Shale Gas and Tight Oil: A Panacea for the Energy Woes of America?

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Shale gas has been heralded as a “game changer” in the struggle to meet America’s demand for energy. The “Pickens Plan” of Texas oil and gas pioneer T.Boone Pickens suggests that gas can replace coal for much of U.S. electricity generation, and oil for, at least, truck transportation¹. Industry lobby groups such as ANGA declare “that the dream of clean, abundant, home grown energy is now reality”². In Canada, politicians in British Columbia are racing to export the virtual bounty of shale gas via LNG to Asia (despite the fact that Canadian gas production is down 19 percent from its 2002 peak). And the EIA has forecast that the U.S. will become a net exporter of gas by 2019³.

Similarly, recent reports from Citigroup and Harvard suggest that an oil glut is on the horizon thanks in part to the application of fracking technology to formerly inaccessible low permeability tight oil plays. The fundamentals of well costs and declines belie this optimism.

In the early days it was declared that “continuous plays” like shale gas were “manufacturing operations”, and that geology didn’t matter. One could drill a well anywhere, it was suggested, and expect consistent production. Unfortunately, Mother Nature always has the last word, and inevitably the vast expanses of purported potential shale gas resources contracted to “core” areas, where geological conditions were optimal. The cost to produce shale gas ranges from $3.50 per thousand cubic feet (mcf) to more than $10.00, depending on the play. Natural gas production is a story about declines which now amount to 32% per year in the U.S. So 22 billion cubic feet per day of production now has to be replaced each year to keep overall production flat. At current prices of $3.70/mcf, only the best wells in dry gas plays are economic, although plays like the Eagle Ford, which have combined oil, natural gas liquids and gas production are economic at lower prices. Overall field declines in plays like the Haynesville are 52%/year and current rig counts are insufficient to offset this decline. As a result I expect falling natural gas production and rising prices in the near to medium term.

Similarly, tight oil plays in North Dakota and Texas have been heralded as a new “Saudi Arabia” of oil. Tight oil is offsetting declines in conventional crude oil production as well as contributing to a modest production increase from the 40-year US crude oil production low of 2008. Overall field decline rates are steep, however, at 40%/year, and production will ultimately be limited by the rate of drilling and the number of available well locations. If EIA estimates of available well locations are to be believed, production will peak at about 2.3 million barrels per day in the 2016-2018 timeframe.

Shale gas and tight oil have been “game changers” in that they have reversed the declines in both U.S. oil and gas production. They both come with environmental costs which have resulted in moratoriums on fracking in New York, Maryland, the Canadian Province of Quebec and France. The longevity of this trend remains in question when the details of geological, economic and environmental issues are examined. For now they have bought some time to develop a more sustainable long term energy strategy for the U.S.