TD Bank Financial Group

TD Economics

Special Report

September 28, 2009

ALBERTA'S NATURAL GAS INDUSTRY FACES CONSIDERABLE LONG-TERM PRESSURES

Alberta's natural gas industry tends to get overshadowed by developments in crude oil and the oil sands. Recently, however, natural gas has shifted to the front pages as this year's slide in prices to below US$3 per MMBtu sideswipes the province's economy and fiscal position. It appears that Alberta's economy continues to contract as most other regional economies in the country show signs of renewed life. What's more, last month, the Finance Minister announced that tumbling natural gas royalties and corporate income taxes would be instrumental in driving a budget deficit of almost $7 billion (2.3% of GDP) in FY 09-10.

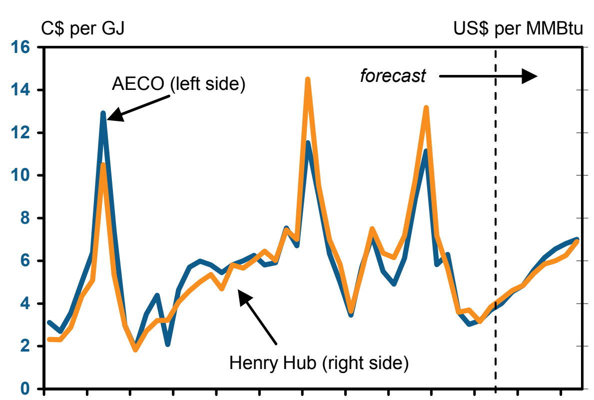
History tells us that such depressed price conditions cannot be sustained for long as the usual supply/demand dynamics kick in that help to restore market balance. Given the considerable excess amounts currently in storage, this process is likely to transpire over a number of months, placing the commodity at risk of further bouts of selling pressure in the near term. But looking out further, investors in the futures markets a return in prices back up to the US$5-6 per MMBtu level (C$4-5 per GJ) by early 2010 and about US$6-7 (C$5-6) in 2011. This projected path remains well off the early-2008 peak of more than US$13, but would provide some needed relief to both the industry and Alberta's overall economy.

That being said, even as prices pull off their lows, questions are likely to linger about the longer-term outlook for Alberta's natural gas industry. The province has been the incremental supplier of the vast U.S. market, accounting for as much as one-seventh of the natural gas consumed south of the border. However, a boom in U.S. domestic

HIGHLIGHTS

- **Even as prices likely gain ground this winter, worries will persist about the longer-term viability of Alberta's natural gas industry.**
- **The primary concern surrounds recent technological advancements that have improved the economics of developing shale gas, notably in the U.S. and British Columbia.**
- **Natural gas currently drives about $35-40 billion per year in annual output in Alberta (10% of GDP), so the risks facing the industry extend to the province's overall economy.**
- **It remains too early to count out the industry. Still, Alberta will need to adjust its course given that the industry is unlikely to return to its former prominence.**

NATURAL GAS PRICES



Source: Bloomberg, forecast by TD Economics as at Sept. 2009 output since 2004 has allowed the United States to meet an increasing share of its needs. Based on these recent trends, there has been some speculation that the U.S. might one day join the small list of countries no longer relying on net imports of natural gas. Moreover, emerging industries in other parts of Canada – notably British Columbia – are threatening to take a larger share of that shrinking U.S. export pie.

The potential for an accelerated long-term decline of an industry that does so much of the heavy lifting in the Alberta economy is arguably the number one risk facing the province's standard of living. Yet, as we discuss, it remains far too early to count out Alberta natural gas.

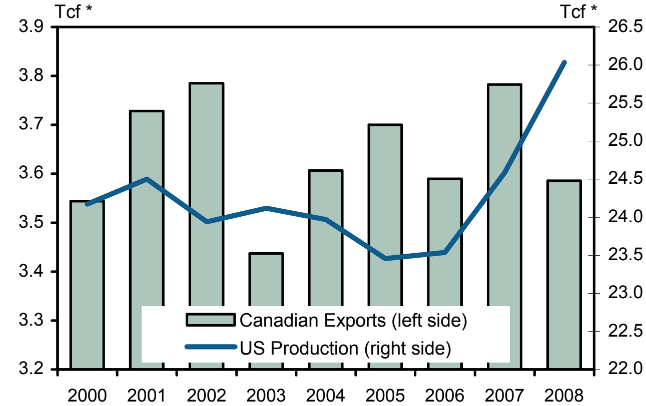
2010 should be a better year for the natural gas market

This year's slide in natural gas prices to 7-year lows has been driven by a combination of the mild winter, the recession, falling North American industrial demand and resilient U.S. production. Accordingly, natural gas in storage has surged some 20% above its 5-year average in both the United States and Canada, fuelling worries that storage capacity limits could be reached this autumn.

