



# Publication

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### THE NATURAL GAS STORY

Both globally and in North America, natural gas is poised to play a bigger role in meeting the energy needs of consumers, businesses and communities. Recent discoveries of large unconventional (shale) gas deposits in the United States, Canada and parts of Europe have heightened awareness that natural gas is an abundant, widely distributed and cost-effective energy source. Many analysts also see natural gas as a “foundation” fuel that can help to pave the way to a lower-carbon energy future. And with a number of countries – Japan, Germany, etc. – now looking at reducing their reliance on nuclear power, the global appetite for natural gas seems poised to increase markedly in the coming years.

#### Global Picture

World natural gas demand rebounded from the 2009 recession, jumping a surprising 7.4% last year – one of the strongest growth rates in four decades. Looking ahead, the latest long-term outlook from the International Energy Agency (IEA) shines a spotlight on the growing profile of natural gas.<sup>1</sup> The IEA report makes clear that natural gas is destined to loom larger in the global energy mix.

- The IEA finds that, under all feasible planning scenarios, natural gas “is the only fossil fuel for which demand is higher in 2035 than in 2008...”<sup>2</sup>
- Assuming governments step up efforts to contain greenhouse gas emissions, world-wide demand for natural gas is expected to surge by 44% by 2035 – an increase of 1.4% per year. This far surpasses demand growth for the other fossil fuels examined in the IEA’s report.
- Globally, power generation represents the biggest gas-using sector and will continue to be the primary driver of demand growth in the coming decade.

Although the use of natural gas is expanding across the world, the trend is most pronounced in China and other emerging markets.

- In its baseline scenario, the IEA foresees China’s consumption of natural gas climbing by almost 6% per year from 2008 to 2035, with the country accounting for fully one-fifth of the total increase in global demand over the period. If China takes more aggressive action than assumed in the IEA baseline to switch from coal-

<sup>1</sup> International Energy Agency, World Energy Outlook (Paris: IEA, 2010).

<sup>2</sup> Ibid., Executive Summary, p. 7.



fired electricity to less carbon-intensive fuels, the country’s demand for natural gas would rise ever faster.

- In the Middle East, natural gas production (not consumption) is projected to double by 2035, reflecting the region’s ample endowment of low-cost resources.

The IEA also points to the continued expansion of natural gas reserves in North America and some other regions as a factor shaping the global energy outlook. This development promises to limit price increases in the medium-term, even as world-wide demand for natural gas steadily grows.

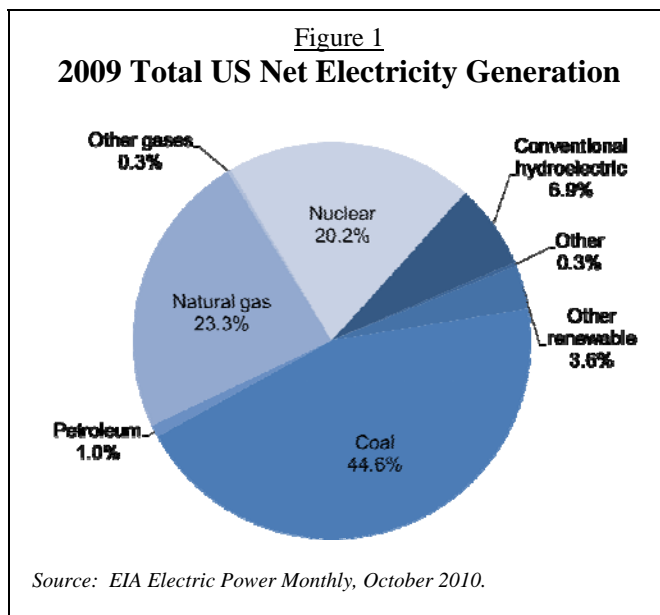
### United States

The latest update from the US Energy Information Administration (EIA) confirms the International Energy Agency’s analysis and reinforces the view that natural gas has a bright future in what is still the world’s biggest economy. Currently, US natural gas consumption by broad sector is divided as follows: residential-commercial uses (mainly heat) – 34.5%; industrial – 32.4%; and electric power generation – 30.2%.

