Global Industries
Energy, utilities & mining

The wealth of nations

How well do countries' petroleum strategies align?

by Rick Roberge and Tom Collins, PricewaterhouseCoopers

PRICEWATERHOUSECOOPERS

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The energy industry of the 21st century has changed forever. This change is characterized by record high commodity prices, surging global demand that is outpacing the traditional energy supply, and an increasing discussion of alternative energy supplies. Perhaps most dramatic is the shift in the competitive landscape, stemming from resource depletion in developed regions such as the US and UK, with simultaneous growth in markets where government has historically played a dominate role in resource development.

In a time when the industry is undergoing more intense competition in search of new reserves, analyzing who the principle players are, and how they interact, can help to determine where the best opportunities are for new investment. International oil companies (IOCs), national oil companies (NOCs) and oilfield services firms are the key players in the global search for new supply. Collaboration is working effectively in some cases, but resource nationalization is also on the increase.

PricewaterhouseCoopers finds that the competitive behaviors of NOCs can be grouped into five distinct clusters, ranging from restricted access to competing head-on with the international oil companies. By mapping oil and gas reserves in the NOC host countries against production levels, the rationale for these competitive behaviors becomes even clearer. Countries with the largest reserves and greatest production have less need or incentive to open their fields to international partners. In contrast, countries with less reserves and lower production have a greater need to open their markets to outsiders, to gain the technological and commercial expertise that international oil companies and oilfield services companies can deliver.

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The Wealth of Nations

In 1776 when Adam Smith published his landmark work on economics, *An Inquiry into the Nature and Causes of the Wealth of Nations*,[1] the world was still using whale oil as a fuel for lighting. In his book, Smith postulated that a country's economic success was not particularly dependent on large reserves of commodities. While Smith's critique of mercantilism might have held true in 1776, in today's world, the wealth of nations is dictated by access to at least one commodity - hydrocarbons - whether by ownership or through trade. As a result, petroleum companies share a pre-eminence among the world's largest commercial organizations, whether they are public, private, or owned by the state.

The reservoirs of riches that would one day decide any nation's destiny were predetermined centuries ago. For the countries rich in oil and gas reserves, their resource endowments were shaped by nature in past eras as the faults, thrusts and traps of the planet's geological activity developed. Within the structure and stratigraphy of the sub-surface, the petroleum resources of the world had already accumulated, waiting in time measured in eons to be discovered and extracted.

Nature's previous propensity has brought favor to those developing nations owning resources. Nearly 93% of the world's proven conventional oil reserves are located outside of the Organization for Economic Cooperation and Development (OECD) members,[2] often in countries where the mineral rights are vested in the state and where the NOC is most often the economic engine of growth. By developing these hydrocarbon resources, the NOC often serves as the instrument of implementation of country policy. Certainly some regions of the world have benefited disproportionately.

The IOCs are fully aware of the resurgence of their reserve-rich NOC sisters, as they continue the daily struggle to maximize their own requirements to replace reserves. The future of any oil company is dictated by its ability to replace its production with new reserves on a cost-effective basis. It is a key performance indicator for public companies, minutely monitored by the capital markets. Booking reserves is the name of the game for the IOCs. However, the vast majority of the world's reserves are concentrated in the domain of the NOCs and the dynamics of that disposition certainly dictate strategic imperatives for all of the players.

The Changing Landscape

Nothing seems to draw more attention to the energy industry than rising prices. As the price of oil reached and surpassed $70/bbl, the public debate about energy supply and demand has moved to the forefront. With ever-increasing regularity, peak oil debates, ultimate reserves calculations, declining replacement statistics, geopolitical considerations, alternative resource initiatives, demand projections and supply constraints regale the literature and press. Amidst this noise, the industry, pundits and governments strive to determine the best way forward.

Much has been written recently about the importance of the national oil company in today's energy industry, and many in-depth studies, conferences and articles have examined how they have emerged on the world's stage. Higher oil and gas prices have boosted the NOCs financials, giving them better access to the tools and technology they have needed to develop their resources. Several recent studies have postulated how the NOCs might now alter the future of the sector, changing the balance of power. Many of these analysts have focused on the implementation and achievement of the NOC strategy and how it is affected by non-commercial, exogenous factors, such as the host country politics, social obligations or the lack of reinvestment of earnings.

Probing deeper into the issues and strategic implications for NOCs, PricewaterhouseCoopers decided to conduct personal interviews with top executives at several NOCs to ascertain their views on various topics in the strategic, financial and operational areas at their company. The opinions and conclusions these NOC executives shared over the past year regarding current issues and other lines of inquiry, including their changing relationships with international oil companies are presented in this article.

Controlling the Wealth

Gaining control of resources has become a higher priority among some developing nations. As the industry progresses further into the current cycle of resource nationalism, several questions arise. How strong is the correlation between the resource endowment of a developing nation and how it positions itself in the hierarchy of the petroleum sector? Just how much do the reserves and production volumes determine a country's hydrocarbon strategy? Clearly OPEC is the cartel that counts, but are there other alignments that can be discerned? Are these alliances the touch points for the IOCs to further their objectives? Can the current NOC strategies meet future global supply and demand scenarios? What are the implications for players outside of the NOCs and IOCs, such as the independents?

Whereas IOCs generally follow a business model that is driven by value creation, the NOCs have different drivers. Acting in various capacities on behalf of the state, the universe of NOCs cannot be regarded as homogeneous. Some NOCs primarily export resources, while others import; some NOCs focus on upstream operations, and others have predominantly downstream operations, and some are fully integrated. There are over 100 NOCs throughout the world, but only twenty or so are well-known and closely observed.

