



The Bureau of Economic Geology

Where energy, the environment, and the economy converge.

BEG Shale Gas Basin Study Updates

Between 2010 and 2015, a team of scientists, engineers, and economists at the Bureau of Economic Geology (BEG) conducted studies of production and reserve outlook scenarios for the four major U. S. shale gas basins—Barnett, Fayetteville, Haynesville, and Marcellus. This research, funded by the independent Alfred P. Sloan Foundation, has been extensively published and cited and is considered the most in-depth public analysis of its kind. In June 2016, the BEG will initiate a project funded in part by the U. S. Department of Energy to update and enhance the production and reserve outlooks for the four major shale gas basins through 2045. We are offering a very low cost, extreme leveraging opportunity to be involved in these updates.

The original outlook studies were conducted by a multidisciplinary team of scientists, engineers, and economists from the BEG led by Scott Tinker and Svetlana Ikonnikova. The analyses integrated academic and industry knowledge and approaches and resulted in a series of outlook scenarios predicting the future production and reserve potential of each basin. The results of the original studies can be viewed at <http://www.beg.utexas.edu/research/programs/shale/publications>

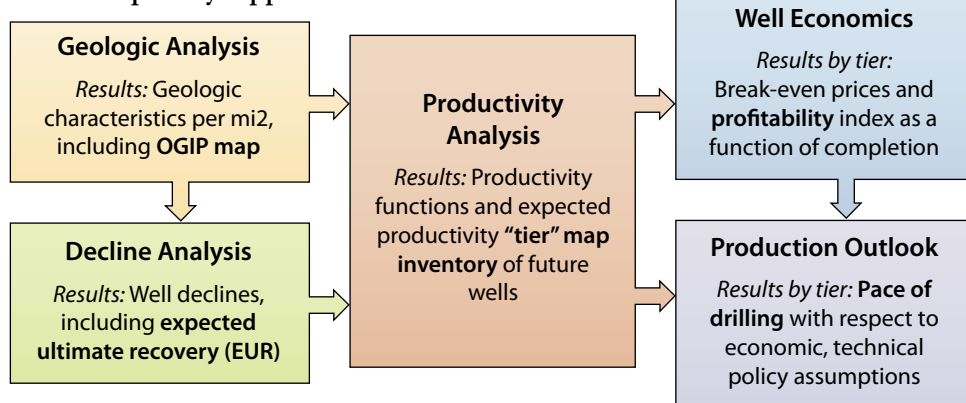
Leveraging Sloan foundation support for the past 5 years with new DOE funding, and offering industry involvement.

Support one basin for \$7.5K or all four studies for \$25K.

BEG Shale Play Study Areas



Interdisciplinary Approach



QAe4721

Expertise from producers active in each basin has been invaluable in ensuring the quality of

previous studies and is actively being sought in this revisit.

The updated study will incorporate new geologic, production, and completion data, enhancing the methodology to capture technological evolution, changes in company strategies, and market environment. The revision will ensure consistency of approaches, benefiting from our most sophisticated production modeling.

Benefits to operators involved in the update of a basin(s) of interest include

- ▶ leveraging of nearly 80x the cost of involvement through previously invested Sloan Foundation support (around \$500,000/basin) and new DOE support (\$350,000 total, or \$87,000/basin)
- ▶ early and detailed insights from our geologic, engineering, statistical, and economic methodologies
- ▶ opportunity to see and participate in research integrating multiple disciplines
- ▶ periodic discussions on work in progress, with opportunities to provide input and guide the study, which would help improve accuracy of results
- ▶ first access to final outlooks

