



## The ongoing struggle of international companies to sustain their natural gas production and reserves status in global terms



Major companies producing and trading natural gas extensively on an international basis are progressively losing ground to the major natural gas exporting nations. A comparison of the natural gas average daily production and year-end proven reserves for years 2002 and 2015/2014 for selected major corporations and nations highlights this situation (Table 1).

The nine selected companies included in Table 1 in 2002 contributed some 19.4% of average annual daily natural gas production worldwide from a holding of some 4.7% of the global total of proven natural gas reserves. Despite collectively increasing from 2002 to 2015 in absolute terms both production and proven reserves holdings this group their contribution in global terms has diminished on both counts. In 2015 these nine companies contributed some 15.9% of average annual daily natural gas production worldwide from a holding of some 4.0% of the global total of proven natural gas reserves. Also, collectively, their reserves life index (proven reserves/annual production - R/P ratio) also dropped over that period from 15.0 years to 13.9 years.

These figures suggest that these companies are finding it unsustainable to produce such a significant share of global gas production from a relatively small and diminishing proven reserves base. Of course, proven reserves are only a part of the total natural gas resource holdings of these companies, and with significant capital investments, there is significant potential for them to upgrade lower categories of reserves and resource holdings into proven reserves to replace those being diminished by ongoing production. However, despite hundreds of billions of dollars of capital investment by these companies in the period 2002 to 2015 into large-scale gas export projects they are failing collectively to do this. To an extent these companies are a victim of their own success as gas producers, as the R/P ratios illustrate – a large annual production volume will continue to place this group of companies under pressure to replace their proven reserves base. By not doing so their R/P ratios will continue to decline.

The lower part of Table 1 places the dilemma of the major companies in context of the production and proven reserves figures of the major natural gas exporting nations for the years 2002 and 2014. The thirteen countries included increased their gas production in absolute terms by some 35% from 2002 to 2014 and managed to maintain essentially two-thirds of global natural gas supply. These nations also increased their proven natural gas reserves by some 8% in absolute terms in that period, but still managed experience a reduced share of global natural gas proven reserves, i.e., from some 59% in 2002 to 53% in 2014 of global proven reserves. This reduction highlights the diversification of

natural gas resource developments worldwide, and the increased number of nations with more limited gas resources exploiting the resources they have available. The R/P ratios of these nations collectively also declined from 2002 to 2014, but remain more than three times higher than those of the nine organisations considered. The fall in collective R/P ratio at the national level is accounted for by large-scale resource developments in that period in certain countries (i.e., Australia, Qatar, Nigeria and Norway, in particular, leading to a reduced R/P ratio in those countries). Canada, Norway and the United States have substantially lower R/P ratios than the other nations considered. The United States is alone in managing large scale gas production, proven reserves and R/P increases from 2002 to 2014; due to shale gas discoveries and developments.

### 1. Comparative annual production and reserves performance of major companies

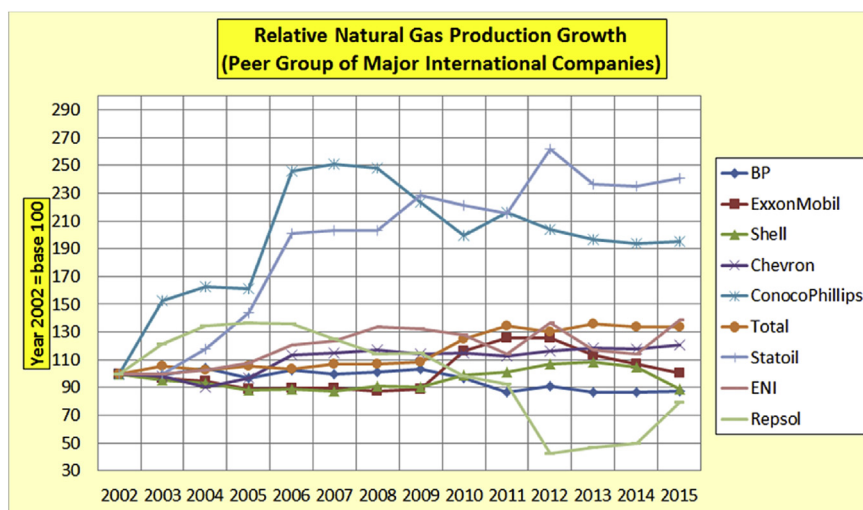
Figs. 1–3 illustrate the contrasting production and proven reserves performances of the nine major companies listed in Table 1 on a year-by-year basis from 2002 to 2015. Six of the nine companies managed to grow production and proven reserves over that period. Repsol and Shell failed to grow either, BP failed to grow production, and ENI just failed to grow reserves. Large increases in production and/or reserves, from one year to the next in Figs. 1 and 2, typically indicate major corporate acquisitions (e.g. ConocoPhillips of Burlington Resources – 2006; Statoil of Hydro – 2006; ExxonMobil of XTO – 2010; Repsol of Talisman Energy – 2015). On the other hand, significant decreases in production and/or reserves, from one year to the next in Figs. 1 and 2, typically indicate major asset sales (e.g. Repsol – 2005; ConocoPhillips – 2009), nationalisation (The YPF portion of Repsol – 2012), or write-downs/restatement enforced by regulators (Shell – 2003).