The continuum of capabilities displayed by these NOCs is fast becoming a topic of conversation in the world of petroleum policy, strategy, operations, finance and economics. In many respects the NOCs are similar to their private sector relatives, the IOCs, having the same general purpose of finding and developing hydrocarbons. But the manner in which the two develop their hydrocarbon resources often varies. Historically, the strategic drivers of the IOCs were distinct from those of the NOCs. The IOCs were driven by pragmatism, production and profit, whereas the NOCs were influenced by politics, policy and procedural practices. The level of difference is surely changing, but the rate of change is not equal among all NOCs.

During conversations with senior executives of several NOCs, it was apparent that they all faced similar issues, but had different perspectives, capabilities and priorities. The main strategic issues NOCs mention include increasing productive capacity and field development, commerciality and infrastructure availability. Reservoir management and manpower shortages were additional areas of concern. Many NOCs seek to have an arms-length relationship with their governments, but when pressed, will admit to getting caught between goals of commerciality and the common good.

Before attempting to answer the proposition regarding a correlation between resource riches and strategic direction, it is useful to look at the landscape, and reflect on the historical progression that has led to the current resurgence of the NOCs.

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The Evolution of the Industry

Broadly speaking, three distinct periods characterize the interaction between NOCs and IOCs, determined in part by prevailing crude prices. The figure below indicates the early industry years dominated by the large American and European oil companies, "the Seven Sisters," followed by a wave of resource nationalism of the Middle Eastern interests and the seismic shift brought about by OPEC. Later came re-establishment of the IOCs, primarily working with the NOCs through various contractual arrangements, most frequently Production Sharing Contracts (PSCs) negotiated directly or awarded by a tender process.

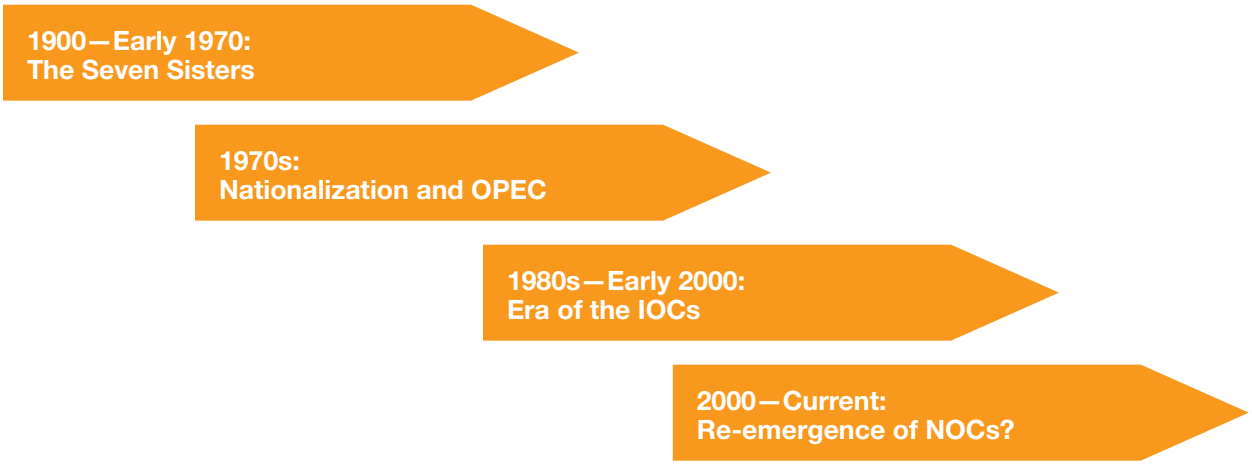

Figure 1: The evolution of the industry

Many would strongly suggest that the fourth era is a re-emergence of the national oil companies. The current high crude price environment has created opportunities for countries with state-owned energy companies to grab a larger take of the oil and gas profits. Venezuela, Bolivia and Ecuador, for example, have all changed the rules of the game for external players. Some NOCs have international aspirations, often driven by greater the need to supplement the local supply. The fact that they are now both partners and competitors to the IOCs provides a challenging environment for an industry seeking cost-effective reserve replacement opportunities.

From discussions with several executives, it is evident that some of the NOCs have an economic advantage that helps them win international projects. The NOC price decks used to forecast future revenues are generally higher than those used by the IOCs, while the hurdle rates are often many points lower. The combination of higher price forecasts and lower required returns provide favorable outcomes for progressing projects. Add to this the natural tendency for governments' preference to deal with one another, factor in the infrastructure arrangements that sometimes accompany such negotiations, and it is easy to understand why so many opportunities are going to the NOCs.

When questioned further on this subject, all of the NOCs interviewed saw themselves as having a distinct advantage over the IOCs. From their perspective, the NOCs cite that they can take a longer term view than their private sector counterparts who are driven more by periodic financial objectives. From the NOC perspective, this longer term view is thought to be more appropriate for implementing a policy of exploitation of their non-renewable resources.

The continuing emergence of the NOCs can be illustrated by comparing their share of production at two points in time. In 1970, at the onset of a wave of resource nationalism, world production was about 50 million barrels of oil per day (bopd). The NOCs controlled just 3 million bopd, while the remainder was split almost equally between US majors and other countries' majors. In 2005, with almost 80 million bopd production, the NOCs now had 54 million bopd, with the IOCs share reduced from 47 million bopd in 1970 to 26 million bopd in 2005.[3]