The EIA’s 2011 Annual Energy Outlook points to a dramatic increase in the size of America’s natural gas resource base. Indeed, the “technically recoverable” shale gas resource in the US is now estimated to be 50% larger than it was just one year earlier.<sup>3</sup> With a bigger resource, the EIA forecasts a substantial increase in production and consumption of natural gas, along with prices for the commodity that are lower than it anticipated previously. Under the EIA’s latest base case forecast, the annual average natural gas well-head price stays under \$5 per thousand cubic feet through 2022, before climbing thereafter. Prices in this range are well below those seen over much of the past decade. However, it must be noted that some analysts foresee a quicker recovery in natural gas prices within the next several years.

With greater domestic production, US net imports of natural gas are expected to decline, posing a problem for Canadian producers who have long shipped a large portion of natural gas output to the United States. A new network of pipelines is already causing Western Canadian gas producers to lose markets in Central Canada and parts of the US.

Natural gas powers approximately 23% of US electricity generation (see



<sup>3</sup> U.S. Energy Information Administration, Annual Energy Outlook 2011, Early Release Overview (December 2010).



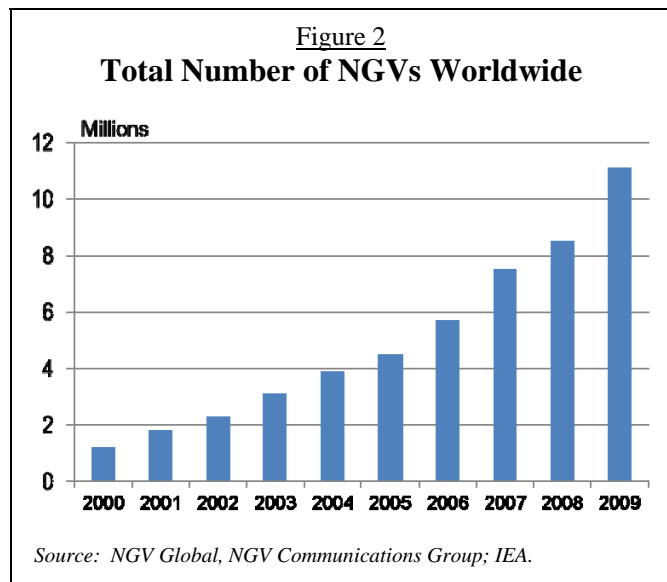
Figure 1). This share should rise over time as more American utilities shift from coal to less carbon-intensive natural gas – a trend that is likely to accelerate given the subdued price outlook for natural gas and the difficulties of financing and gaining regulatory approval for new nuclear power plants. An additional reason to expect growing US demand for natural gas is the boom in domestic unconventional gas reserves. Today, shale gas accounts for almost one quarter of US production, up from 4% five years ago, and this figure is sure to rise over time. That said, the EIA’s 2011 reference case projection actually assumes a fairly modest increase in total US natural gas consumption – from 22.7 trillion cubic feet in 2009 to 27 trillion cubic feet by 2035. This forecast seems low, considering the domestic abundance of natural gas, its attractiveness in the power and industrial sectors, and ongoing pressure to reduce greenhouse gas emissions. Upon closer inspection, it turns out that the EIA’s reference case assumes very limited US policy action to address greenhouse gas emissions over the medium-term. This assumption could well prove to be mistaken. And while the EIA base case sees natural gas playing a larger role in electricity generation and assumes somewhat higher natural gas consumption in the industrial sector, its projections do not incorporate any incremental demand for the commodity in the transportation sector (the biggest source of US delivered energy consumption).

