

# Natural Gas—Easing Glut Leaves Room to Rally

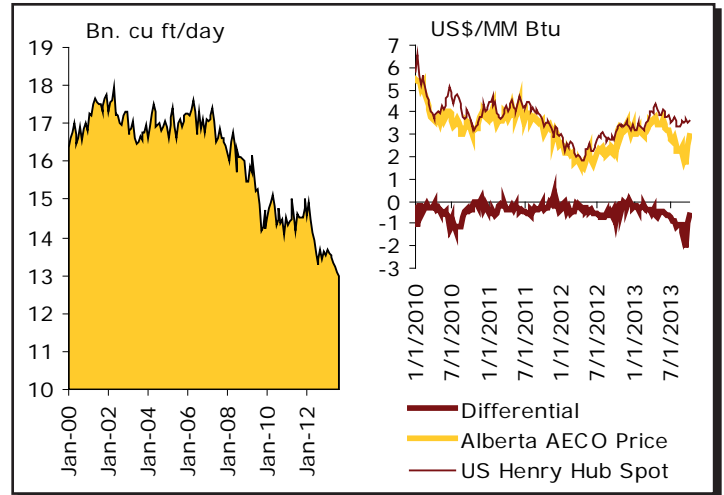
Peter Buchanan

Natural gas, left in the dust by oil’s rally, could soon be rising for reasons other than seasonal temperature variations. The explosion in US shale gas production, and modest increases in other non-conventional gas sources like coal bed methane (Chart 1), have meant stiff competition for Canada’s O&G sector in recent years. Our natural gas output has plummeted by 25% in the last half-decade as lower cost production stateside has made inroads into traditional markets for Canadian gas in both the US and in Eastern Canada (Chart 2, left).

Though less widely recognized than the discount on the oil side, Canadian natural gas producers have suffered from a “double discount” of their own lately. Compounding the generally soft pricing environment, the differential between AECO’s key reference price for Alberta production and gas at Henry Hub, the key US pricing point has touched \$2/MM Btu recently (Chart 2, right). Pipeline toll changes, which are more significant for Canadian than US shale production, given longer distances to market, have contributed to the wider differential. Bearing witness to divergences in the two fuels’ price trajectories, gas-levered stocks have also significantly underperformed oil-levered ones on the TSX (Chart 3).

There are signs that the period of exceptionally low prices that has dented this key Canadian resource may be

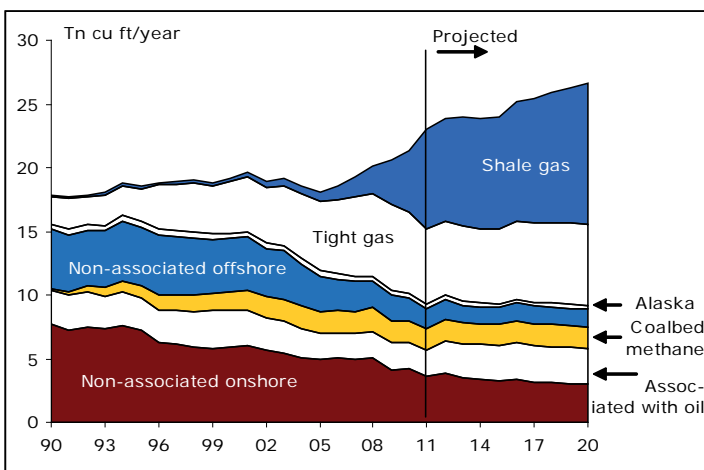
Chart 2  
Canadian Gas Production Down 25% (L),  
Wider Alberta Price Differential versus US (R)