But already, the dynamics appear to be in place that will help to restore a semblance of balance in the market. For starters, North American consumption appears set to rebound in the months ahead as economic recovery becomes more firmly entrenched. The relative decline in natural gas prices vis-à-vis crude oil and coal will not create substitution en masse to the cheaper gas alternative due to limited fuel-switching capabilities in the short run. Nevertheless, there are likely to be some incremental demand gains on this front. For example, TD Newcrest has estimated that at natural gas prices below US$3-4 per MMBtu, there is currently an incentive for power utilities to switch away from coal. Finally, we make no heroic assumptions on this year's winter weather conditions, assuming that the average heating degree days is roughly in line with the average over the past half decade.

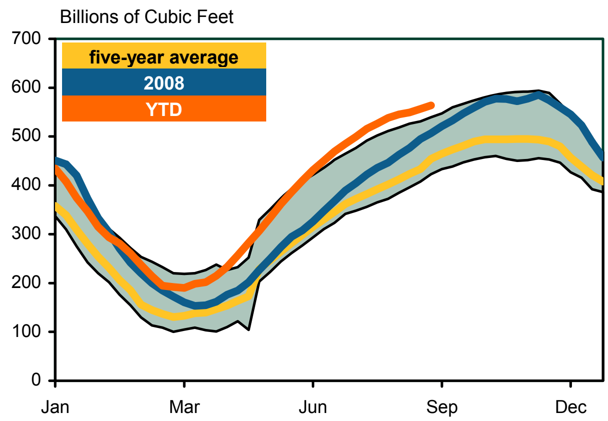
On the supply side, North American production is poised to be adjusted significantly in response to a slump in drilling activity and a lack of storage capacity. U.S. and Canadian active drilling rig counts have tumbled by about 50-60% compared to their year-earlier levels and rig utilization has fallen to multi-year lows. In Canada, production has already followed suit, falling 6% Y/Y in July. But while U.S. production been growing on a Y/Y basis so far in 2009, recent monthly figures suggest that the

U.S. DOMESTIC PRODUCTION & CANADIAN EXPORTS OF NATURAL GAS



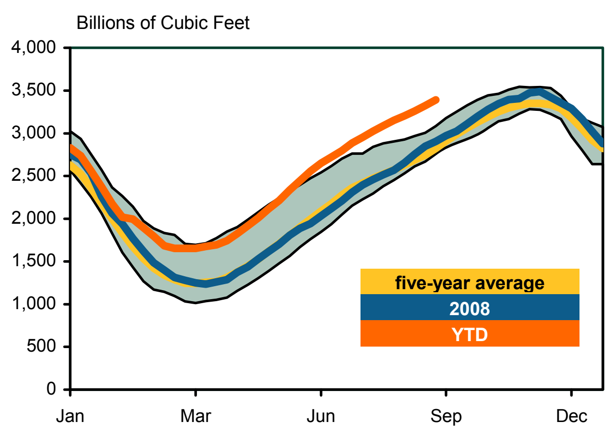
Source: Energy Information Administration * Trillions of Cubic Feet

CANADIAN NATURAL GAS IN STORAGE



* Green band highlights the spread between the maximum and minimum values of the last five years; Source: Energy Information Administration

U.S. NATURAL GAS IN STORAGE



* Green band highlights the spread between the maximum and minimum values of the last five years; Source: Energy Information Administration

peak in output was reached in March. Drilling reductions normally affect production with a 6-month lag, suggesting that U.S. production could be falling sharply as 2009 draws to a close. There could be a modest offset to weaker continental production from liquified natuarl gas (LNG) imports from abroad. However, more attractive pricing levels in Europe are expected to limit these inbound shipments in the coming quarters.

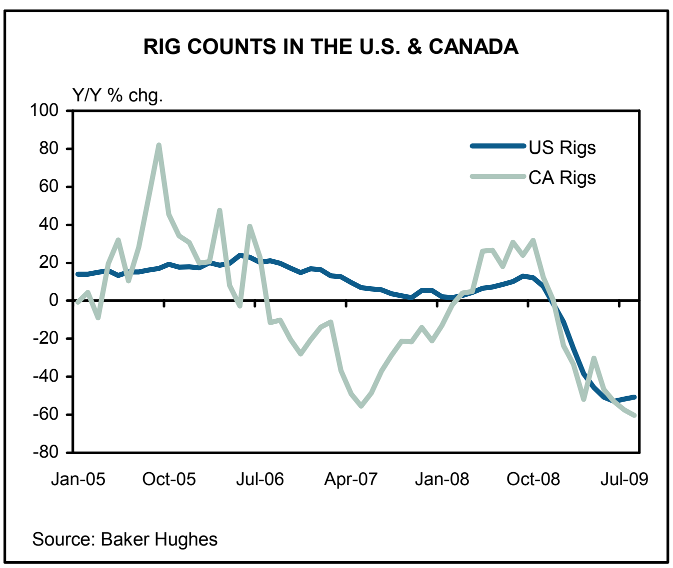
By late fall, we concur with the view that prices will begin to respond to the improvement in market fundamentals. And by mid-2010, North American natural gas inventories should be in the ballpark of their 5-year averages. TD Economics' price projections for the U.S. benchmark Henry Hub over the next 2 years are roughly in line with the $5-7 expectations in futures markets. Still, our forecast of Alberta (AECO) prices reaching C$7 by the end of 2011 is on the optimistic side, seemingly reflecting a more bearish view on the currency (our base case has the Canadian dollar falling from par in late 2009 to below 90 US cents in 2011). Over the next few months – barring significant hurricane activity in the Gulf of Mexico – a bearish tone is likely to pervade the natural gas market. As such, prices – which have bounced back to around US$3.75 in September – are vulnerable to further setbacks before the firming trend ensues.