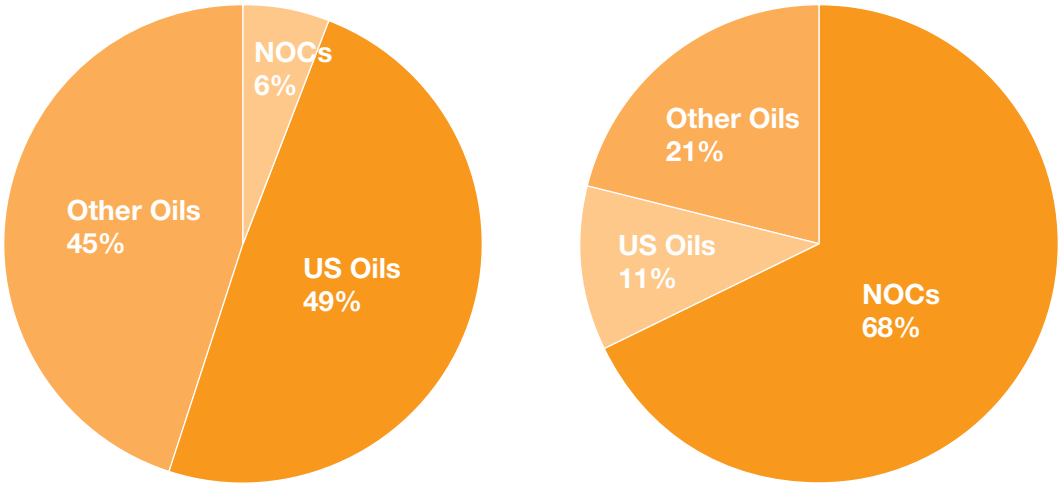

Figure 2: 1970 oil production (left) and 2005 oil production (right)

Today the NOCs rank as the world's largest petroleum companies. Using oil and gas reserves as the benchmark, 14 of the top 20 upstream oil and gas companies are national oil companies or recently privatized NOCs, according to Petroleum Intelligence Weekly.[4] On the production scale, the top six ranked companies are NOCs.

During discussions with executives, it was suggested that they are not uncomfortable in their role as leaders, although they are experiencing some of the same limiting factors as the IOCs. There is an industry-wide shortage of quality technical personnel, and all companies face a challenge to secure access to materials and equipment.

In response to inquiry about the importance of NOCs in the energy industry, all executives interviewed were quick to point out the necessity of a national oil company to be primarily responsive to and responsible for their country's interests. During the interviews, executives were asked to prioritize the company's top three objectives. The results included revenue generation for the country, creation of local employment, utilization of local goods and services, transfer of technology, overall economic development at the local level.

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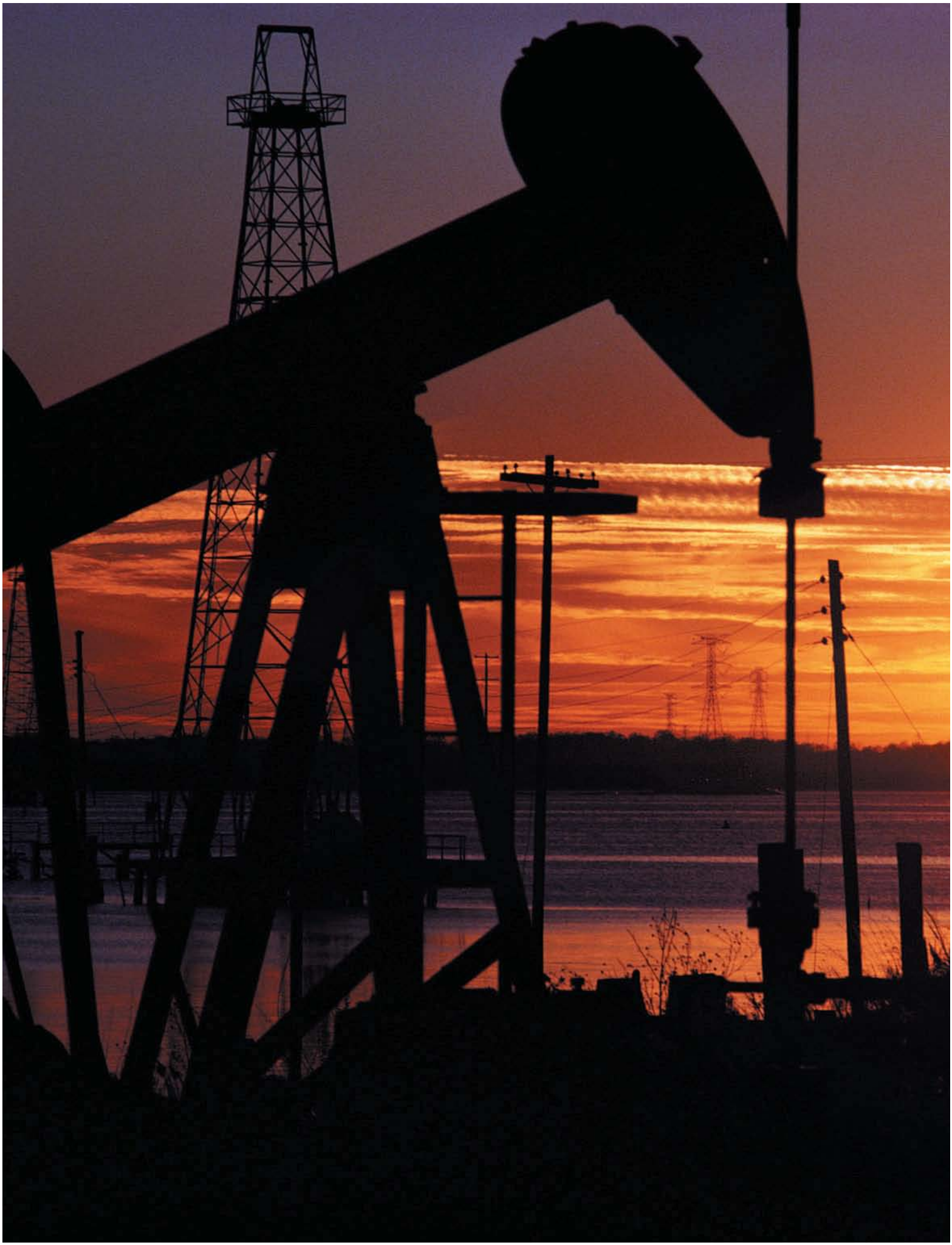

Wealth does Determine Strategy

To better understand the influence of the NOCs, it is helpful to identify a consistent means of comparison of the countries. Using traditional financial benchmarks or performance indicators is insufficient, since these statistics are not available for most Middle East countries. However, published production and reserves statistics are available for all countries. Not all countries have the reserves certified independently, but this data provides the best available means of comparison. Oil and gas figures are normalized to barrel of oil equivalents (boes).