Source: NEB, Bloomberg, CIBC

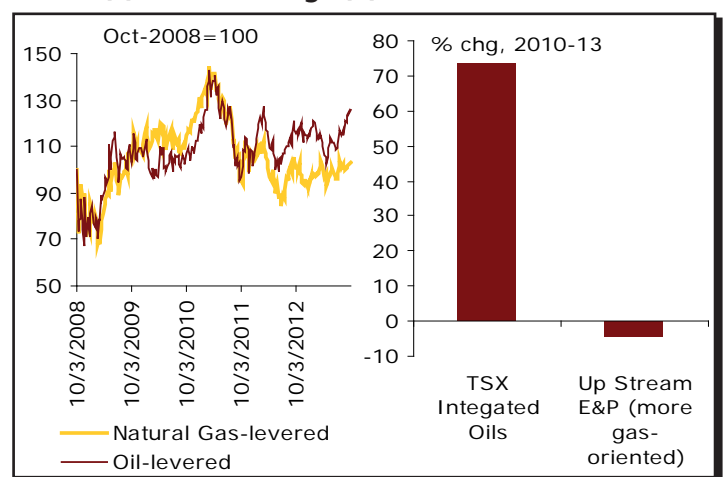
coming to an end. That doesn’t mean a return any time soon to the past decade’s double-digit price peaks, but it does mean \$4-5 is likely to be the new norm as compared to prices as low as \$1.80/MM Btu, a quarter or less of oil, in energy equivalent terms. We expect North American natural gas prices to average \$4.30/MM Btu in 2014, up from an average of about \$3.70 this year. Events like the recent energy-centred Abe-Harper summit, and British

Chart 1  
The US Natural Gas Revolution



Source: US DoE, CIBC

Chart 3  
Oil/Gas Price Divergence Has Affected TSX Share  
Prices (L), Cdn Earnings (R)



Source: Bloomberg, CIBC

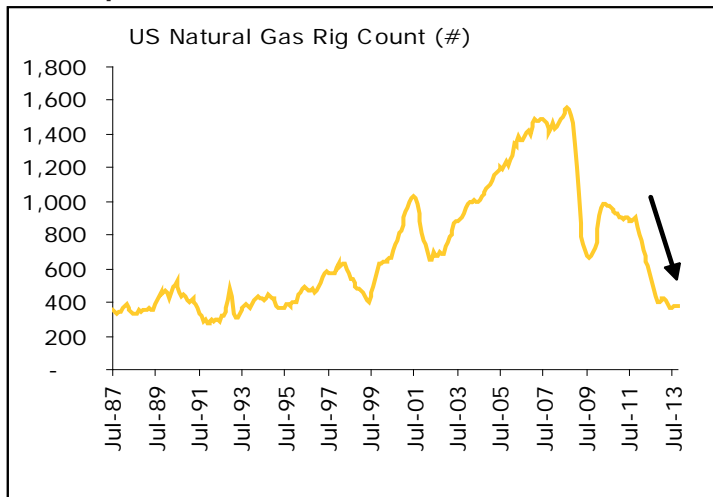
Columbia’s efforts to reach agreement on a tax framework for LNG exports, have also focused attention on Canada’s own world class shale gas resources. Challenges remain, but longer term those could potentially offer economic and other spinoffs comparable to the US shale gas revolution.

**US Supply Growth Stalls as Demand Keeps Rising**

As in Canada, US gas producers have responded to the sustained low price environment by savagely cutting exploration and development activity. High crude prices have also helped, effectively drawing resources away from gas to more profitable oil exploration activity. Since late 2011, the active gas rig count in the US—a key measure of exploration/development activity— has fallen by about 60% to the lowest level in nearly 20 years. That follows a steep decline during the recession and its immediate aftermath (Chart 4).