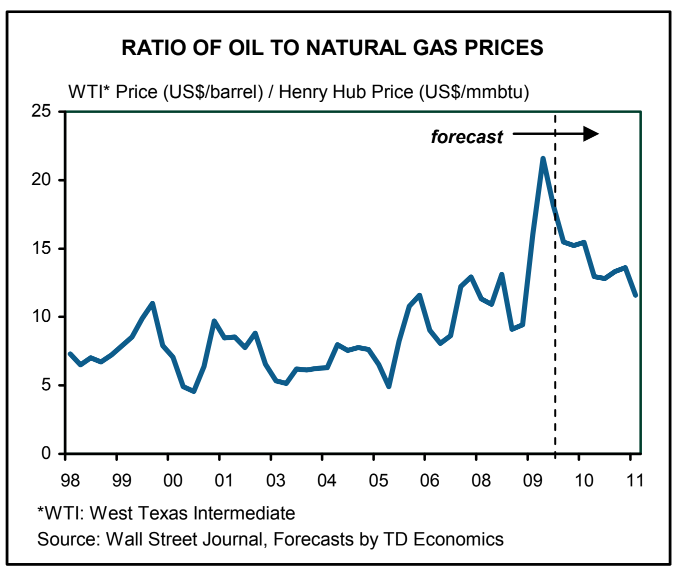
Some narrowing ahead in oil-gas price differential

There has been much ink spilt within the investment community about the growing decoupling of natural gas prices from those of crude oil. Between 1998-2007, crude oil prices traded at an average of 8 times natural gas prices, but have spent periods trading as low as 3 times to a high of 12 times. Since 2007, however, this divergence has grown in favour of oil prices, and by August 2009, the ratio had surged to a high of 23-25 times. We don't find any compelling reason why a strong oil/gas relationship should hold over the short run. Whereas crude oil has complex ties to the performance of the global economy, capital flows and swings in the U.S. dollar, natural gas remains a continental market and tends to be driven by a simple formula of supply and demand. And, as mentioned, near-term substitutability between the commodities is limited. Regardless, with crude oil prices projected to trade in the US$65-80 range over the next 18 months, the crude oil/natural gas price ratio should fall back to about 13-15 times.

Momentum shifting to other jurisdictions

A significant improvement in price conditions would provide a dose of good news for natural gas producers and supplier industries, which have been on a rough ride lately. Yet worries will persist about the longer-term viability of an industry that has been such a major contributor to the Alberta Advantage over the years. Concerns on this front are not brand new – in fact, for a number of years, forecasters have predicted that natural gas output would peak this decade, and recent figures suggest that high water mark might have occurred as early as 2001. At the same time, however, there had been a widely-held belief that the downward descent would occur relatively gradually over the next 1-2 decades, leaving the Alberta economy ample time to adjust. In light of recent developments, there are now fears that the sun could set more quickly on the





industry than initially believed.