Analysis of the top 25 countries with national oil companies indicates that they account for 85% of the world's proven reserves, expressed in boes.

Table 1 ranks the countries in question.[5]

There are clear, regional concentrations of natural resource wealth. Nearly 57% of the boe reserves are concentrated in the Middle East. Russia and the Commonwealth of Independent States (CIS) countries comprise 22% of reserves, and the African continent has a 9% concentration. On the production side, once again the Middle East leads with 32% of the boes, followed by Russia and CIS at 26%. The Far East, South America and Africa each have approximately 12% of the global production. These statistics demonstrate that reserves are geographically more concentrated than production.

Country	2005 Proven Reserves			Rank	Country	2005 Annual Production		
	Oil	Gas	BOEs			Oil	Gas	BOEs
	mmbbls	Bcf	mmbbls			mmbbls	Bcf	mmbbls
Russia	74,436	1,688,046	355,777	1	Russia	3,486	21,109	7,004
Saudi Arabia	264,211	243,570	304,806	2	Saudi Arabia	4,028	2,453	4,437
Iran	137,490	943,922	294,810	3	Iran	1,478	3,071	1,990
Qatar	15,207	910,140	166,897	4	China	1,324	1,765	1,618
Iraq	115,000	111,901	133,650	5	Mexico	1,372	1,394	1,604
UAE	97,800	213,036	133,306	6	Norway	1,084	3,000	1,584
Kuwait	101,500	55,492	110,749	7	UAE	1,004	1,645	1,278
Venezuela	79,729	152,320	105,116	8	Venezuela	1,098	1,020	1,268
Nigeria	35,876	184,619	66,646	9	Algeria	735	3,099	1,252
Kazakhstan	39,620	105,900	57,270	10	Nigeria	942	769	1,070
Libya	39,126	52,632	47,898	11	Kuwait	965	342	1,022
Algeria	12,200	161,674	39,146	12	Indonesia	415	2,683	862
China	16,038	82,955	29,864	13	Brazil	627	402	694
Norway	9,691	84,897	23,841	14	Libya	621	413	690
Indonesia	4,301	97,428	20,539	15	Iraq	664	62	674
Malaysia	4,200	87,544	18,791	16	Qatar	400	1,535	656
Turkmenistan	546	102,370	17,608	17	Malaysia	302	2,114	654
Mexico	13,670	14,544	16,094	18	Kazakhstan	498	830	636
Azerbaijan	7,000	48,361	15,060	19	Argentina	265	1,610	533
Egypt	3,720	66,717	14,840	20	India	286	1,073	465
Brazil	11,722	10,943	13,546	21	Egypt	254	1,225	458
India	5,919	38,865	12,397	22	Angola	453	26	457
Uzbekistan	594	65,305	11,478	23	Turkmenistan	70	2,076	416
Oman	5,572	35,124	11,426	24	Oman	285	618	388
Angola	9,035	9,535	10,624	25	Uzbekistan	46	1,966	374

Table 1: Top 25 countries with national oil companies

Source: BP Statistical Review of World Energy, 2006

By graphing the 2005 reserves and production figures for the top 25 countries with NOCs, their relative positions fall into clusters. (Figure 3). In addition to the OPEC members, five clusters are readily apparent from the figure showing the relative positions of the countries. The synthesis of the groups indicates that their resource endowment has almost certainly influenced and occasioned the countries to act in particular manners. Although this might seem self-evident, it is surprising how the comparisons hold a certain appeal.

Recognition that a country's strategy is a function of its position along the curve, the relative groupings could be described as follows:

- Six with laws that favor restricted access
  - Russia, Saudi Arabia, Iran, Mexico, Venezuela and Kuwait
- Five with international aspirations
  - China, Norway, Brazil, Malaysia and India
- Three with gas technology and market needs
  - Algeria, UAE and Qatar
- Six with traditional PSCs and bid rounds
  - Nigeria, Indonesia, Libya, Egypt, Angola, Oman
- Five whose sectors are currently "works in progress"
  - Iraq, Kazakhstan, Turkmenistan, Uzbekistan and Azerbaijan