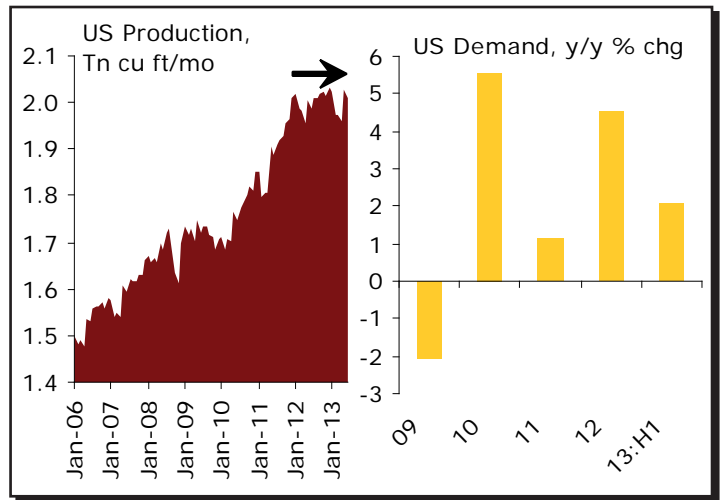
While these cuts were initially offset by improvements in rig efficiency tied to new drilling technologies, there are growing signs that they are now having an impact on supply. Overall US dry gas production has effectively flat-lined since early 2012 (Chart 5, left). That comes after an average annual 4% rate of increase in the preceding six-year period that more than reversed a three-decade long, earlier decline. The slowdown has occurred, moreover, in spite of the lack of severe weather this summer that caused major outages in offshore US production in years past.

Chart 4  
**US Producers More Serious About Cutting Development**



Source: Baker Hughes, CIBC

Chart 5  
**Production Flatlining (L) As Demand Keeps Rising (R)**



Source: DoE, CIBC

Reinforcing our view that sustained North American prices above \$4/MM Btu will eventually be needed to balance markets, recently stagnant production coincides with continuing, albeit modest, traction in demand. Even with a comparatively mild summer crimping demand for electricity to power air conditioners, gas consumption in the US is running about 2% above the year earlier level, to date in 2013 (Chart 5, right).

**Heating Season Starts with Low Storage Levels**

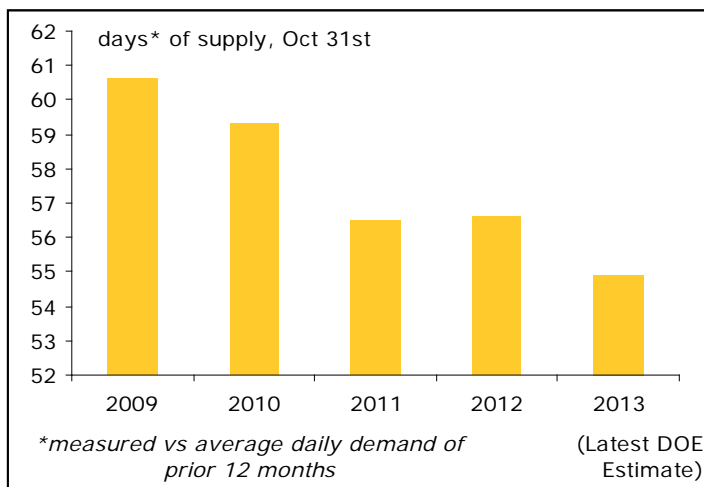
Looking ahead, the heating season’s start is now less than a month off. Market conditions are notably tightening. Measured in days of forward cover, US working gas storage levels are poised to start that key demand period at multi-year lows (Chart 6). Normalized for changes in demand, supplies will start out the current peak annual consumption period about 8% below the level three years ago.

That points to some near term price momentum, but is it sustainable? One of the most important medium term, and widely debated, price drivers, is the breakeven full-cycle cost for shale gas. That source accounts for about a third of overall gas production presently versus a negligible amount a decade ago and is expected to account for virtually all of the incremental supply growth in the next 10-20 years.

Compared to more traditional gas development, shale gas is quite labourious, in some respects. Rapid decline rates means new wells must be constantly developed,

Chart 6

### Days of US Working Storage Will Start Heating Season at Half-Decade Lows



Source: DoE, CIBC

contrasting with the public perception of an abundant, cheaply available resource. Each of the 10-12 major shale plays across the US varies in geology. That along with other factors such as proximity to existing pipeline links translates into differences in cost economics. Significant costs are involved at no fewer than seven stages of the well development and production cycle.

