

# The New Age of Natural Gas: Technology Needs and Policy Impacts

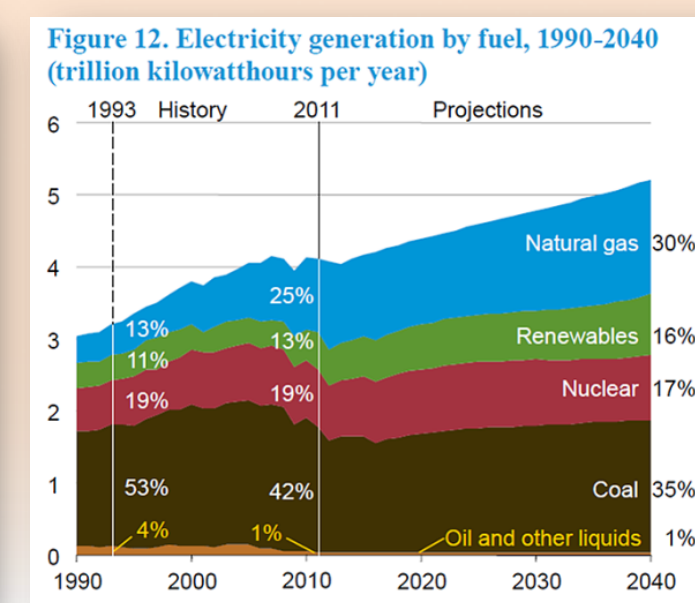
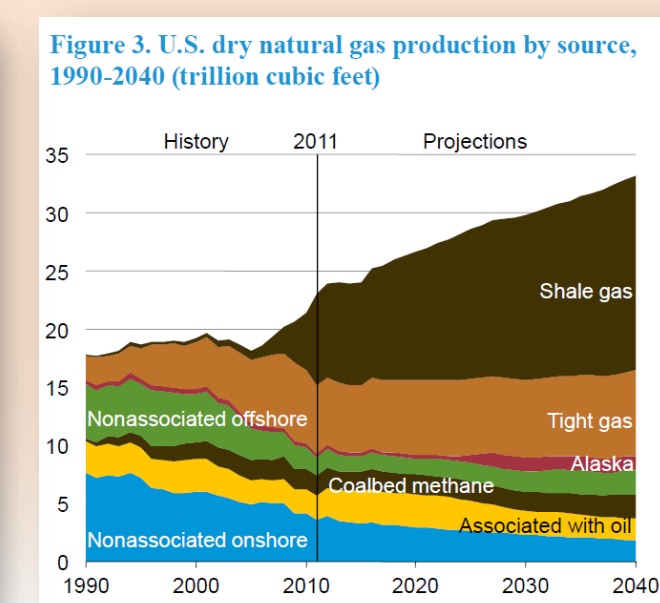
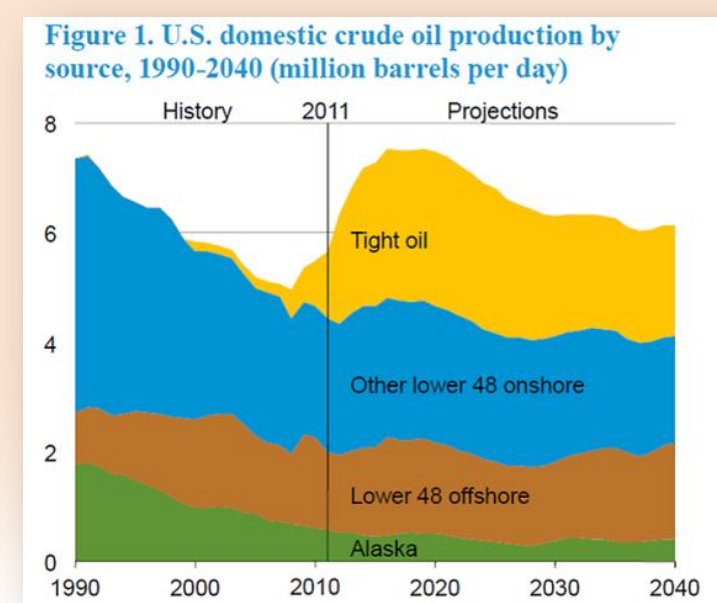
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The projected expansion of the US natural gas supply provides many opportunities for the nation. At the same time, this potential resource raises core uncertainties for the nation. Central questions are whether the resource is sustainable, and whether new end-users will emerge to utilize the new supply. Additionally, the global and national security impact of increased natural gas supply has great upsides, but there may be transitional insecurities in markets and nations-states.



