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what's
next



Number

34

C O N T E N T S



GIANNI
DI GIOVANNI

A changing scenario

It seemed like a delusion. Every previous attempt to reconcile the positions of OPEC members didn't produce results. National interests have often prevailed over the common good, reflecting the social and economic differences of the countries that have historically been part of the cartel. United by their benevolent fortune to host, on their own territory, substantial oil reserves, they are nonetheless often diametrically distant by tradition, historical events and cultural roots.



Now comes the change. First in Algiers and then in Vienna, between September and November 2016, what many international observers believed to be highly unlikely happened. We saw the signing of an agreement that, in addition to sanctioning very precise cuts in crude oil production, established new balances within and outside of the organization, partly in an effort to restore life to government budgets that rely almost exclusively on proceeds from oil, and that therefore very often pay the price for sudden price drops like those that occurred between 2014 and the present.

Convinced of this is Mohammad Sanusi Barkindo, Secretary General of OPEC, who observes how the policy of crossed vetoes has now been replaced by reasonableness, such as to give life to "a historic event." As explained exhaustively by Moisés Naim, the high prices prior to the post-2014 crisis encouraged the production of U.S. shale oil, with the resulting surplus of crude oil on the world markets, and the downward pressure on prices. In the first instance, the cartel decided to keep production prices unchanged to stop American expansion, but eventually, the

negative impact of that decision on the cash registers of the member countries, especially Saudi Arabia, forced the cartel to resort to milder, more profitable, measures, reviewing its protectionist strategy and proceeding to downsize extractions to support prices. As the map at the beginning of the issue clearly shows, it appears that to date the commitments assumed by the negotiators have produced encouraging results: the planned cuts had reached, in January 2017, 90 percent of the established amount. However, Moscow and Washington are not merely watching. The former led the contingent of non-OPEC countries towards the agreement, and Igor Yusufov, the former Russian energy minister, retraces in his article the episodes through which his country contributed over the decades to the creation of a global energy policy. From the U.S., new signals are expected. Donald Trump's positions on energy, as described by Molly Moore and Sarah Ladislav, are already under scrutiny by the international community. Will it really be a policy of revival of domestic hydrocarbon production and the elimination of any restrictions on drilling? It is still too early to say. Saudi Arabia, in the meantime, is seeking an alternative economic route, even in renewables, to its dependence on oil, as Bassam Fattouh explains, while Nigeria, Iraq and Venezuela, thanks to the recovery of the barrel, are perhaps seeing the clouds over economic recovery clearing away. Meanwhile, demand for oil races on, and will do so for some time, as Lazlo Varro, Chief Economist at the International Energy Agency, points out. This growth will be especially apparent in the transport sector, which, as Lazlo Varro advises, imposes a recovery of investments in the upstream oil market. We see a heterogeneous scenario, therefore, determined, according to our experts, by a feeling of "unpredictability" that will accompany us for a long time to come.

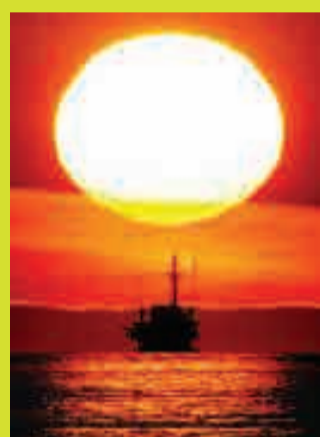
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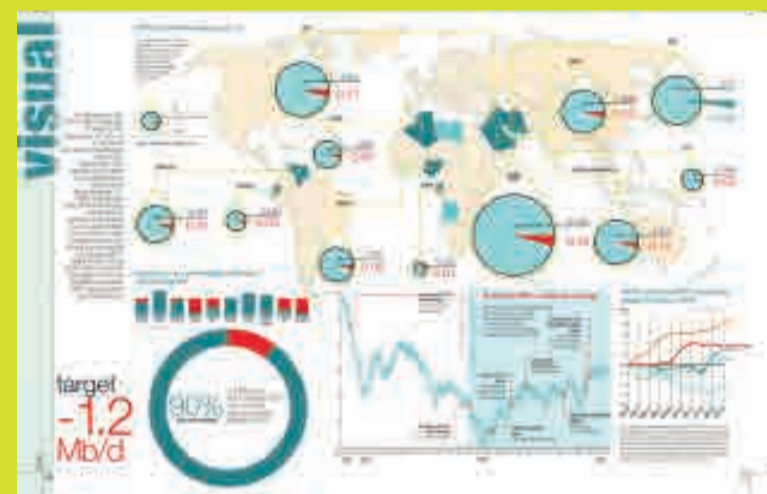
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CARLO ROSSELLA

