

North American Renaissance: The Outlook for Oil Production in the US and Canada

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Energy Intelligence Group publishes 15 North American and international publications: Petroleum Intelligence Weekly, Energy Compass, Energy Intelligence Briefing, Oil Daily, International Oil Daily, Energy Intelligence Finance, EIF Alert, Jet Fuel Intelligence, Natural Gas Week, NGW's Gas Market Reconnaissance, Nefte Compass, Oil Market Intelligence, Nuclear Intelligence Weekly, World Gas Intelligence and World Watch.

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THE OLD REALITY

- For more than 30 years, expectations were that the US would become more and more dependent on oil and gas imports.
- Federal legislation mandated ethanol for environmental reasons and to cut down on dependence on foreign sources.
- Scores of LNG import terminals were proposed in anticipation of growing reliance on foreign sources of natural gas.
- All were wrong!

SHALE REVOLUTION

- The “crazy Greek” George Mitchell and team.
- Worked 16 years to “crack the code” in Barnett Shale of North-Central Texas.
- The key was “slick-water fracturing and horizontal drilling. The revolution was on.
- Underfunded Mitchell Energy sold out to Devon Energy in 2002 and Barnett activity soared.
- The gas field is the largest US. Output 10 Tcf.
- Production 5.2 Bcf/d and only now beginning to plateau. Years of life remaining as development has moved to oil-prone “Barnett combo.”

THE REVOLUTION SPREADS

- Shale is every where. The Haynesville in Louisiana. The Fayetteville in Arkansas. The Cana and Woodward in Oklahoma. The Granite Wash in the Texas Panhandle. The Marcellus in Pennsylvania, New York and West Virginia. The Utica in Ohio.
- Then the oily shales: The Bakken in North Dakota and Montana on over into Canada. The Niobrara in Colorado and Wyoming. The Permian Basin of West Texas. More found daily.
- And oily sections in the gas shales.
- The Eagle Ford is a good example.

CANADIAN AND ALASKAN SHALES

- Western Canada: The Horn River, Montney and undiscovered shales in Alberta.
- These will feed LNG export ventures.
- The Yukon and Northwest Territories are unexplored, but have known conventional gas.
- Eastern Canada: Utica and Horton. Extent yet to be defined, but multi-Tcf already confirmed.
- Liquids produced likely will stay in Canada.
- Alaska is largely unexplored, but state officials say shale deposits exist. Liquids-rich shales will be the focus there to fill Alaska Pipeline.

OVERALL NORTH AMERICAN VIEW

- From Canaccord Genuity of Calgary: In the aggregate, Canadian, Bakken, Permian and Mid-Continent crude output is projected to grow about 500,000 b/d annually over the next several years.
- Capacity constraints will be a problem, especially out of Cushing, but 800,000 b/d from Wrangler not needed, especially with Keystone XL.
- More debottlenecking needed in other areas.
- More new lines needed in Bakken.

BAKKEN OIL: THE US NORTH SEA?

- From Bank of America.
- North Dakota shale output has doubled in the last two years to 425,000 b/d.
- DOE puts proved reserves at 3.65 billion bbl. Industry estimates range from 5 billion to 24 billion recoverable bbl.
- Forecasts call for 2015 production of 1.3 MM b/d
- North Sea peaked at 6 MM b/d. Current production 3 MM b/d and holding.
- The Bakken is not there yet.

DON'T FORGET ABOUT OIL SANDS

- Western Canadian oil sands production now stands at about 1.8 MM b/d.
- Forecasts vary, but reliable soothsayers put future volumes at 3 MM b/d in 2020, up to 5 MM b/d in 2030. Assumes prices above \$60/bbl.
- May stay at that level for 50 years, according to former Alberta energy minister.
- Most will come to US, up to 4 MM b/d.
- About 1 MM b/d could go to Asia.
- Small volumes might go to Europe, but not likely.

WHAT ABOUT NGLS?

- The original shale liquid.
- Both a petrochemical feedstock and a refinery blending stock.
- In either case, important to backing out foreign imports and creating domestic jobs.
- Source of billions of dollars of new pipelines in coming decade.
- Marcellus, Eagle Ford and Permian will be key sources.

CONVENTIONAL OIL STILL FLOWS

- Not as much and not as fast, but still an important source of supply.
- The Gulf of Mexico will be the only region where conventional volumes will increase.
- Growth will be deferred because of Macando-related delays.
- EIG's forecast sees 2011 production of 1.4 MM b/d, down from 2010, but climbing to 1.65 MM b/d in 2015.

INFRASTRUCTURE PLAYERS

- The companies that transport oil and NGLS.
- TransCanada and Enbridge are the only traditional C-Corp companies in the group. Both are Canadian. Enbridge's US affiliate is an MLP.
- Kinder Morgan, Energy Transfer and Enterprise are multi-unit MLPs.
- All have multi-billion dollar market capitalizations.
- All are run by smart people who know how to manage risk.
- Equally important is a keen sense of timing. Just ask Rich Kinder, who is worth \$6.5 billion.

NEW SUPPLY SOURCES

- Sasol brings natural gas-based Fischer-Tropsch projects to North America.
- Current plans call for a 50,000 b/d plant in Alberta and a 98,000 b/d complex in Louisiana.
- Advanced biofuels from algae. Comparable in quality to what we once called straight run.
- Hybrid synthetic fuels from combined modified FT and other coal-to-liquids processes that feed captured CO₂ to algae to form fertilizer. No CCS required.

CONCLUSIONS

- We are not running out of either oil or gas.
- The Permian Basin may never run out.
- Even the White House is beginning to admit wind and solar won't solve it all.
- Petroleum industry ingenuity continues to overcome adversity and challenges.
- GHGs are simply the next challenge.
- Scientists will turn CO₂ into transport fuels.

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