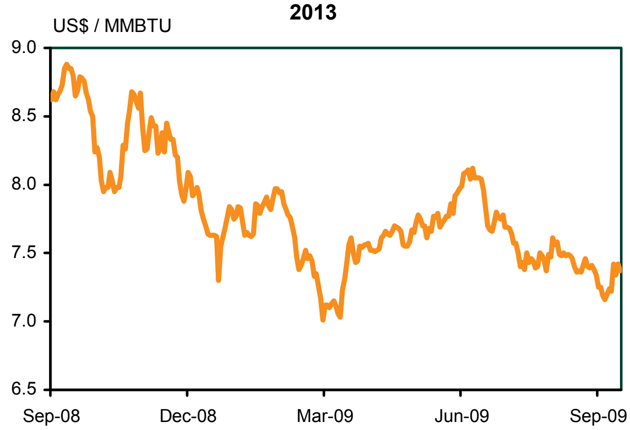
U.S. could become a net gas exporter

The developments that have raised eyebrows recently have ranged from royalty, tax and other regulatory changes that have weakened Alberta competitiveness to the surge in the Canadian dollar. But particularly key are the advancements in technology over the past several years that have shifted Alberta's geological advantage into a disadvantage. By this, we are referring to the traditional edge that Alberta enjoyed owing to its natural wealth of highly-productive and low-cost conventional natural gas resources. But as conventional reserves have begun to deplete and output head lower, producers have cast their eyes on more expensive unconventional sources, such as coal-bed methane (CBM), tight gas and, most notably, gas from shale. The plentiful gas supply found in shale formations has proved particularly costly and difficult to reach – *that is, until recently.* Advances in horizontal drilling and the hydraulic fracturing of rock have opened the door to development of shale gas. Interest in the sector has now turned to a number of established shale plays in the United States (Barnet, Bossier, Marcellus, Woodford and Fayetteville) and in north-eastern British Columbia.

In the U.S., the emergence of shale gas has left a particularly indelible imprint on the supply picture. Shale gas production came out of virtually nowhere 5 years ago to account for about one-tenth of U.S. production in 2008. What's more, long-term projections released by the U.S. Energy Information Administration (EIA) show that this share could increase to 18% by 2030. Along with CBM, another area of significant potential, non-conventional sources could account for one-third of U.S. annual supply in two decades. U.S. proven natural gas reserves – 237 trillion cubic feet at last count – have not yet been hiked by the EIA to account for the vast potential of shale. However, a recent report by the Potential Gas Committee, a U.S. authority on gas supplies, has raised its count of ultimate proven, potential and possible reserves by 30% since 2006. At more than 2,000 trillion cubic feet, its revised estimate implies enough supply at current consumption rates to satisfy U.S. demand for 90 years.

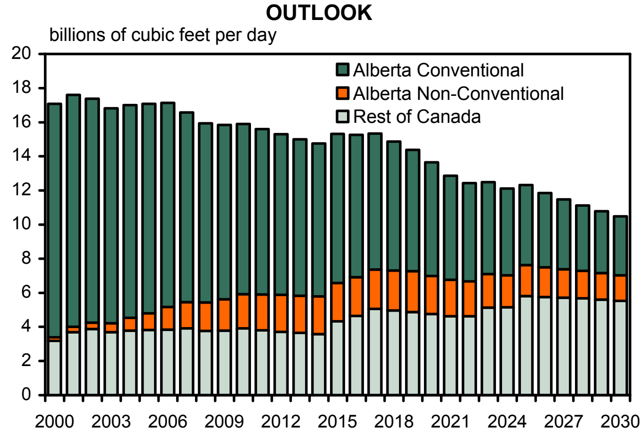
The U.S. natural gas supply network is being enhanced in order to accommodate the increasing resource potential. When the eastern expansion of the Rockies Express Pipeline (REX) is completed later this year, it will move

NATURAL GAS FUTURES PRICE FOR DECEMBER 2013



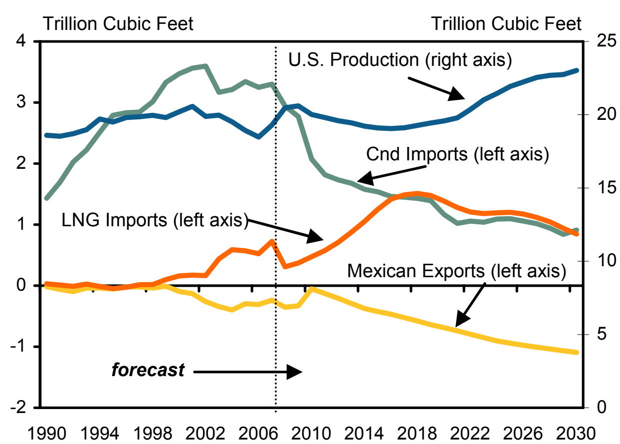
Source: Wall Street Journal

CANADIAN NATURAL GAS PRODUCTION OUTLOOK

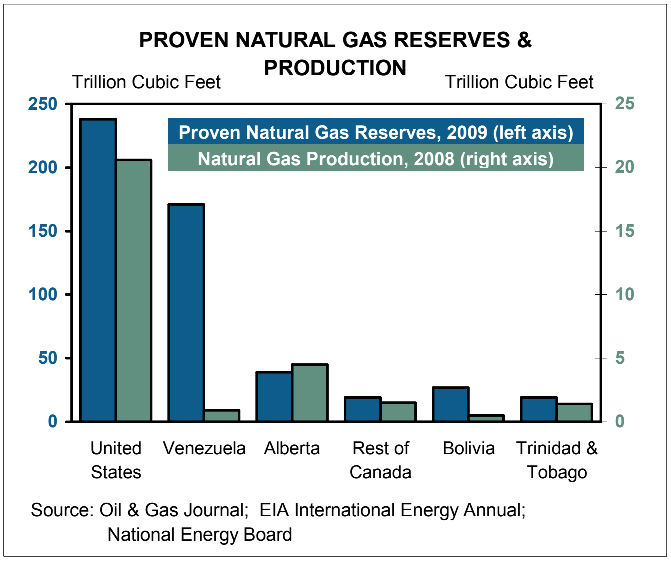


Source: National Energy Board

U.S. NATURAL GAS SUPPLY OUTLOOK



Source: Energy Information Administration



approximately 1.8 trillion cubic feet/day from Colorado to Ohio. There are plans to build additional transportation capacity from the U.S. Rocky Mountain region to the Malin Hub at the Oregon-California border.