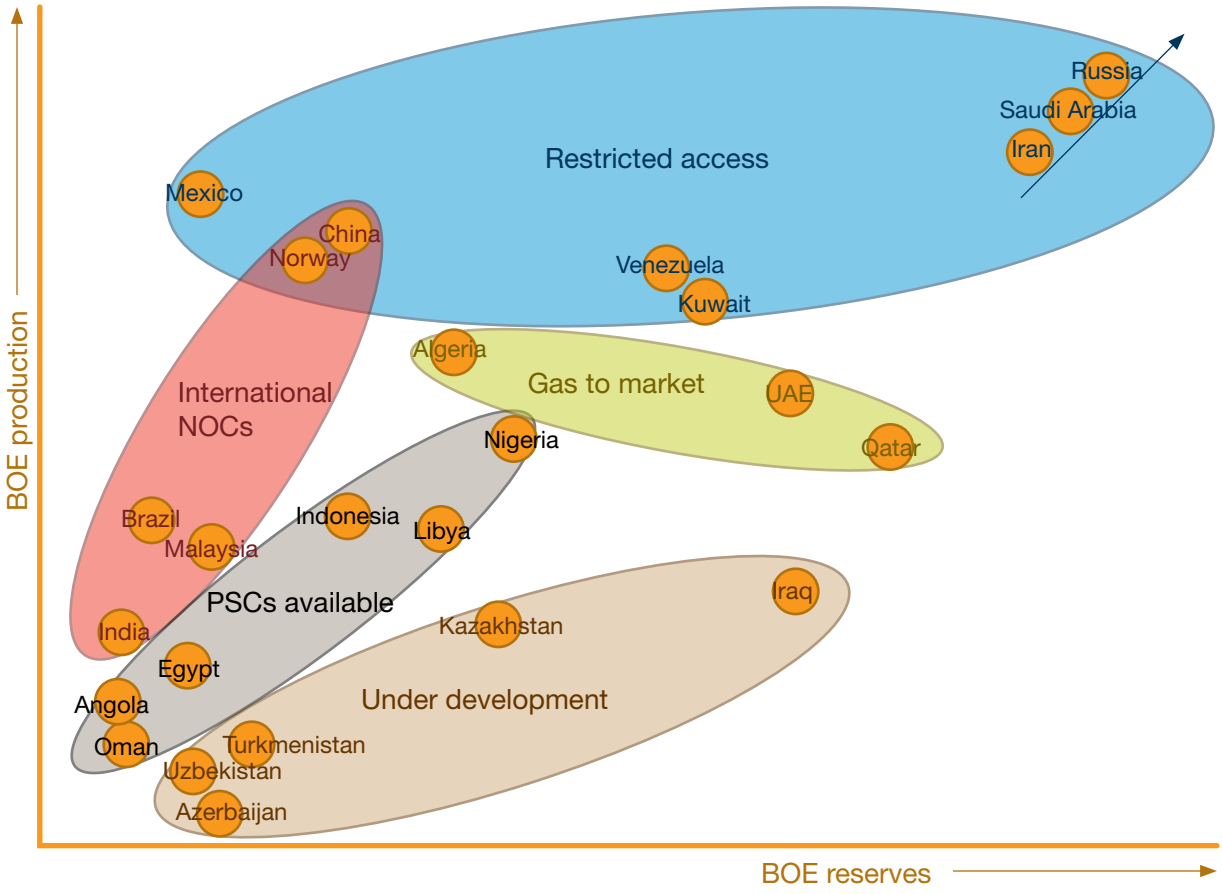

Figure 3: Top 25 countries with NOCs in 2005 – relative positions for reserves and production[6]

The question is...how much has the resource inheritance driven the strategic objectives of the NOCs and the political direction in those countries? Not unexpectedly…a great deal, if viewed at face value. What resources a country has been given, influences what it is going to do with those resources, and how it will operate.

Of the countries in the **Restricted Access** group, most have restraints which limit ownership of hydrocarbons to state-owned enterprises. Such an arrangement precludes production sharing arrangements and booking barrels by contractors, which gives rise to various forms of service contracts for use with IOCs. As might be expected, countries with high reserves and production profiles have greater power to determine contractual, fiscal and operational arrangements with IOCs (apart from Mexico).

Examples of restricting access can be found among the countries with some of the largest oil and gas reserves. NOCs are interested in ensuring all strategic resource assets are owned and controlled by the respective State. This is being done around the world through tougher negotiations and increased legislation, such as in Russia and Venezuela. Iran has its often problematic buy-backs agreements as arrangements with IOCs, as well as directly negotiated deals. Saudi Arabia has only recently opened its doors to IOCs for gas exploration in the natural gas sector by selected foreign investors. In moves to strengthen international relations with countries including Russia, China and the European Union, Saudi Arabia has signed exploration and production agreements with companies from these countries. Kuwait is in the lengthy process of executing the North Kuwait Project using Operating Service Agreements, presently held up by its Parliament. Kuwait again will use a selective approach for investors. Mexico's Article 27 of the Constitution limits what can be done by anyone other than its NOC, Petroleos Mexicanos (PEMEX). In Mexico's case it could be argued that their falling reserves numbers, as indicated by their position in Figure 3, should highlight whether or not they can continue to be a part of the Restricted Access group. The need to increase production and replace reserves may drive Mexico to consider changing its strategy, to become less dependent on NOC initiatives alone.

While some of the Restricted Access group have begun to allow limited access, others in this group are moving in the opposite direction, further reducing IOC opportunities. Venezuela is radically changing its petroleum sector ownership agreements to the financial detriment of the IOCs. Beginning in 2006, state-owned PDVSA began transitioning operating agreements with IOCs to joint venture arrangements. During the same timeframe, the Venezuelan government dramatically raised the tax rate companies pay for extracting natural resources.

Surprisingly, adjacent to the most restricted group, are the **International NOCs**, which include all of those countries that compete directly with the IOCs at the moment. The International NOCs strategy is occasioned by insufficient or declining reserves and/or production in their domestic markets. This group has incoming foreign investment via PSCs, and the majority has publicly listed arms to their NOCs. Clearly market factors are in play with this group to increase value through reserves replacement overseas as a part of these countries' strategies.

All five International NOCs can be characterized as having both domestic and international strategies with regards to their energy industry. In addition to seeking a secure supply of energy for the domestic needs, these NOCs also have commercial strategies. India and China are currently the most active on the international M&A stage. These two countries share a relentless pursuit of international reserves to satisfy the booming domestic energy growth requirements, and often face off against one another in the M&A arena.