### **Natural Gas in the Transportation Sector**

Today, natural gas is only a small niche market in transportation: globally, it supplies less than 1% of total road fuel consumption. Looking ahead, there is room to boost its role as a transportation fuel. Apart from its abundance, natural gas has the potential to significantly reduce carbon dioxide emissions from vehicles. On average, a 25-30% reduction in carbon dioxide equivalent emissions can be achieved, on a wells-to-wheels basis, from replacing gasoline (refined petroleum) in light duty vehicles with compressed natural gas.<sup>4</sup>

A 2010 report from the International Energy Agency focuses on greater use of natural gas vehicles (NGVs) as part of a longer-term shift toward more sustainable forms of transportation.<sup>5</sup> The number of NGVs on the world’s roads has risen significantly since 2000 (see Figure 2), reaching 11 million by 2009. These vehicles consist of passenger cars, buses and heavy-duty trucks,

with the mix varying across countries. Worldwide demand for NGVs will depend on advances in technology, the evolution of public policies affecting greenhouse gas



<sup>4</sup> International Energy Agency, The Contribution of Natural Gas Vehicles to Sustainable Transport (Working Paper, 2010), pp. 7-8.

<sup>5</sup> Ibid.

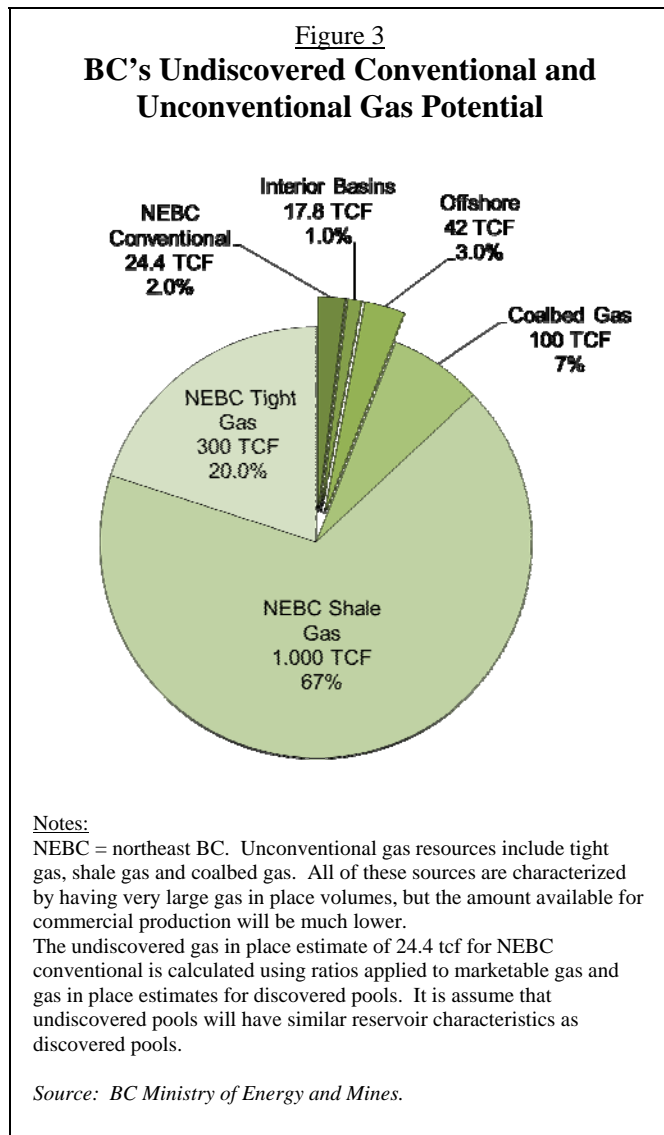


emissions and local air quality, future market prices for various energy commodities, and the development of supporting transmission and distribution infrastructure. Analysts generally agree the best prospects for NGVs are in the heavy vehicle sub-sector (trucks and buses). To date, the take-up of NGVs has been much greater outside of North America than in the United States or Canada (including BC). This has led some analysts to call for short-term policy incentives to entice North American fleet customers to switch to natural gas.