**Support one basin for \$7,500
or all four basins for \$25,000.**

Outlook Update for Each Play

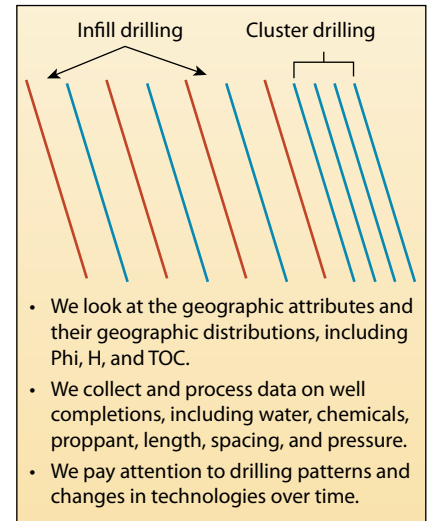
**Expected completion
dates:**

Barnett: December 2016

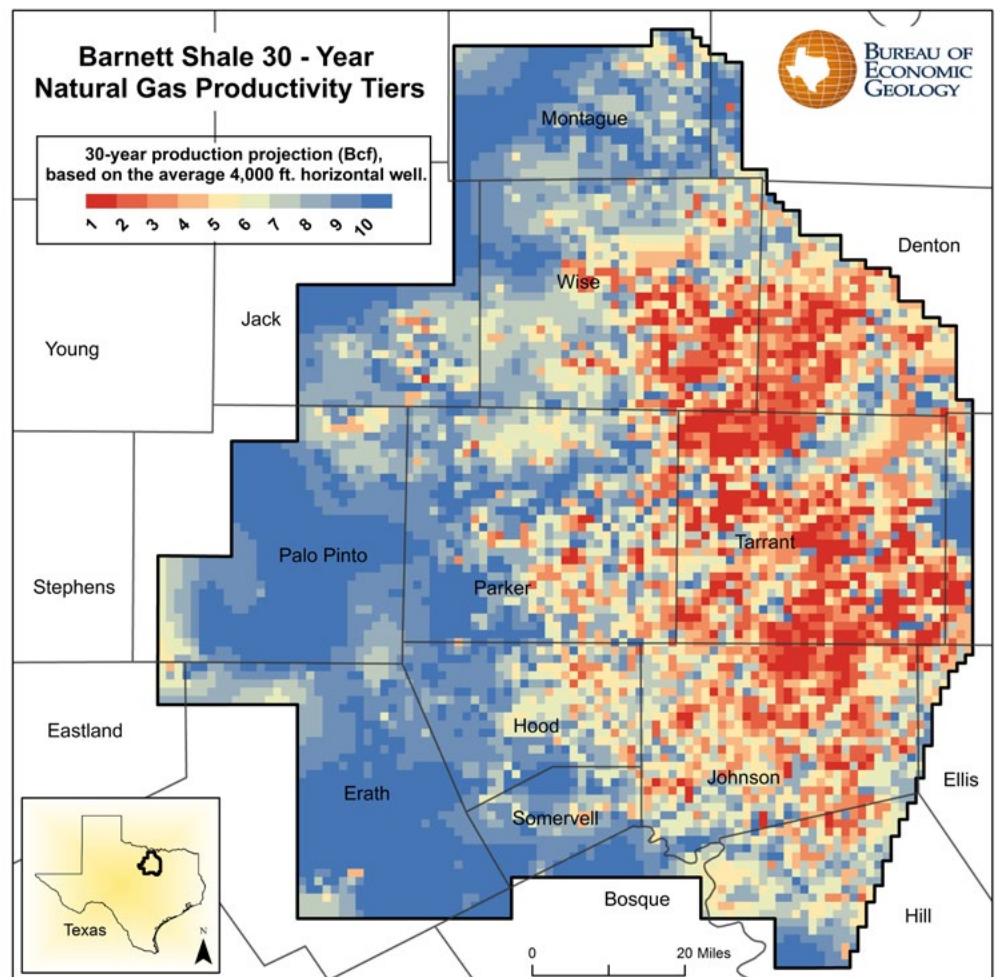
Fayetteville: March 2017

Haynesville: June 2017

Marcellus: December 2017

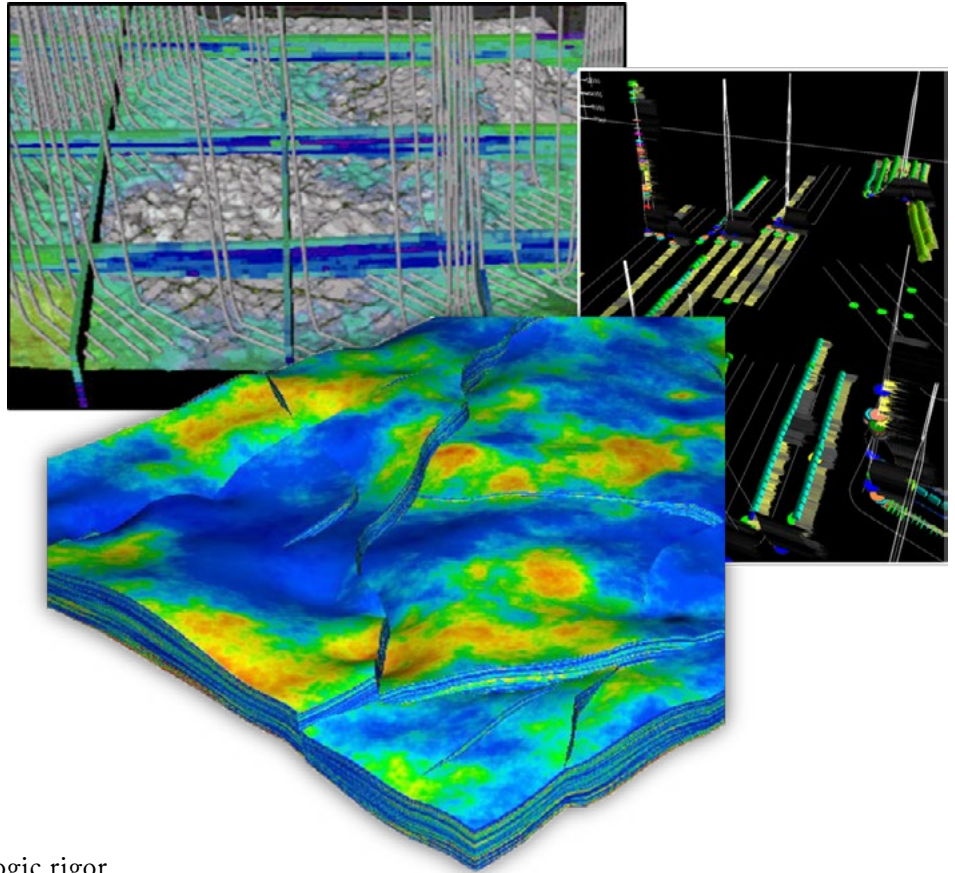


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DOE funding efforts:

- ▶ Updated resource-in-place maps, using additional log and core data
- ▶ Updated individual well production declines for all wells
- ▶ Recovery and productivity maps resulting from the statistical analysis of a comprehensive database, including well location, geologic attributes, completion, and production
- ▶ Maps of current and future profitability index under various scenarios
- ▶ Well economics and play outlook for a set of price, cost, and technology scenarios



Corporate support will add:

- ▶ 3D geocellular model improving geologic rigor
- ▶ Details of petrophysical analysis, addressing issues such as clay content
- ▶ Details of the statistical analysis investigating the relationship between production, geologic attributes, and completion details for individual wells (production function analysis)
- ▶ Differences in production from infill, cluster, and/or closely spaced wells
- ▶ Well-economics analysis with a focus on
 - sensitivities to spacing and timing
 - trade-off between completion costs and completion-dependent production, particularly related to water and proppant usage

Contact information

Participation in a basin will include discussions with the research team during the study to enhance the approach and to consider additional data and insights. Results will be presented to participating companies as each basin study is finalized and prior to public release and publication.

Companies should contact Svetlana Ikonnikova (svetlana.ikonnikova@beg.utexas.edu) to elect basins for participation.