The big question

Oil prices have begun to rise again. While the worst is over for producers, employment in the oil industry does not seem likely to increase, as automation continually reduces the need for human labor. In America, for example, while production rose to 8.6 million barrels per day (bpd), as of September 2016, as many as 16,300 jobs in the oil industry have been lost. And 9,800 of those lost jobs were in Texas, the state where the most oil is extracted. Reducing the cost of oil extraction through automation is on OPEC's agenda, perhaps even at the very top. Not all member countries can afford the American model. But those that can will do it. In Vienna, at OPEC headquarters, the discussion is open. Of course, the Intercontinental presidential suite, home and office to the Sheikh Yamani, the Saudi who managed to get everyone to agree by hook or by crook, no longer hosts its own supertankers. However, OPEC's agenda is working. Two weeks ago, in mid-February, despite the increase in U.S. stocks and the fact that, overall, stocks of crude oil and gasoline are at record highs, oil prices remained stable at \$53.11 per barrel.

It happens that prices fall, but then rise again shortly thereafter to settle on the average trend. "The mystery," as defined by The Financial Times, is giving rise to conspiracy theories that behind the strange rebounds in prices there is an OPEC country that is more attentive to finance than product.

On Wednesday February 22 a meeting was held between OPEC and non-OPEC countries; since then, all have cut their production to drive up prices, except for Iran, Libya, Nigeria and shale oil companies which, after the end of the sanctions, have returned forcefully to the market. If January's production levels remain unchanged or almost unchanged, according to the International

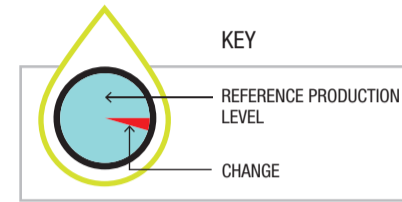
The author

He is a journalist and executive. He has been the head of *La Stampa*, *Panorama*, TG1 and TG5 (the TV news programs). He is currently chairman of Medusa Film, the production company of Mediaset.

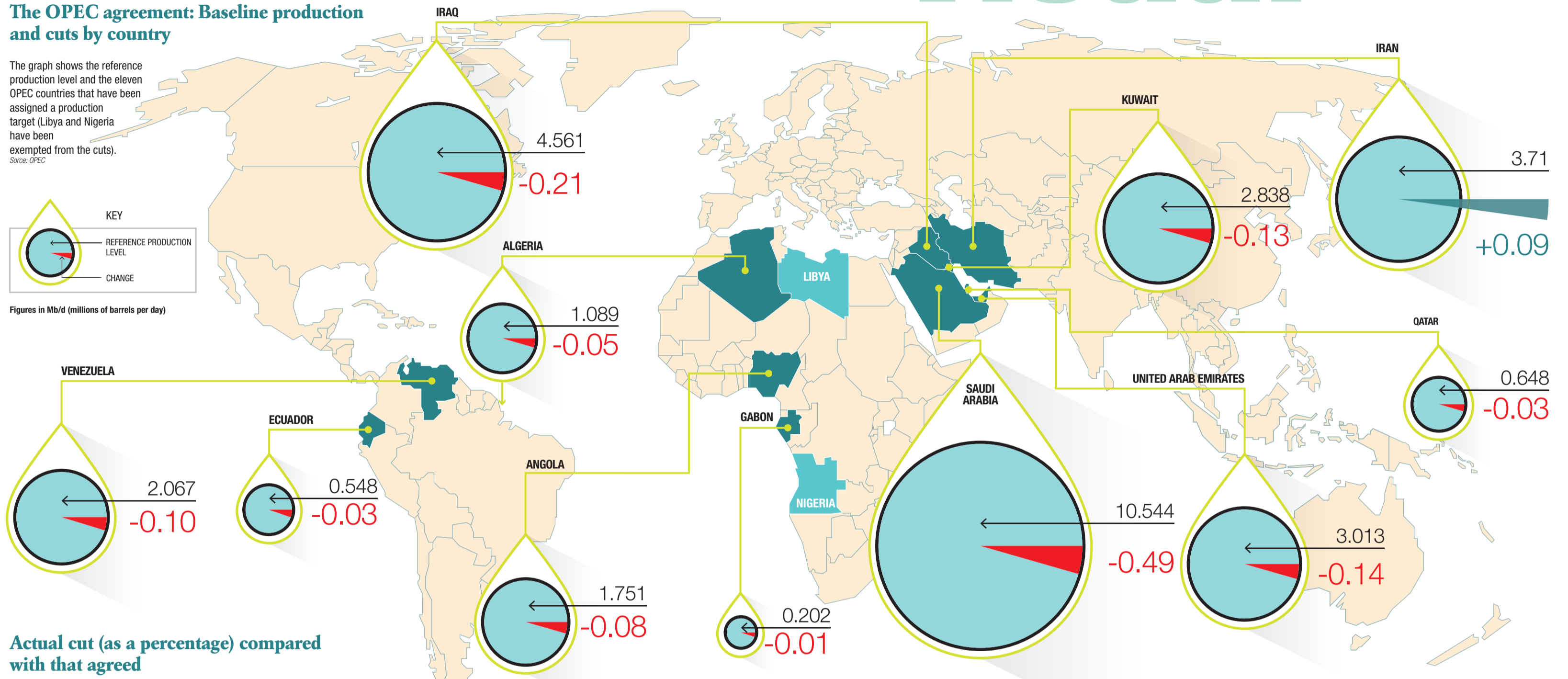
Energy Agency (I.E.A.), global oil stocks will decline by 600,000 bpd in the first half of 2017. In the second half of last year, there was a reduction of 80,000 bpd, the sharpest drop in three years. All this against rising crude for oil demand. An increase of 1.4 million bpd is expected, of which 290,000 bpd more will be extracted from Libya, Nigeria and Iran. Another 400,000 barrels will come from U.S. shale oil production. Oil prices are, therefore, back under observation especially by governments of non-producing, importing countries. With low oil prices, their economies (Italy, first and foremost) will benefit. But how long will the calmness last? At Vienna's OPEC, it is already said to be over. The first winds of the next storm can already be felt.

