ emissions per unit energy produced compared with a coal-fired power station (up to 50% if fugitive emissions are captured or ignored) ("Hunting a climate fugitive," E. Kintisch, p. 1472), this is largely irrelevant to solving the climate change problem. What matters is the long-term accumulated stock of carbon in the atmosphere, not the short-term rate of emissions (3). The relationship between cumulative emissions and peak warming is insensitive to timing of emissions or peak emission rate (4). The lifetime of the airborne fraction of a pulse of fossil fuel-derived CO₂ is much longer than the centuries some authors still believe (as stated in the News story by Kintisch). Modeling reveals that 20 to 35% of the CO₂ emitted now will still be in the atmosphere after 2 to 20 millennia (5). To have a greater than 66% chance of limiting global warming to less than 2° C above the pre-industrial average surface temperature (6), humanity can emit only a further 275 Gt C, or about 34 years of "business-as-usual" emissions (7). The harsh reality is that CO₂ emissions must decrease to zero before the end of this century or we will likely exceed the 2° guard rail. In these circumstances, it is difficult to envisage a future where both the climate change problem is resolved and today's fossil fuel industry persists.

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