With U.S. production and pipeline capacity expected to continue increasing on a long-term trend basis, Canadian natural gas imports will only get squeezed further. The EIA predicts that Canadian gas shipments, of which Alberta currently accounts for about four-fifths, will decline sharply from the current 3 trillion cubic feet to about 1 trillion cubic feet two decades from now. But just as supplies have topped expectations since 2004, there is some speculation that an unanticipated supply windfall from shale production could ultimately tip the U.S. into net export status.

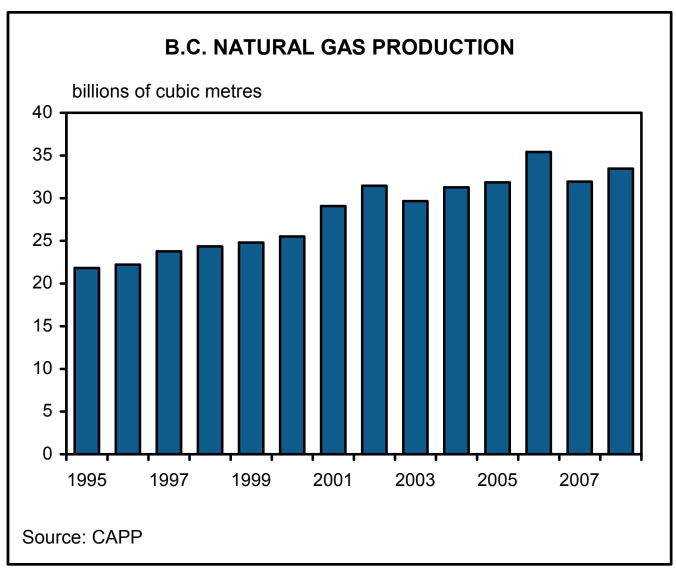
B.C. may take growing share of shrinking U.S. pie

If waning U.S. long-term demand for Canadian gas wasn't a big enough concern, Alberta's industry is experiencing increased competition from other parts of Canada. There has been excitement recently about potential shale developments in Quebec, Atlantic Canada and Saskatchewan's Bakken Formation. But what has really been causing a stir is the potential of B.C.'s Horn River and Montney Basins. Indeed, since 2006, companies have invested some $4 billion for drilling rights in the region. And while the industry has not been immune to the recent slide in prices, natural gas output has increased so far in 2009 on a Y/Y basis. At an annual rate of 1 trillion cubic feet of gas, B.C. has emerged as Canada's second largest producer.

At 13.3 trillion cubic feet in 2007, B.C.'s proven reserves remain about one third of Alberta's. But estimates of the total volume of shale gas that could possibly be developed if further advancements are made are as high as 1,000 trillion cubic feet. This is not to say that Alberta does not also boast significant potential for both conventional and unconventional supplies. For example, a 2005 joint study by the Alberta Energy and Utilities Board and the National Energy Board showed that the province has an ultimate potential of 223 trillion cubic feet. In addition, Alberta has significant resources of CBM, tight sands gas and shale gas. Estimates of the resources in place are some 500 trillion cubic feet of CBM, over 400 trillion cubic feet of tight sands gas and more than 800 trillion cubic feet of shale gas. But to date, the challenging formation of Alberta's non-conventional deposits means that there has been relatively limited development – particularly for shale.

Economics drives investment

The flow of investment towards U.S. and B.C. established shale deposits has been matched by the dramatic improvement in economics. Generating precise cost estimates is no easy feat given the huge variations in geology even within regions and the permutations and combinations of technology required to develop the resource. But the strong gas flows in many of the U.S. plays appear to make them economic at less than US$4-5 excluding up-front costs such as land. In B.C., the Horn River shale deposits are considered economic at around US$6. In contrast, conventional plays in Alberta do not appear economic at prices below US$7-7.50.



