



UNCONVENTIONAL WISDOM

Conventional wisdom, since the oil downturn began in 2014, has been that demand will peak and technological innovation will mean any future supply gap can be met rapidly by shale basins in the US. Actually, conventional oil still has a role to play, nonetheless the pace of the discovery has plunged in the last decade. The consequence is an overreliance on existing reserves to meet future demand. Clearly, the question is less about resources and more about the price and speed at which they will be required to balance the market. In fact, they will need to be brought to market at the fastest pace seen in oil's history — the industry needs to get to work.

Secondo l'opinione dominante dal 2014, il picco della domanda e la rapida entrata in operatività dei bacini shale oil negli Stati Uniti consentiranno di far fronte a qualsiasi futura carenza d'offerta. In realtà, cruciale sarà ancora il ruolo giocato dal petrolio convenzionale, le cui scoperte sono tuttavia crollate da un decennio a questa parte. La conseguenza è una sovraesposizione sulle riserve esistenti per soddisfare la domanda futura. Più che la presenza delle risorse, la questione riguarda il prezzo e la velocità con cui dovranno essere estratte per bilanciare il mercato. Queste infatti dovranno essere portate sul mercato a un ritmo inedito nella storia del petrolio: sta all'industria rimboccarsi le maniche.

Conventional wisdom, since the oil downturn began in 2014, has been that demand will peak a lot sooner than previously expected and technological innovation will mean any future supply gap can be met rapidly by shale basins in the US. These two ideas, accepted as gospel by most in the industry, have significantly altered the way that producers invest and culminated in the oil industry cutting Capex for three consecutive years, from 2015 to 2017. This marks the longest and deepest investment

trough in the history of oil and has left many scratching their heads about its potential impact over the coming years.

1. BACK TO THE FUTURE

At Energy Aspects, we see demand continuing to rise, at least until the mid-2030s, when it is expected to peak just shy of 108 mb/d, and it won't then sharply fall as key supports—such as aviation and petrochemical demand—remain somewhat entrenched. So, between now and 2040, the industry will need to bring an extra 30 mb/d to the market. Shale is expected, in fact required, to meet this demand over the medium term. We forecast that shale output will peak above 11 mb/d in the 2030s. However, even with a near doubling in output from current levels, shale will still represent a mere 10% of the global liquids market. Clearly, conventional oil still has a role to play, and this is where the challenge facing the industry is being grossly underestimated. Buried in the euphoria of rapid production growth from unconventional liquids, under the pretext of value over volume, conventional oil has well and truly become a back-seat driver in a world of shale, climate change and energy transition. And this is the crux of the problem.

But before delving into this, let's briefly set the scene by looking at trends in the discovery of conventional oil, which have been evol-

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ving for more than a decade now. Between 2000 and 2014, on average 10 billion barrels per annum were discovered. However, over the past three years, this plunged to a paltry 3 billion barrels per annum as producers combatted low oil prices by taking an axe to exploration spend. Operators justified a dwindling reserves-to-production ratio by claiming that the industry no longer requires a large inventory buffer, dismissing it as a poor use of capital.

2. TALL ORDER

The corollary of a precipitous drop in Capex and thus discoveries is an over-reliance on existing reserves to meet future demand. Reduced exploration and reserve replacement will ultimately result in oil being extracted faster than it is being replaced, which accelerates depletion rates. Field depletion, alongside declines, are among the most fundamental concepts in the current debate about future oil supply. Decline and depletion rates are related, but they are not identical. Decline rates refer to the annual reduction in the rate of production from a field after peak output has been achieved. Depletion, on the other hand, refers to the rate at which oil is produced from a field expressed as a fraction of either the estimated ultimate recovery (EUR) or the remaining reserves.

Meeting future demand from existing reserves is a tall order, especially when one considers that 70% of non-OPEC reserves have been depleted and will be consumed at a rate of 4% per year between 2019 and 2040—twice the rate considered sustainable. Typically, a field moves into decline after 40% of its reserves have been depleted. In order to offset a declining conventional output trajectory, the industry will need to get to work on finding the 600 billion barrels of conventional oil that will be needed.

3. THIS OIL IS THERE, BUT CAN IT BE DEVELOPED QUICKLY ENOUGH?

Clearly, the question is less about resources and more about the price and speed at which they will be required to balance the market. In an era in which investors have a myopic focus on returns over investing for portfolio longevity, the popular belief is that \$70 oil will be a sufficient price to encourage investment. Our analysis suggests that 15 mb/d of oil needs to be brought online through higher recovery rates of existing resources and development of known resources. A further 15 mb/d of the 30 mb/d supply gap is expected to come from the development of resources that have yet to be found. Providing some context on this point using historical development cycles highlights the enormity of the challenge that lies ahead.

