Update on BEG’s Sloan Foundation project

Future production from top four shale gas plays

Mapping geological drivers of best producing areas

Goal: predict the production performance over a 20-year period for the top four shale gas plays in the U.S.

- 2 1/2 year project funded by Sloan Foundation
- Concludes in 4Q 2013
- 5 journal articles currently submitted for Barnett portion of study
- Special session at forthcoming URTEC conference in Colorado
- Working on final play (Marcellus) currently

Impact

- Reality check on the shale gas boom
  - How substantial?
  - How long sustained?
  - How profitable?
- Did not address:
  - How safe, how environmentally friendly, true EROI (energy return on energy invested), etc

Team

~16 people

- 6 geologists including 1 student and 1 post doc
- 4 petroleum engineers (1 student)
- 5 economists (2 students)
- 1 GIS/mapping/database expert
- Age range 22 to 80+
- 5 nationalities
- 2 cities
- 4 departments in 2 universities
Terminology
- Keep in mind others may not know terms you use...
  - Permeability means nothing to economists;
  - Externalities means nothing to geologists;
  - Devonian means nothing to engineers.
- The same terms may have different meanings for different people, e.g.
  - matrix may mean something that has nothing to do with numbers....

Future shale gas production rates
- Difficult to forecast because of interactions of geology, price, recovery per well, spacing, refracs, technology change, costs, drilling pace, well attrition, and accessibility
- Forecasting starts with aggregating single-well data like this:

Geologic drivers
- Total Organic Carbon, thermal maturity, and brittleness (fracability) are all important...
- Porosity x thickness (\(\Phi \times h\)) is reliable indicator of sweet spots once a play is identified
- We map this from publically available downhole logs
- In some plays, need to modify (reduce) \(\Phi \times h\) to account for clay, which reduces well productivity
Barnett production tied to Phi*h

Barnett Shale 30-year productivity Prediction, normalized to 4000' horizontals