### Shale Breakevens Point to Long Term Normal \$4-5/MM Btu Price Range

That inherent complexity and the fact the shale gas industry is still in its infancy, amplifies uncertainty. Several recent studies have nonetheless suggested an average full-cycle cost of from just over \$4.00 to around \$4.70/MM Btu for new US shale gas developments. The figure for individual plays varies from around \$3.30 to well over \$6, depending on the field and study (Table 1). Those numbers are not written in stone. Future costs could rise or fall, depending on whether technological improvement is able to fully offset the normal decline in the quality of the resource base, since lower cost plays are tapped first. But the cost studies appear to suggest the need for higher marginal prices ahead.

Turning to another price determinant, demand for gas from the power generation sector has grown particularly rapidly in recent years, for a variety of reasons, including the relatively low capital intensity of gas-fired installations and short investment and cycle times compared to alternatives, like steam and nuclear. Power generation now accounts for nearly 40% of US gas consumption, the

Table 1

### Estimates of Breakeven Costs for US Shale Plays

Field	Center for Energy Studies		MIT (2011)
	Harvard (2013)	MIT (2011)	
Marcellus	3.32	4.00	4.00
Eagle Ford	3.51	4.00	-
Utica	3.97	6.25	-
Barnett	4.47	4.25	5.84
Fayetteville	5.05	4.25	5.25
Haynesville	6.11	4.00	5.04
Woodford	6.24	4.50	5.96
Average	4.06	4.20	4.50

Source: MIT "The Future of Natural Gas" (2011), Baker Institute (2011), A.K. Cohen (2013)

most of any sector. The growth there has offset a modest decline in residential use, due to improved efficiency and climate factors.

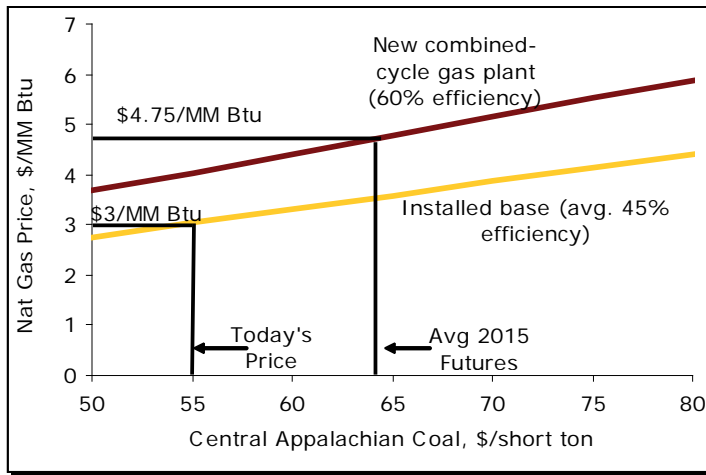
The rise in gas-fired generation reflects a massive shift away from coal, whose share of the generation pie has fallen to 40% from 50% a decade ago. How high can gas prices rise without inducing a massive shift back into coal?

Estimates of the coal-gas "switching price"—the threshold at which fuel costs for the two energy sources align—vary depending on station efficiency (with gas typically enjoying a sizeable advantage in this regard), load factors and coal prices. The price could be as low as \$3 for an older facility achieving a 45% level of thermal efficiency and \$55/ton central Appalachian coal. But it could be upwards of \$4.50 for a new facility, achieving 60% efficiency, based on 2015 forward, thermal coal prices (Chart 7), leaving room for higher nat-gas prices as a result.

Moreover, tighter environmental regulations are likely to appreciably improve gas' relative economics. Next June the EPA will release tightened emissions for existing coal plants. That complements recent ones for new facilities. About 50% of the installed US coal generation base lacks scrubbers—and in many cases, any emission controls at all—and could be at risk of closure or costly retrofitting (Chart 8, left).

Chart 7

**Coal-Gas Switch Price From \$3-5/MM Btu, Depending on Plant Efficiency, Coal Prices**



Source: CME, CIBC, GE, DoE

Another factor that could affect North American prices longer term, eliciting controversy in the US recently, is the construction of new LNG export facilities. Four applications have been approved south of the border for liquification chains and related port facilities. Twenty more are pending. It will nonetheless be at least 2020 before liquefied gas export volumes begin to narrow the yawning gap between North American and overseas gas prices. Even then, the need to recover the tremendous capital and operating costs involved will likely maintain a price wedge between North American and overseas

prices (Chart 8, right). That should continue to favour a range of gas and energy intensive sectors on this side of the Atlantic.