Through sustained effort by its NOC (Petrobras), Brazil has become energy self-sufficient once more as a result of its domestic policy, and hopes to be a net exporter. Norway is looking to offset declining North Sea resources, and must deal with the economy's dependency on this sector. Norway is consolidating both domestic NOCs (Statoil and Norsk Hyrdo) into one entity, which will create the world's largest offshore oil company. This consolidation approach has not been mirrored by India and China who prefer to keep several NOCs, with each operating somewhat independently. Malaysia has a single NOC, Petronas, which is the single largest revenue contributor to the country's economy. Malaysia has chosen to be a strong regional player with limited expansionist strategies.

In approximately the same area of the graph as the International NOCs are those countries with lower reserves and production that have chosen a domestic strategy of inviting international investment into their sector, principally through the issuance of Production Sharing Contracts, negotiated or tendered, and joint venture arrangements. The **PSCs Available** grouping is indeed diverse, but all have provided fertile basins and provinces for exploration and production. The group ranges from Indonesia, an early PSC instigator and now an importing OPEC member, to Angola, the doyen of the deepwater and newest member of OPEC. Nigeria is an African powerhouse that has its share of internal troubles and turmoil. Libya has recently seen the lifting of sanctions that have allowed a return to previous strategies of inviting foreign investment. Egypt has long been a country that has used PSCs to its advantage, along with Oman and its extended relationship with IOCs. One noticeable change within this group is the frequency nowadays with which the smaller, independent foreign oil companies have succeeded in these countries.

The **Gas to Market** grouping, in the center of the graph, contains three gas powerhouses, all members of OPEC. Qatar and Algeria have chosen to bring technology into their gas sectors by partnering with IOCs who possess Liquefied Natural Gas (LNG) expertise. Qatar is now the largest exporter of LNG in the world. Previously the UAE had enjoyed LNG sales from its Das Island terminal to the far Eastern block, a region also now supplied by Qatar. The UAE's principle export market is now Japan.

Algeria was the first producer of LNG in 1964, and has maintained a dominant role in the sector ever since. Algeria's proximity to Europe has made it an alternate energy source to lessen the continent's dependency on Russian gas supplies.

Towards the horizontal axis of the graph are those countries **Under Development**. Strikingly, all of the CIS countries align together on the chart, together with Iraq. Largely constrained by inadequate infrastructure, many of these countries have not been able to attract or retain foreign investors and operators. Lack of infrastructure is an element that seems to underlie most of the group, many of which met with financial hardship after gaining independence from the former Soviet Union. Turkmenistan and Uzbekistan need access to markets for their hydrocarbons. The once prolific Azerbaijan wrestles with economic challenges and lackluster results in some production fields. In contrast, Kazakhstan's situation appears to be improving. It is benefiting from the foreign investment and improved infrastructure and has recently restructured its hydrocarbon sector to good effect.

The only non-CIS member of this Under Development cluster is Iraq, whose industry faces great uncertainty due to the ongoing war. Production is increasing, but much of the country's infrastructure was damaged or looted in recent years. Iraq has just drafted its first Hydrocarbon Law which calls for the use of PSCs. Prior to the war, Iraq's energy industry was limited by outdated technology and methods. Under the new law, the Iraq government will have a better idea of the size and quality of reserves.

Meeting the Demand Equation

But what will the future bring? Oil supplies are becoming all the more geographically concentrated, in fewer and fewer countries. In the last ten years, 33 of the top 48 oil producing countries have seen their production decline.[7] The peak oil point for the remaining 15 countries is yet to be realized.

Of the 25 countries listed in Figure 3, coincidentally 15 are in a position to provide capacity growth over the next ten years. Russia, Saudi Arabia, Iraq, Brazil, Kazakhstan, Iran, Kuwait, Algeria, Qatar, Libya, Nigeria, United Arab Emirates, Angola and Azerbaijan will account for 66% of global oil production capacity in 2017, according to CERA.[8] This list is augmented by Canada, who had a national oil company that was privatized. Canada's growth will result from steeply increased production from oil sands projects. The list might include Venezuela as well, but the certification of their heavy oil reserves is still in process.

Of these 15 countries with growth potential, 14 have national oil companies and 10 are in OPEC. Four of the 15 are in the Restricted Access group (Russia, Saudi Arabia, Iran and Kuwait), three are Under Development (Iraq, Kazakhstan and Azerbaijan), and all three of the Gas to Market grouping are included (Qatar, Algeria and UAE). From PSCs Available, three are present (Libya, Nigeria, and Angola).Only Brazil makes it from the International NOCs group. All five groupings are represented, some more powerfully than others. If the list were to be extended to more than the top 25, then the continuing emergence of countries such as Argentina, Chad, Equatorial Guinea, Gabon, Sudan, Vietnam and Yemen might have an effect on present strategies.

Will this concentration of resources result in a more permanent shift of power within the industry? One conclusion might be that it is "business as usual" as far as policy and strategic direction are concerned. If the status quo has served their purposes to this stage, then why should a country change its policy? The answer lies in future reserves. The resource inheritance is not infinite and the wealth of nations does not last forever. In the oil business depletion is a fact of life. Many countries have already peaked in terms of oil production and a global production peak is often cited. With intense debate and calculation from oil companies, academics, agencies and governments, current opinion and consensus puts the peak for oil somewhere between 2010 and 2020, with non-OPEC countries peaking before the OPEC supply.[9]

On the demand side of the equation, the International Energy Agency (IEA) predictions for 2030 show global oil demand at 116 million barrels per day.[10] This level is nearly a 40% increase in production, or almost 1,400 barrels a second.

Most IOCs will agree that present production from existing fields is declining at 5% per year, and that for every barrel discovered, the world consumes between three and four. If production today is 85 million bopd and the IEA predicts 116 million bopd in 2030, the 31 million bopd increase has to come from somewhere. Is it realistic to assume that the 15 countries, listed earlier as having the capacity to increase, can indeed meet these targets? NOC executives tell us that capacity development is very high on their list of priorities, with the recognition that investment and capital discipline play primary roles in achieving this objective.