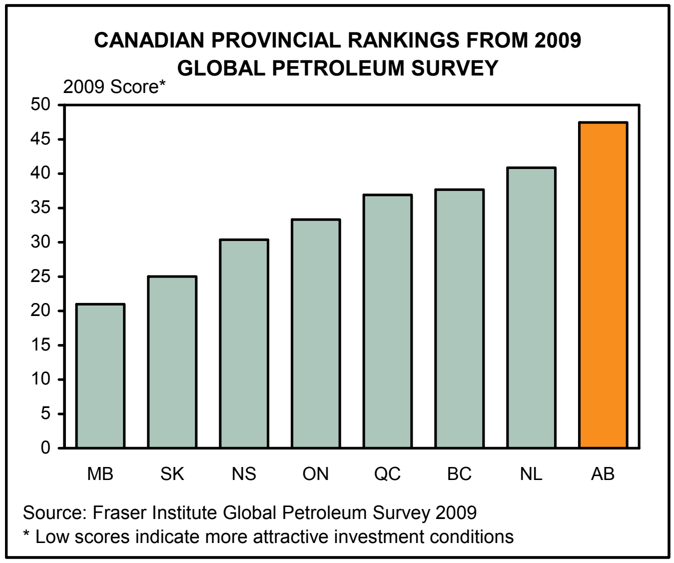
The reason for the deterioration in Alberta's competitive position stems from more than just geology and technology. The legacy of the 2006-07 cost bubble, the surge of the Canadian dollar and a tightening in the province's royalty structure following the 2007 Royalty Review have also conspired to hold up the finding and development costs of conventional – and unconventional – resources. Depending on market price and production levels, natural gas royalties were raised from 15-35% to 15-50%, effective January 1, 2009, although low productivity wells could cut the royalty rate to 5%. By comparison, natural gas royalties in B.C. have ranged from 9-27% contingent on price. At low natural gas prices – say under US$5-6 – Alberta royalties remained competitive, even after the 2007 reform. It is when prices and production rates are at a higher plateau that the reforms have taken a bite out of competitiveness in the province's natural gas industry.

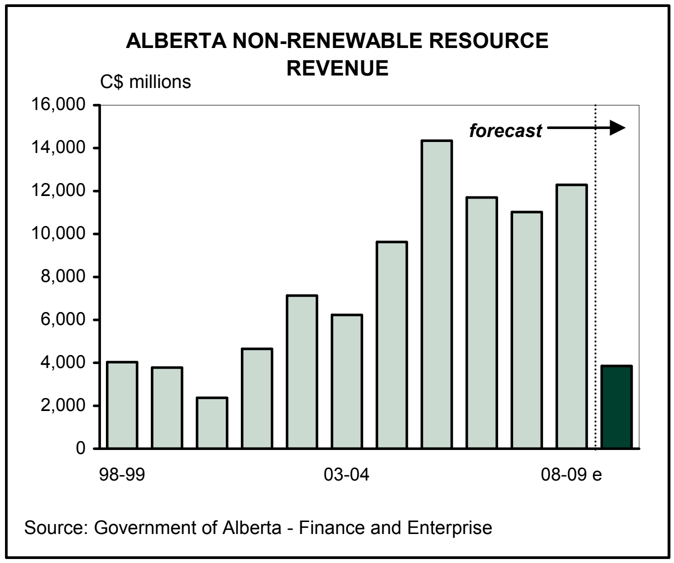
The perceived negative impact on Alberta's competitive standing has been borne out in the Fraser Institute's Global Survey of Petroleum Executives, which ranks jurisdictions in terms of attractiveness as a location to invest in the oil and gas sector. In the 2009 edition, Alberta was found to be the least attractive among the eight Canadian provinces covered as a place to invest. U.S. jurisdictions occupy most of the top 10, led by Arkansas and Alabama.

More recently, the province has reacted to the deepest recession in the post-War period by providing temporary natural gas drilling incentives as part of a larger stimulus package. In March 2009, the Alberta government slashed its royalty rate to a maximum of 5% for at least a year and, in June, extended the program. The B.C. government has also responded by cutting its royalty rate on wells drilled between September and June 2010 to a mere 2% for one year. These moves were welcomed by the industry as greatly increasing competitiveness on the North American landscape. That being said, the challenge is that many investors are unlikely to build their companies based on temporary royalty incentives.

Ample gas supply at prices of US$6-7

Given the sheer size of the developments involved, this shift in cost landscape will have implications for the longer-term direction of natural gas prices. Whereas there have been concerns earlier this decade about longer-term supplies in the North American market, there now appears to be as much natural gas as required at prices of US$6-7.