## PRODUCTION

*Improved science and engineering is needed for:*

Quantitative prediction of matrix-to-fracture gas release mechanisms to more accurately anticipate reservoir decline

Reservoir characterization and management

Non-water based fracturing methods

Remote sensing of fractures and proppant placement

Improved well cementing methods and/or well deterioration diagnostics and remediation

Disposal/treatment of flowback fluids

New methods for measuring natural gas emissions near the land surface

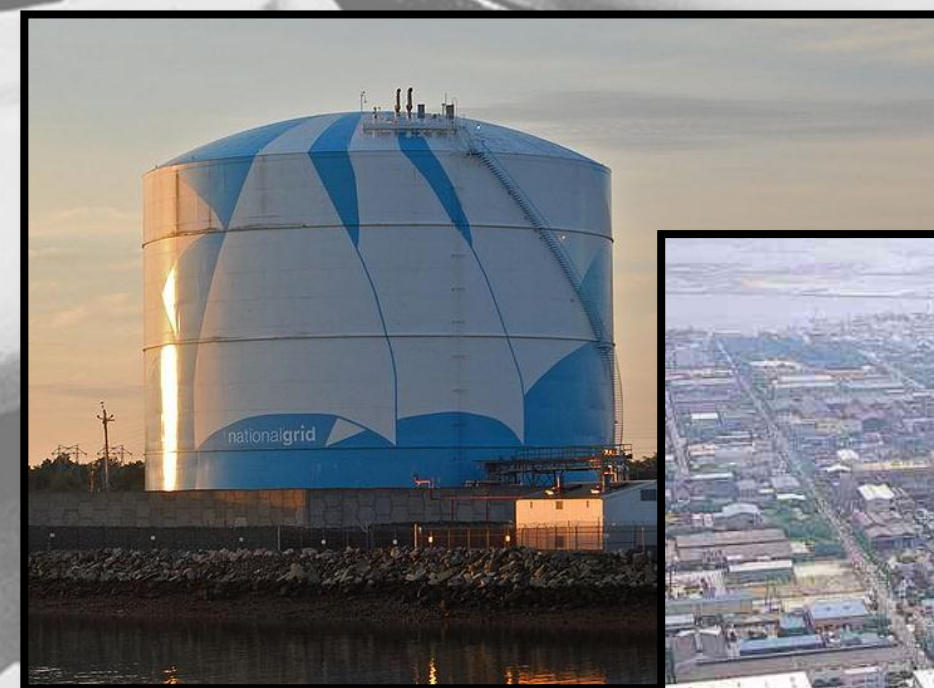
New approaches to understanding and avoiding seismic risk

## INFRASTRUCTURE

Can the current natural gas infrastructure handle the increased supply and demand?

How will the infrastructure expand and at what cost?

Will more storage be required at different locations?



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Will different infrastructures compete with each other for the distribution of natural gas or its alternative end products relative to spare capacity and utility?

Natural gas to the electrical infrastructure  
Natural gas to the liquid fuels

## NATIONAL SECURITY

Will the growth of shale gas and shale oil geographically redistribute the energy suppliers?

If the global spare capacity of oil production, for example, approaches 8 million barrels per day, will the cartels such as OPEC lose their capacity to control the price and production of oil? If so, would this lack of control lead to a regional instability result?

Will the increased supply of natural gas in Europe and North Africa impact Russia's energy hegemony with Europe and, thus, impact Russia-NATO interactions?



\*US Energy Information Agency, pre-release Annual Energy Outlook (AEO) 2013