R/P ratios have for the most part remained in the 10–16 year range from 2002 to 2015 (Fig. 3). Of these companies, Only Statoil had a natural gas R/P ratio below 10 years in 2015.

The nine companies (Table 1) performed much better in terms of sustaining their natural gas production and reserves holdings than they did with respect to crude oil and natural gas liquids. Figs. 4 and 5 illustrate that only three of the nine companies (i.e., BP, ConocoPhillips and Statoil) in the period 2002 to 2015 managed to increase liquids production; helped in all three cases by acquisition, and in the case of BP its Russian corporate holdings. Those three companies plus ExxonMobil managed to grow their proven liquids reserves. Chevron, ENI, Repsol, Shell and Total failed to grow liquid production or proven reserves.

**Table 1**  
Company Data are from the annual report submissions (2003–2015), and submissions by these companies to the U.S. Securities and Exchange Commission (SEC). National and global data are from the BP Statistical Review of World Energy (2015). Note 1: some of the corporate production and reserves figures (upper part of table) also form part of the national figures (lower part of table). Note 2: national and global figures are for year-end 2014, whereas corporate numbers are for 2015. R/P means proven reserves to annual production ratio, also referred to as the reserves life index.

Natural Gas production & proven reserves comparisons for selected organisations & nations						
	Daily production		Proven reserves		R/P ratio	
	Millions cubic feet/day		Billions of cubic feet		Years	
	2002	2015	2002	2015	2002	2015
<b>Major international natural gas companies</b>						
BP	8707	7625	42,959	44,197	13.5	15.9
Chevron	4375	5266	19,335	29,437	12.1	15.3
ConocoPhillips	2307	4501	16,040	17,193	19.0	10.5
ENI	3306	4584	18,629	18,295	15.4	10.9
ExxonMobil	10,459	10,515	55,718	60,210	14.6	15.7
Repsol	2497	1978	18,204	10,026	20.0	13.9
Shell	9422	8380	53,438	37,375	15.5	12.2
Statoil	1822	4384	13,470	14,624	20.3	9.1
Total	4532	6052	21,723	32,206	13.1	14.6
<b>Combined 9 companies</b>	<b>47,427</b>	<b>53,285</b>	<b>259,516</b>	<b>263,563</b>	<b>15.0</b>	<b>13.6</b>
<b>Global total</b>	<b>245,015</b>	<b>334,822</b>	<b>5,505,183</b>	<b>6,603,705</b>	<b>61.6</b>	<b>54.0</b>
<b>% Contribution of 9 companies</b>	<b>19.4%</b>	<b>15.9%</b>	<b>4.7%</b>	<b>4.0%</b>		
<b>Selected major natural gas exporting nations</b>						
		<b>2014</b>		<b>2014</b>		
Algeria	7776	8060	159,662	158,991	56.3	54.0
Australia	3155	5350	84,070	131,944	73.0	67.6
Canada	18,177	15,678	58,739	71,663	8.9	12.5
China	3265	13,011	48,728	122,110	40.9	25.7
Egypt	2641	4712	58,492	65,174	60.7	37.9
Indonesia	6542	7101	90,262	101,498	37.8	39.2
Malaysia	4807	6427	88,956	38,064	50.7	16.2
Nigeria	1746	3733	176,394	180,030	276.8	132.1
Norway	6337	10,529	74,730	67,847	32.3	17.7
Russia	52,133	55,994	1,105,052	1,152,326	58.1	56.4
Qatar	2854	17,147	910,140	865,842	873.6	138.3
United Arab Emirates	4198	5588	213,706	215,012	139.5	105.4
United States of America	51,857	70,461	186,868	344,856	9.9	13.4
<b>Combined 13 countries</b>	<b>165,486</b>	<b>223,790</b>	<b>3,255,800</b>	<b>3,515,358</b>	<b>53.9</b>	<b>43.0</b>
<b>% Contribution of 13 countries</b>	<b>67.5%</b>	<b>66.8%</b>	<b>59.1%</b>	<b>53.2%</b>		
Note: 1		Note: 2		Note: 2		



**Fig. 1.** Natural gas annual production–growth trends for nine large international companies. Trends are shown relative to an index of 100 set for volumes reported in the 2002 from the annual report submissions (2003–2015), and submissions by these companies to the U.S. Securities and Exchange Commission (SEC) (see Table 1). Values below 100 on the vertical scale indicate decline relative to 2002 production levels; Values above 100 on the vertical scale indicate growth relative to 2002 production levels.

Shell and Repsol performed significantly worse than their peer group during this period with respect to both natural gas and liquids. To some extent when production and proven reserves are considered on a barrel of oil equivalent (BOE) basis, for some of these companies, it is their modest growth in natural gas that is

masking a progressive decline in liquids (e.g., Chevron and Total). When oil prices are high it is clearly more profitable for these companies to focus their efforts on developing their oil resources in preference to natural gas, which was clearly the case between 2010 and 2015. Nevertheless, Fig. 4 indicates that almost all of these

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