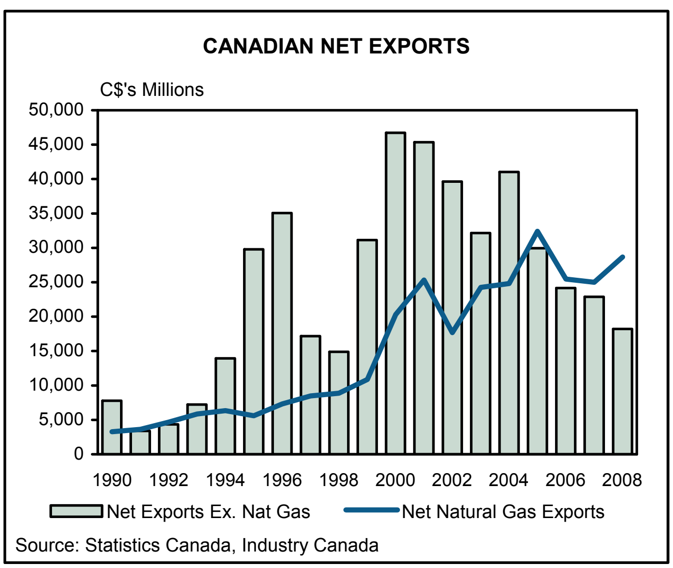


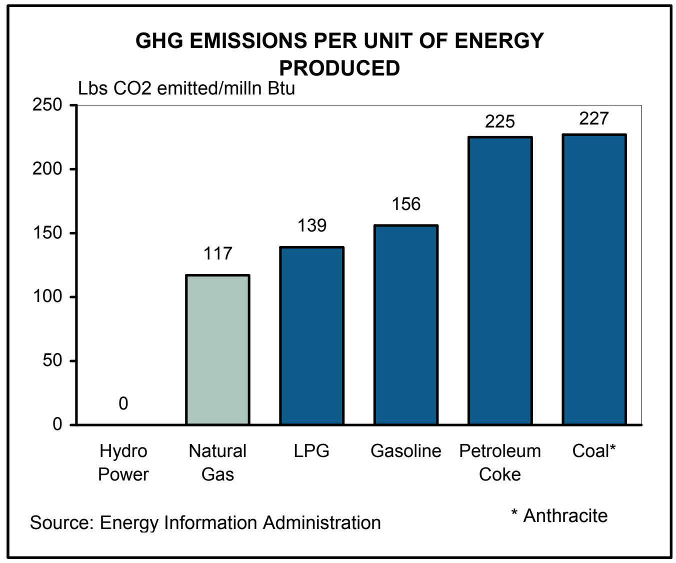
As such, expectations of long-term prices being sustained above $7 now seem a distant memory. The improving economics of U.S. onshore production has also taken some the shine off prospects for liquefied natural gas (LNG), which faces the competitive disadvantage of higher transportation costs.

Risk not just to gas industry but entire economy

The shifting momentum is not merely a risk facing the Alberta natural gas industry but the entire provincial economy. Based on value of Canadian production (of which Alberta accounts for about four fifths) crude oil has jumped ahead of natural gas since 2006, reflecting in part an improvement in pricing in favour of crude. Yet the natural gas industry remains a centrepiece of income, exports and government revenues in Alberta.

- Natural gas in Alberta drives about $35-40 billion per year in annual production value, an amount equal to more than one-tenth of the entire Alberta economy.
- As many as 140,000-150,000 jobs in Alberta are directly tied to the province's oil and gas extraction and services industries. While no breakdown exists across oil and gas, it is safe to say that at least 60,000 jobs (3% of total provincial employment) are linked to the natural gas industry.
- Factoring in indirect jobs would push this count up significantly. And, here, we're not just referring to the recycling of income paid within the natural gas industry to local businesses. The oil sands and petrochemicals industry, for example, are two vital sectors that benefit significantly from domestic production of natural gas feedstock.
- Between FY 00-01 and FY 06-07, natural gas generated $43 billion in royalties or about 2/3 of Alberta's total non-renewable resource royalties. This excludes the benefits to corporate income tax revenues.
- This year, the problems in the natural gas industry have served a reminder of the importance of natural gas to government revenues. Natural gas royalty estimates for FY 09-10 are on track to come in at $1.9 billion, under half of that budgeted and well down from over $5 billion last year. (Each $1 decline in the gas price costs $1.4 billion in foregone revenue.)





- In 2008, natural gas comprised 7% of Canada's commodity exports and contributed about $30 billion (or two-thirds) to Canada's trade surplus.

Too early to rule out the Alberta natural gas industry

While the downside risks facing Alberta's natural gas industry are significant and growing, it remains far too early to throw in the towel. The momentum has recently been swinging towards jurisdictions that have established shale plays. Yet it is important to keep in mind that the shale gas industry remains in its infancy. Not only does its short history complicate the challenge of accurately estimating reserves, but further technological advances will be required to realize on much of shale's potential. And then there are environmental concerns associated with shale gas that could be an impediment to investment, such as contamination of water.

The recent experience makes it clear that the industry doesn't stand still for very long, making straight-line forecasting a precarious game. Just as technological advancement has hurt Alberta's traditional advantage in natural gas it will hopefully return as its saviour. Further innovation in the industry could open the door to increased recoveries of existing conventional reserves and provide a major shot in the arm to Alberta's non-conventional industry, which as noted, also offers significant potential. Still, such a shift back in the pendulum will not occur by luck, but will require a competitive – and stable – royalty and tax structure, regulatory burden and significant support for infrastructure and R&D. Indeed, the province is no stranger to flexing its innovative muscles, as the development of the oil sands attests to.