4. A CONVENTIONAL REVOLUTION IS REQUIRED

Discoveries peaked in the 1955-1964 period, and the subsequent development of giant fields such as Ghawar (KSA), Samotlor (Russia) and Gachsaran (Iran), which rank among the largest in the history of the oil industry, yielded a period of rapid production growth. Saudi Arabian and Russian output each rose from 1 mb/d to 8 mb/d over 20 years, while Iranian output rose from zero to 6 mb/d over a similar time period. In short, from 1954-1974, development of giant fields helped production rise by 20 mb/d.

Back in the present, however, discoveries have been less frequent and have been getting smaller in size, while FIDs have only just started to be sanctioned again. Despite this, the market is somehow assuming, either through complacency or denial, that the as-yet-undiscovered resources will ramp up to 15 mb/d, matching a feat last seen almost five decades ago.

However, this entirely discour-

ts the reservoir complexity of the world's remaining oil. As has been seen in the development of several other industries, the low-hanging, easy-to-develop resources are always explored, developed and brought to market first. Over time, higher prices and technological evolution will allow for the development of harder-to-reach resources, be it from unconventional tight oil or the Arctic deepwater basins. Our analysis suggests that conventional as-yet-undiscovered resources will need to be brought to market at the fastest pace seen in oil's history.

5. PEDAL TO THE METAL

It is clear that operators will need to put the pedal to the metal to avoid a supply gap developing. Whichever direction the industry takes, the stage is set for a delicately balanced market in the coming years. In the short term, the only way to manage a looming shortfall is by re-visiting existing fields and implementing tieback-type developments. To develop a greenfield development from scratch at this point in the cycle is simply not an option. A good example here is the discovery of four billion barrels in Guyana, which marks the largest discovery in recent history. The discovery (2015) to first production (late 2020) cycle of almost six years has been accelerated by a severely depressed international offshore segment and a decision by Exxon to raise Capex counter-cyclically. A ramp-up to peak capacity will take another eight years.

By 2030, we assume redevelopment and reserve growth at existing fields will raise output by 10 mb/d. Currently, we estimate that 85% of conventional non-OPEC production has passed its peak, with redevelopments and new capacity additions simply holding conventional output constant since 2005. Clearly swimming against the tide, the market needs shale output to double, but this is whe-

re a new consideration comes in—how to manage cashflows.

6. *CONVENTIONAL VS UNCONVENTIONAL: THE CASHFLOW CONSIDERATION*

Ultimately, the objective of producing oil, be it for a government or private oil companies, is to generate positive returns and free cashflow over the long run. The ebb and flow of business cycles will always result in periods where the economics are adverse, as costs may have risen too far or prices fallen by too much. During such periods, producers adjust their behaviour to cope with the poor economic climate. Capex gets reduced, field development plans stall, and operators go back to the drawing board. This aptly describes the cycle we are only just emerging from after prices started to plunge in 2014. The oil market's entire demand growth since 2010 has been met from unconventional oil sources and liquids such as NGLs.

7. *CONVENTIONAL RESOURCE IS A CASH-GENERATING ASSET*

A rapid increase in production from shale has led to the popular belief that it alone can meet incre-



mental demand growth. But this is where the importance of conventional oil comes to the fore. Our analysis suggests that conventional oil has been largely cash-generative, whereas the shale industry has been cash-destructive through low (2015-17), medium (2017-present) and high (2010-2014) oil price cycles. Comparing this to another recent industry success story, wells in the Brazilian pre-salt can flow at 25 thousand b/d over periods extending beyond five years. The cost of a well can be recovered in a matter of months and after this point it spews out free cash month after month. Meanwhile, a shale well will typically flow at 10% of a pre-salt well and decline at double-digit

pace within one year. This will require immediate re-investment just to sustain output.

8. *A TRANSITION IN FULL SWING*

While ample opportunities exist to develop conventional assets across the globe, the recent establishment of IOCs as major shale operators suggest that the transition from conventional to unconventional is in full swing. Their entrance will no doubt spur further technological innovation, but considerable uncertainties remain for the future of conventional oil. What shape will Venezuela's rebound take? How will the latest round of sanctions impact the long-term trajectory of Iranian production? Will Libya's output ever be able to get back to pre-conflict levels?

While conventional oil has been the main focus of the industry since its inception, both conventional and unconventional resources have an important role to play in meeting future demand. Our analysis indicates that meeting global oil demand will require both the high-speed development of conventional resources that are yet to be found and a doubling in shale output beyond 2030. The trends are very clear—the industry needs to get to work.

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