Barring further enormous field discoveries, the present way forward will entail increasing recovery rates from existing fields, along with bringing existing major greenfield projects on stream. According to some experts, these efforts will only account for 12 million bopd, with the balance of around 20 million bopd yet to be discovered. A United States Geological Survey (USGS) report indicates that since 1996, recoverable oil discovered has averaged 9 billion barrels per year, a pace that will have to be maintained for the next 23 years.[11]

Expanded Role for the Oilfield Service Company

Given these statistics of supply, one participant that is very often overlooked in the NOC-IOC equation is the oilfield service company. During the industry downswing in the 1980's, many of the major E&P companies reduced the research and development budgets. To fill this gap, the oilfield service companies invested in new technologies. As a result, much of the advanced technology now available lies with the service companies. The realization of the 1,400 barrels a second needed in 2030 will likely include a large contribution from the service sector.

The three-way relationship that has to develop will be interesting to watch as it unfolds. Many NOCs may feel less intimidated by developing relationships with the service companies as there are no direct threats to sovereignty and there is no pressure to book reserves. In addition, contracting with them addresses one of the major issues facing all oil companies regarding access to scarce technical staffing and skill sets. The oilfield service companies are up-to-date with global operational best practices, and they are accustomed to fee-for-service environments. Halliburton's recent announcement to move its headquarters to Dubai as "the next step in a strategic plan…to focus on expanding its customer relations with national oil companies[12]," might be a good indication of this growing three-way relationship.

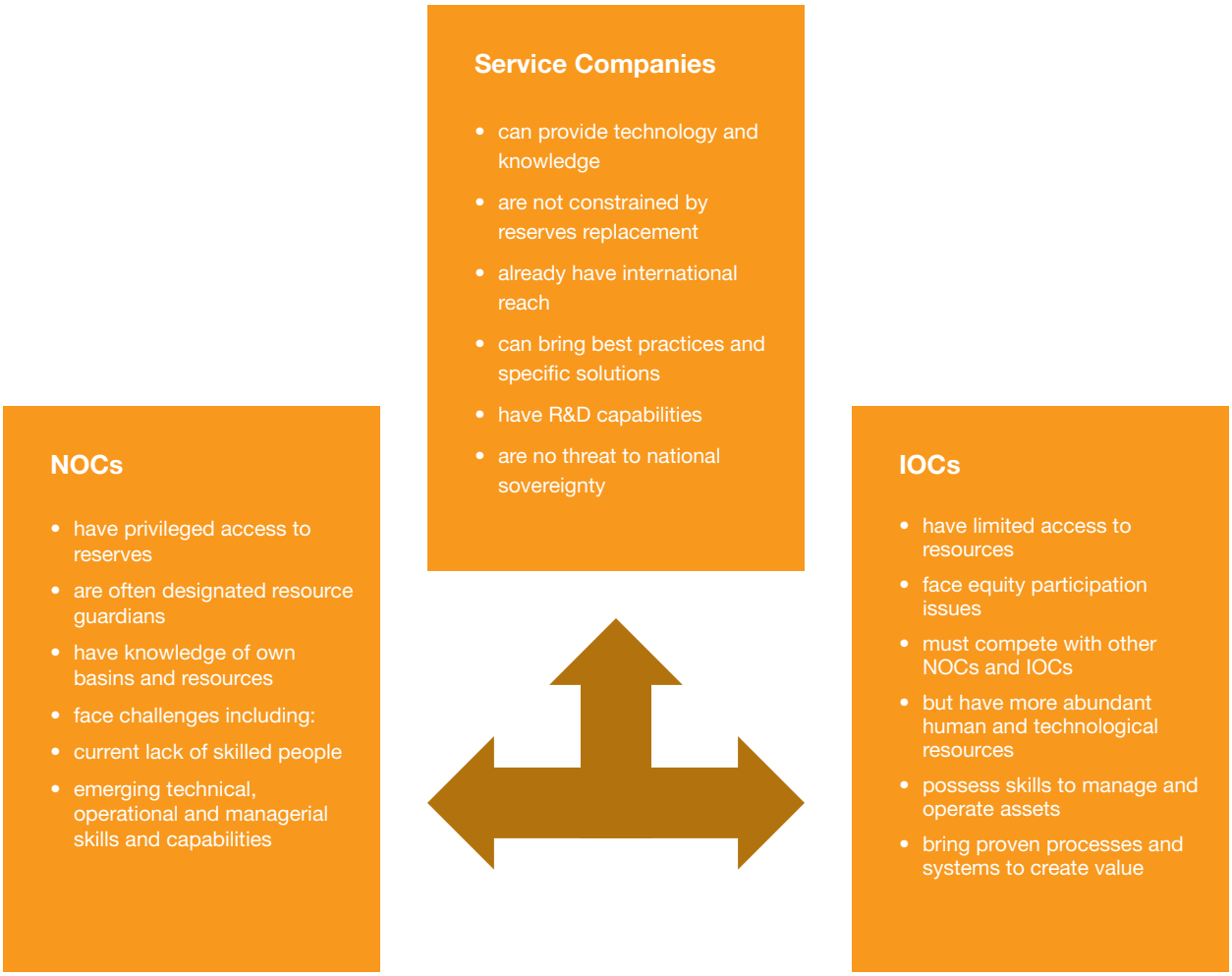

Figure 4: A three-way split?