The OPEC agreement: Baseline production and cuts by country

The graph shows the reference production level and the eleven OPEC countries that have been assigned a production target (Libya and Nigeria have been exempted from the cuts).
Source: OPEC

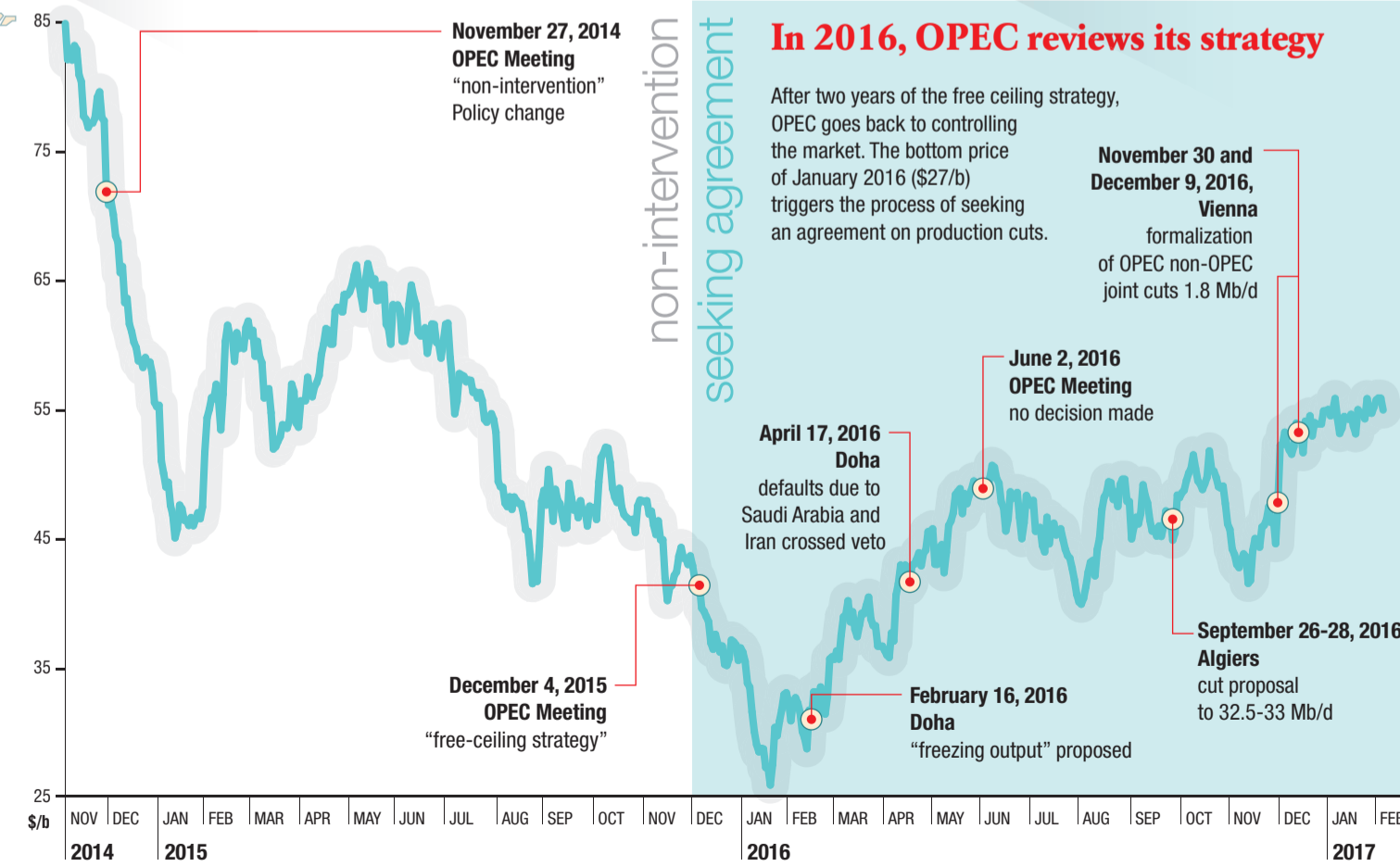
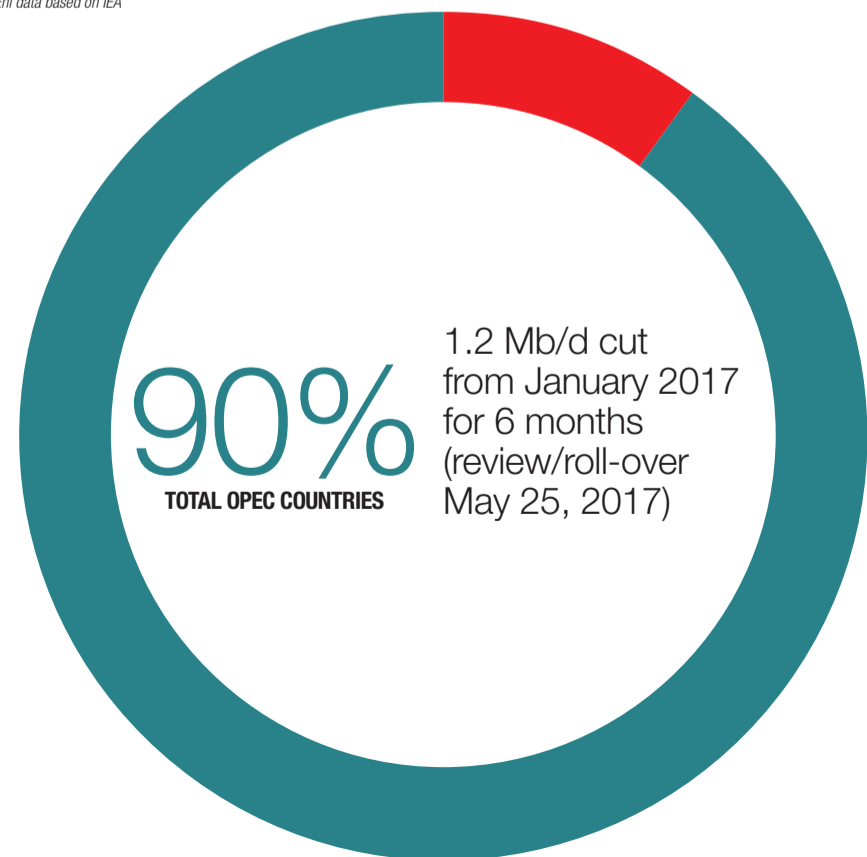
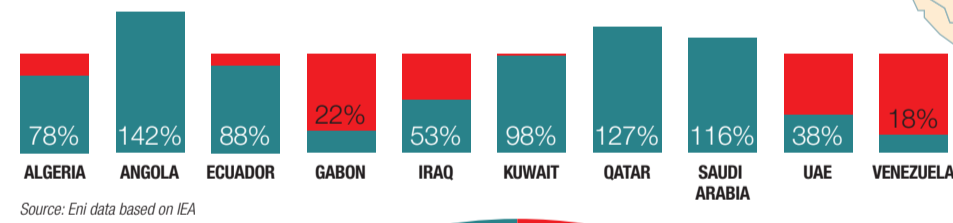