### A BC Perspective

British Columbia stands to benefit from a world in which natural gas occupies a more prominent place within the energy supply mix. The province is endowed with extensive natural gas resources – both conventional resources as well as massive “unconventional” sources such as shale gas, tight gas, and coalbed gas. BC is well-positioned as a natural gas supplier thanks to the size of its resource base, the volume of gas delivered per well, the availability of infrastructure to connect supply to market, the presence of a well-established industry with many knowledgeable operators, and a solid provincial regulatory framework. The competitive challenges facing the industry in BC include distance from end-use markets, high transportation costs, and stiff competition from gas producers located closer to US population centres.

As of 2009, natural gas production in BC was 3.1 billion cubic feet per day, adding up to 1.1 trillion cubic feet (tcf) per year, the second highest in Canada. Three years ago, the province’s remaining marketable conventional reserves were pegged at about 18 tcf. The Ministry of Energy and Mines recently published updated estimates (see Figure 3). It now projects conventional undiscovered natural gas potential of 42.2 tcf, plus 300 tcf of “tight





gas,” 100 tcf of coalbed gas, 42 tcf of offshore gas, and small amounts of other gas.<sup>6</sup> On top of this is a massive unconventional shale gas resource of roughly 1,000 tcf scattered across various parts of the province (notably the Horn River and Montney basins). By any standard, then, BC is richly endowed with natural gas. This large and growing resource will be available to serve export markets and to help meet domestic energy requirements.

The development of large unconventional natural gas plays in British Columbia, Alberta, and parts of the United States has had a profound impact on the industry’s understanding of where the best growth opportunities lie. With North American supplies rising, there is growing interest in exporting Canadian natural gas to offshore markets, particularly in Asia, where it is likely to command a price premium relative to the North American market. British Columbia is at the centre of this re-appraisal of the industry’s future market orientation. Absent additional export markets, there is a very real risk that BC natural gas will become “stranded” and thus diminish in economic value.

A number of proposals to construct liquefied natural gas (LNG) export terminals (and related pipeline infrastructure) along BC’s west coast are under consideration, with several energy companies committing capital to spur the development of an LNG export capacity in the province. Industry experts believe there may be room to quadruple BC’s production volumes, assuming steps are taken to convert BC-produced natural gas into LNG destined for offshore markets. Globally, LNG trade is growing rapidly: in the past five years, worldwide LNG production capacity has expanded by 58%, with LNG’s share of the overall trade in natural gas rising from 23% to 31%.<sup>7</sup>

As a gas-rich jurisdiction, it also makes sense for British Columbia to look at stimulating domestic demand for the commodity in a range of areas, including for power generation, in industrial uses, in transportation, and in the residential sector. On the power generation side, natural gas has a number of advantages from both a consumer and a public policy perspective – competitive costs, reliability, time to market (gas-fired plants can be built relatively quickly and can be sited close to base load demand), the availability of private sector funding, and a lower carbon footprint compared to some other energy sources.

In the case of transportation, the province benefits from the presence of Westport Innovations, which has pioneered alternative fuel low-emissions technologies that enable engines to run on cleaner-burning fuels such as compressed natural gas, liquefied natural gas and biofuels. While the purchase price of natural gas trucks is higher than conventional diesel trucks, the life-cycle operating costs are lower and the environmental footprint is smaller. As home to a global leader in this technology space, the province should consider ways to encourage the use of natural gas vehicles as a means to strengthen British Columbia’s emerging clean technology cluster.

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<sup>6</sup> Ministry of Energy and Mines and National Energy Board, Ultimate Potential for Unconventional Natural Gas in Northeastern British Columbia’s Horn River Basin (May 2011).

<sup>7</sup> “Bouncing Back,” The Economist (June 11, 2011), p. 78.