**Canada's Shale Gas: A Limited Time Window**

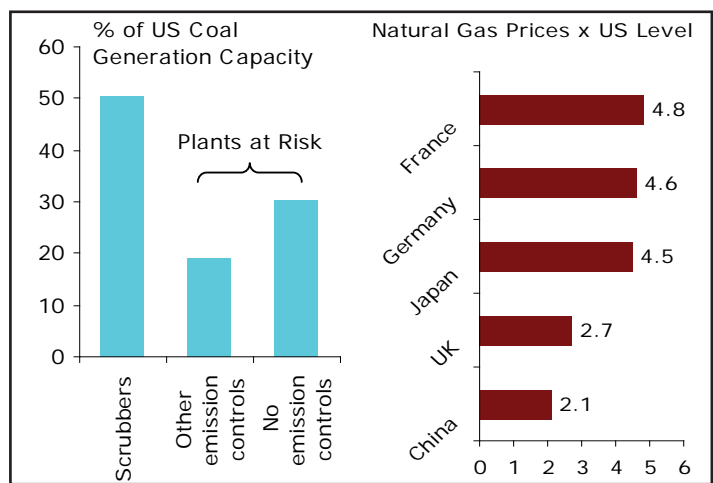
The shale revolution began in the US, and like most disruptive technologies, has left some winners and losers. While Canadian conventional gas producers have been in the latter camp, Canada's own shale reserves are world class. With appropriate attention to environmental considerations, these could provide the important ace card, with spinoffs not unlike those seen stateside.

Recent estimates by the US Department of Energy peg Canada's recoverable shale resources at 573 trillion cubic feet, the fifth largest in the world. That's equal to about two centuries of domestic consumption and only about 14% less than those south of the border (Chart 9).

According to recent National Energy Board estimates, over 90 percent of Canada's shale resources lie in the Montney and Horn River basins in BC and Alberta. Significant gas volumes are also believed to exist in Québec's Lower St. Lawrence basin and in New Brunswick and Nova Scotia. While Canada's gas resources are potentially vast, the country may have to move quickly on issues like pipeline and LNG infrastructure and a suitable fiscal and regulatory framework, lest opportunities are closed off by a number of potential global competitors.

Chart 8

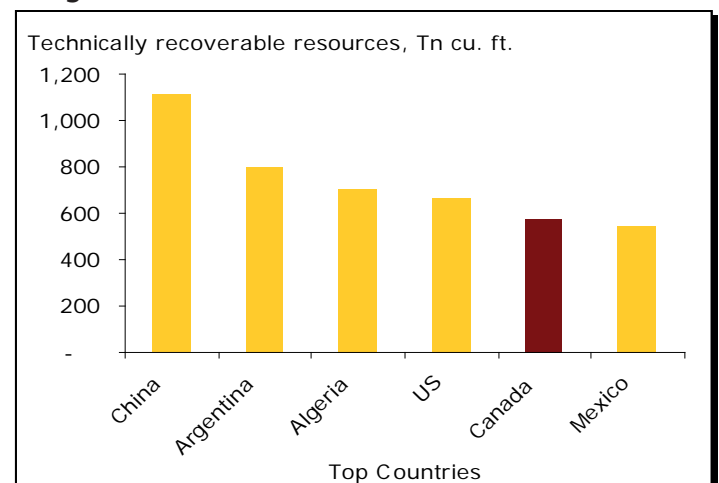
**Half of Coal Fleet Threatened by Emission Controls (L), Huge US Natural Gas Price Advantage (R)**



Source: Energy Velocity, Bloomberg, CIBC

Chart 9

**Canada's Own Vast Shale Resources Could Leverage Longer Term Growth**



Source: DoE