Options in the U.S. for Natural Gas during the Energy Transition

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BACKGROUND

- Until recently, most environmental groups and others viewed natural gas favorably in facilitating the **transition to a low-carbon environment**.
- Today, these groups have radically changed their perspective by
  (1) opposing natural gas for electric generation and
  (2) advocating **electrification**, where fossil-fuel customers. convert to electricity for water and space heating, and transportation.
- This presentation examines their arguments and policy recommendations.

METHODOLOGY

- This presentation applies **public-policy theory** emphasizing **economics and risk analysis** to evaluate the role of natural gas during the transition period to a low-carbon energy sector.

OUTCOMES

- As a **bridge fuel**, natural gas can serve both as a cost-effective option to reduce GHG emissions (as supported by a number of objective studies), and as a supplement to renewable energy in maintaining reliable and well-operating electric systems.
- Staying with natural gas too long or prematurely phasing out natural gas are **suboptimal policies**.
- This presentation addresses the **risks** associated with both policies.

RECOMMENDATIONS

- The "bridge" to clean energy from natural gas and other fossil fuels depends on the stringency of carbon targets.

Carbon Targets and the "Bridge" Length for Natural Gas

- **450 ppm** (target temperature limit of around 2°C): allows the use of natural gas for a short time, peaking before 2030
- **350 ppm** (target temperature limit below 2°C): requires removing CO2 out of the atmosphere and stop using all fossils fuels immediately
- **550 ppm** (temperature rises above the 2°C threshold): assumes that natural gas can play the role of a bridge, peaking in usage around 2050

The pre-industrial concentration of CO2 in the atmosphere in the 1750 to 1850 timeframe was about 280 parts per million (ppm); the current level of CO2 is little over 400 ppm.

- Presently it seems that the **most rational policy** is to continue relying on natural gas for electric generation for the next two decades and probably even longer.

Future Options for Natural Gas: What Makes the Most Sense?

- ***Premature phase-out of natural gas*** could defer the retirement of coal plants, leading to higher carbon emissions; it reflects an all-in bet on renewable energy that may be the best opportunity to achieve 450 ppm or a temperature limit around 2°C; but it is a risky bet from an economic and electric-system reliability perspective (e.g., higher energy prices to consumers and less reliable electricity service)
- ***Staying with natural gas*** too long may conflict with a deep decarbonization policy and accelerate in time a "tipping point" beyond which the path toward climate catastrophe becomes irreversible
- ***Bridging natural gas to the future*** seems most sensible option: (1) electric generators will continue to rely on natural gas until large-scale renewable energy becomes economical; (2) as a hedge, natural gas would serve as a backstop if policymakers decide to take little action on climate change or if clean-energy technologies fail to meet their expectations; and (3) natural gas would then continue to displace coal and produce environmental benefits

- During that time, the U.S. can also grow the penetration of zero-carbon technologies, like renewable energy and nuclear power, to meet growing demand for electricity and replace coal-fired power plants.
- In fact, a **reasonable argument** is that regulators/ policymakers should encourage the expansion of natural gas for different applications (e.g., for homes and businesses) rather than its suppression; opponents of natural gas tend to overemphasize the environmental and climate-change benefits of deep decarbonization relative to the economic benefits of natural gas.
- Before advancing electrification with various policy measures, policymakers should ask themselves what benefits electrification offers relative to the costs. It is unlikely that any jurisdiction would realize net benefits if the sole intent of accelerated electrification is to mitigate carbon emissions.

Cost-Benefit Approach for Policymakers in Evaluating Electrification

Review the end-use energy market	Need for better understanding of the market before taking any action
Evaluate its economic efficiency	Comparison of the actual market with a well-functioning market
Detect undue barriers ("electrification gap")	Obstacles to electrification, segmented by normal market forces and artificial barriers
Identify the preferred policy response	Alignment of the best policy response with a specific undue barrier
Conduct cost-benefit analysis	Measurement (to the extent possible) of the benefits of a policy response along with its costs
Execute policy action	Cost-beneficial action to improve market performance (i.e., economic efficiency)
Evaluate action ex post	Periodic review of action in light of changing market and other conditions

- Natural gas has produced large economic and environmental benefits that policymakers should not overlook.

Reference Materials

- Costello, Kenneth W., Electrification: The Nexus between Consumer Behavior and Public Policy," The Electricity Journal, Vol. 31, Issue 1 (January/February 2018), 1-7.
- Costello, Kenneth W., "Why Natural Gas Has an Uncertain Future," The Electricity Journal, Vol. 30, Issue 7 (August 2017): 18-22.
- Costello, Ken, "Questions on the Future of Natural Gas," NRRI Report 17-1, May 2017.

Keywords

natural gas, bridge fuel, electrification, optimal policy, risk analysis, climate change, energy sector transition

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