Coal is the climate's Public Enemy #1. The use of natural gas has helped to ensure that the coal problem has not become even worse. Without natural gas, we would use more coal for space heating and for many more industrial processes than is currently the practice. Without natural gas, our reliance on coal for electricity generation would be at least 50% greater.

Many describe natural gas as a "bridge" fuel that helps us avoid more coal use now, and buys us some time to perfect our use of renewable resources and other low or no carbon energy options. The challenge is that no one knows how long the bridge might be, or how we will get off of the bridge. This is critically important, because the use of natural gas contributes significantly to our environmental and climate problems.

At the smokestack, natural gas produces about half of the greenhouse gas emissions of a similar coal-fired power plant, but methane leaks occurring at points of production, gathering, transportation, storage, and end-use reduce this benefit to an extent that is not clearly understood. The problem is that natural gas is still a fossil fuel and its use across all sectors makes too much of a dent in our long-term greenhouse gas budget. The authors of a well-known study on Pathways to Deep Decarbonization in the United States conclude that we have the ability to achieve the often-stated goal of reducing greenhouse gas emissions to 80% below 1990 levels by 2050 by pursuing a three-pronged strategy: (1) make our use of energy much more efficient, (2) electrify almost all fossil fuel uses including space and water heating and most forms of transportation, and (3) decarbonize the electric grid. It can be done, but we have to start now. Reducing natural gas use in the long-term is important to meeting each of these goals.

As natural gas use continues to grow and billions of dollars are invested in new natural gas infrastructure, weaning ourselves from natural gas use becomes increasingly more difficult.

How long will an entity seeking approval of a new gas-fired power plant want to continue operating that plant? I am the author of a new report issued by the Center for Sustainable Energy. We looked at California's history of licensing, constructing, operating, and retiring large natural gas-fired power plants. We looked at historical data available from the California Energy Commission and produced timelines for likely retirement dates for new plants based on short, average, and long-lived past facilities. What we found is that even for a plant licensed and constructed quickly and retired at an early age, investors for a power plant seeking a license this year

will expect to operate that plant until at least 2050. For an average facility, the target year would be 2057. In the high case, the target would be 2077. For each year beyond 2016 in which proponents might apply for a license to build and operate a new gas-fired power plant, the end-date moves farther beyond 2050. And this data only relates to larger power plants – those that have capacity of 500 megawatts or more. The smaller plants would be expected to operate even longer.

No doubt, those who invest in these facilities will want to maximize their returns. That means that in the years running up to 2050, policy makers will experience more and more pressure to allow the plants to continue operating.

What would this mean for our efforts to meet long-term greenhouse gas reduction goals? That, of course, depends on how much natural gas we continue to burn for all purposes. No one is in a position to predict, with confidence, how much that will be in 2050. However, it is interesting to note that the U.S. Energy Information Agency projects that overall gas consumption will continue to increase, under existing policy, at least until 2040 – the agency isn't even pretending to guess what might happen after that. No one has demonstrated when natural gas use might begin to decline.

Taking EIA's baseline projections and assuming natural gas use remains flat from 2040 to 2050, the potential impact of natural gas-related greenhouse gas emissions in 2050 is disturbing. By then, we calculate that the U.S. would emit an amount of greenhouse gas from burning natural gas that would exceed the nation's entire greenhouse gas budget – the budget that would apply if the country has any hope of reducing emissions to 80% below 1990 levels.

If we continue to use natural gas at this rate, there will no doubt be efforts to capture and sequester a portion of the gaseous carbon. To some extent, this might work for gas used at power plants, but how would we capture and transport emissions from residential and business use, and where would we find the water and energy needed to strip carbon from the fuel stream? More importantly, if one were to believe EIA's projections, we would still be burning coal in power plants in 2040. Dealing with the emissions from coal plants would likely be a higher-priority use of any capture-and-sequester resources that we have available.

Our current natural gas policy is to produce as much as we can and use it as quickly as possible. The implication is that the marketplace will determine how or if we ever reduce our dependence on natural gas. It's more than time to move beyond this

blind-eye approach and start doing some planning. What is it we want to achieve with our use of natural gas? What long-term greenhouse target do we want to embrace? How must our natural gas use decline over what period of time in order to hit the target? How do we want these plans to affect decisions about new natural gas infrastructure going forward? And how can we ramp up reliance on the other tools at our disposal to stabilize and then reduce our use of natural gas — tools that include energy efficiency and demand response programs, energy storage, strategic use of hydroelectric resources, and regional balancing of renewable energy generation?

Rational people usually try to plan for the future. They don’t just cross their fingers and hope.