Will the NOCs look towards the service companies to assist in producing greater recovery factors? Or, will the IOCs have to assume a different role with NOCs to combat the service companies, especially in countries where reserves cannot be booked and only service contracts might be available? Will Wall Street adapt and consider other measures such as long-term, sustainable NOC partnerships and new technology developments in its market evaluation? It will be interesting to watch these dynamics over the next few years as the industry continues to evolve.

From discussions with several NOC executives there is a diversity of approach to the changing roles in the industry. Many NOCs still utilize their own in-house service departments, and many still own their own rigs. All are comfortable using a combination of their own resources, if they possess them, and those of the service companies. Several executives commented that development of non-conventional resources would require partnering with the most expert available organization being the provider or partner of choice. Thus, the partner may be either an IOC or a service company.

The general direction of NOC/IOC/Service Company relationships, as explained by several NOCs, can be described as moving towards interdependence rather than independence, but with the host country having more informed input than in the past. Increased interaction between consuming and producing countries, through their NOCs is seen as inevitable.

Ultimately it's all about NOC/IOC/Service Company cooperation, one deal, and one field at a time. The vast levels of new production necessary to meet future demand can only be solved with larger complex high-tech projects. To quote Total's CEO, Christopher de Margerie, "New developments are an industrial, financial, political and human challenge. What is needed is confidence based on mutual understanding and respect."[13]

The evolution of the national oil company to its present place on the world's petroleum stage is a story that has different elements depending on the specific country under consideration. How the NOCs now compete, their successes and failures, what the future holds for them and their IOC relatives, is a story still unfolding. Against the backdrop of declining global production and restricted access to reserves, some episodes have taken place, while others are not yet written. All of these factors are important in the race for reserves and the creation of the wealth of nations.

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Notes

1. Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, 1776
2. *BP Statistical Review of World Energy*, 2006
3. Lukoil presentation, "A New Wave of Globalization of the Oil & Gas Industry", CERA Week, February 2006
4. Cited in "Strategies and Influences of Emerging National Oil Companies on World Energy Markets", The James A. Baker III Institute for Public Policy of Rice University, May 2005
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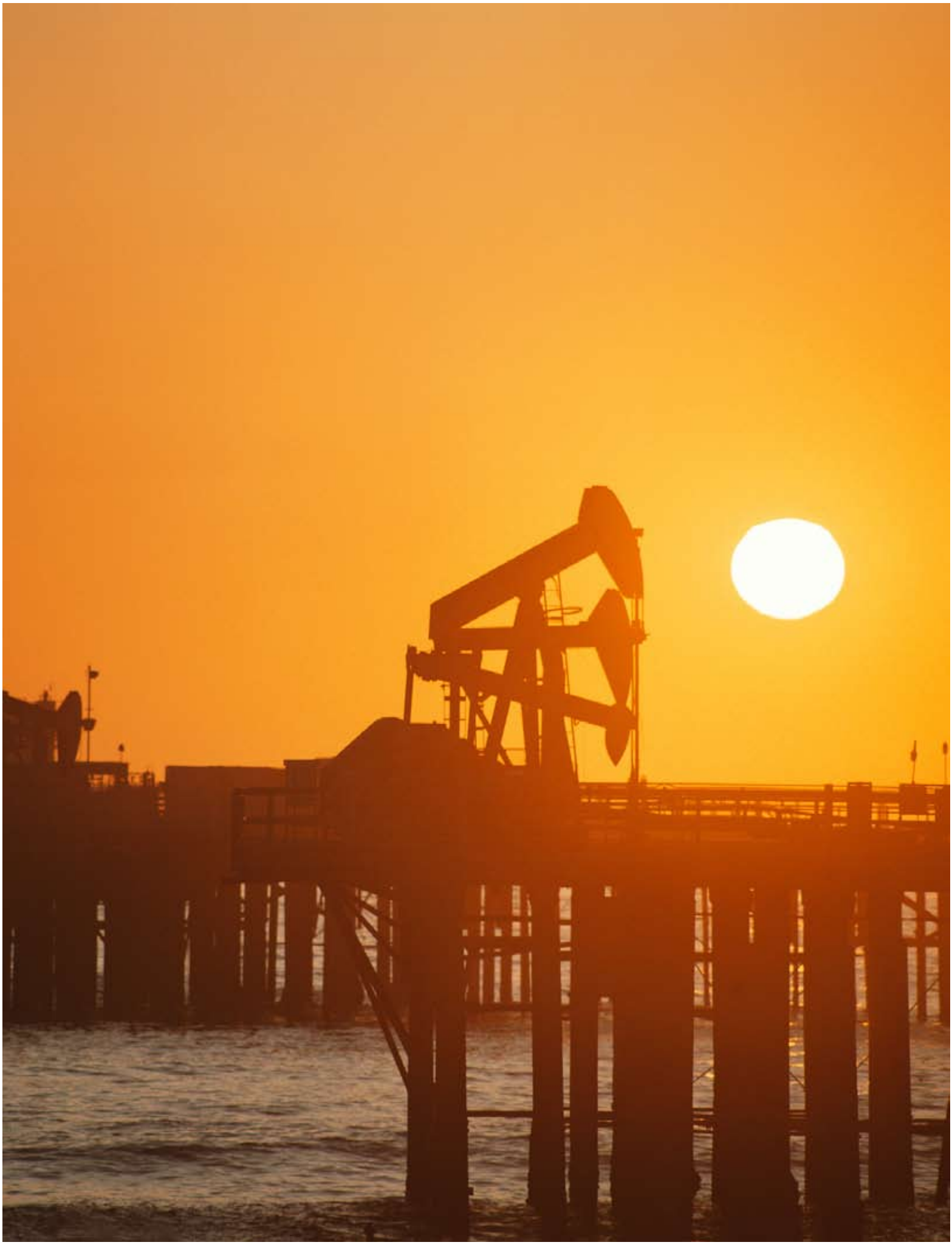

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