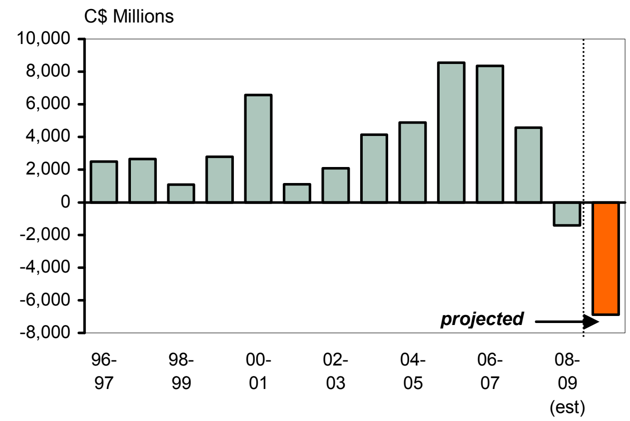
The downside risks to Alberta's natural gas industry – an overall economy – would be even greater if the long-term outlook for natural gas demand was in decline. But if anything, prospects on that front remain bright. Global warming undoubtedly poses a challenge to residential heating demand, but opportunities abound in the electricity and transportation sectors. With natural gas emitting about half as much greenhouse gas emissions (GGE) as coal per unit of energy produced, the commodity could be used to generate a growing share of base-load power or, by compressing the gas, a large number of vehicles in the future. The dramatic shift in fortunes surrounding U.S. supply suggests that the United States, in particular, could embrace natural gas as a primary energy source. The shift towards gas in the energy mix could be mirrored in other international markets that that are striving to meet their GGE targets. The Alberta natural gas industry could position itself to take advantage of export opportunities to those markets that can't satisfy their own growing needs for natural gas. For example, the proposed LNG terminal at Kitimat, British Columbia would support increased shipments of gas from the Western Sedimentary Basin to the growing Asian market.

Alberta natural gas won't return to former prominence

That being said, it is important to be realistic. So much has been written about the declining role of manufacturing within the Ontario economy. In the same vein, natural gas will never return to the same prominent place it occupied in the Alberta economy only 5-10 years ago. Development is continuing to forge ahead in the oil sands, but even there, long-term growth prospects are clouded by the risk of carbon pricing. These question marks underscore the necessity of laying the groundwork for other industries to emerge. And as we note in our September 2007 report, *The Tiger That Roared Across Alberta*, the most powerful way to diversify is to continue the province's past formula of creating a winning overall business environment. We argued that the focus of policy would have to be fixed on removing the remaining impediments to growth in the tax system, knocking down barriers to international migration, boosting trade through agreements like TILMA, raising education rates and on strengthening infrastructure. Above all, the government would need to set aside enough oil and gas revenues in order to protect public services in the future from the risk of declining non-renewable royalties.

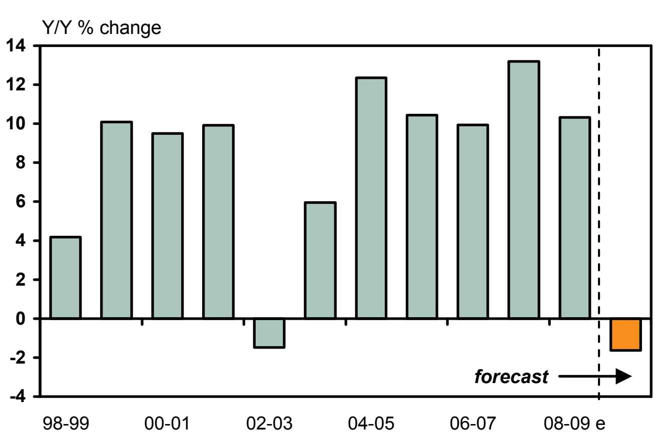
In 2007, the government enjoyed the prospects of large surpluses as far as the eye could see; today, it's facing a large budget shortfall in the order of 2% of GDP. Even though budget prospects should improve in FY 10-11 with a helping hand from higher natural gas prices, a structural deficit will likely remain an issue. The developments in the natural gas industry over the past two years have not only highlighted the long-term risk to non-renewable resource royalties – and thus, saving for the future – but also the importance of maintaining a stable royalty structure in an increasingly competitive environment. Put simply, the overall balancing act facing policymakers in Alberta has got even more delicate since our comprehensive report was released.

ALBERTA BUDGET BALANCE



Source: Government of Alberta: Finance and Enterprise

ALBERTA GOVERNMENT SPENDING



Source: Government of Alberta: Finance & Enterprise

The rapid spending years of the past half decade – when annual outlays rose at a double digit rate – will need to be relegated to Alberta's history books. Parsimony in non-priority areas will need to be the watchword even once surpluses re-emerge. On the plus side, the growth-related pressures that drove much of the robust spending increases earlier this decade appear unlikely to return over the foreseeable future.

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