Figures in Mb/d (millions of barrels per day)

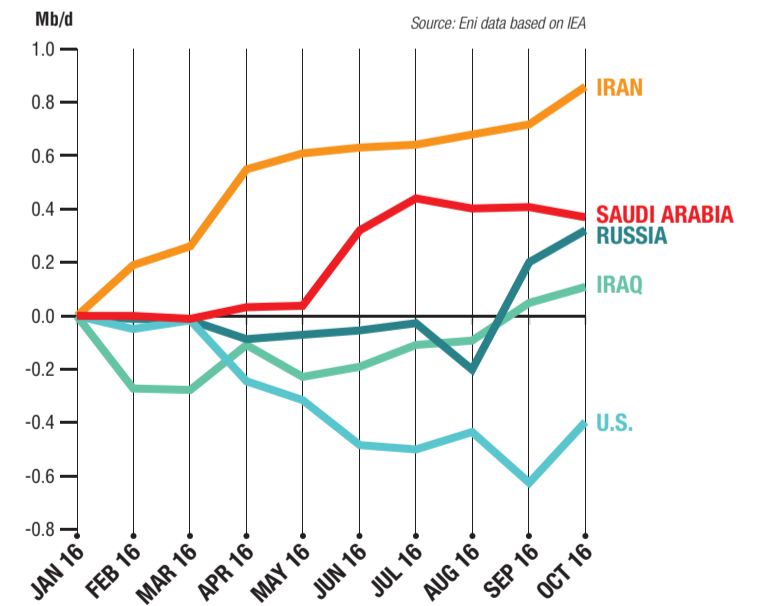


On November 30, 2016 in Vienna, OPEC finalized the agreement to cut crude oil production reached at the end of September. The exporting countries have agreed on a reduction of approximately 1.2 million barrels per day. The map shows the reference production level and cut agreed with each country, while the graph shows the actual cuts recorded in January 2017. The graph at bottom shows that oil prices rebounded significantly in response to the agreement

Actual cut (as a percentage) compared with that agreed



OPEC and non-OPEC production change since January 2016



OPEC production steadily increased in 2016: +0.8 Mb/d in October from January (of which +0.3 after Algiers). Driving the growth was the return of Iran (+0.86 Mb/d) and record Saudi production. Even Russia accelerated, thanks to ruble devaluation, favorable taxation, low extraction costs and large greenfield investments in the past. In October, a rebound of 0.5 Mb/d occurred compared with August. In 2016, the only major producer in decline was the U.S.

target
-1.2
Mb/d



Mohammad Sanusi Barkindo

Mr. Barkindo was officially appointed Secretary General of OPEC for a three-year term at the organization's 169th Meeting of the Conference on June 2, 2016 in Vienna. He replaced Abdalla Salem El-Badri who had led the Organization since January 1, 2007. Mr. Barkindo brings with him a wealth of experience in the oil and gas industry, both in Nigeria and internationally. From 2009 to 2010, he was Group Managing Director of the Nigerian National Petroleum Corporation (NNPC). Previous to that, he served as Deputy Managing Director of Nigerian Liquefied Natural Gas. Mr. Barkindo has also helped produce the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol as the leader of Nigeria's technical delegation to the U.N. negotiations since 1991.

Exclusive/Interview with OPEC's Secretary General

A historic decision that reassures markets

The 24 producing countries' commitment to reducing oil output will bring the market back into balance, re-establishing an appropriate relationship between supply and demand and supporting the industry in the short, medium and long term



DANIELE DI MITA AND SERENA SABINO
Di Mita, specialized in media and communication at Catholic University of the Sacred Heart in Milan, is a journalist for AGI and was its Nigerian correspondent from 2009 to 2013.

A journalist, Serena Sabino has worked for *Oil* since its first edition. She has also worked for the AGI news agency and, previously, for the Dire news agency and for Radio24i/sole24ore.

PEC is taking back its destiny. After eight years of more misunderstandings and summits than mutual vetoes and concrete decisions, on November 30, 2016, crude oil exporting countries wiped out skepticism and doubt by reached an agreement to reduce oil production by 1.2 million barrels per day (bpd). Consequently, on December 10, a large group of countries outside of OPEC, led by Russia, joined this decision by cutting their own output by an additional 600,000 bpd. OPEC's Secretary General, Nigerian Mohammad Sanusi Barkindo, in an exclusive interview with *Oil*, called this agreement "historic," capable of "stabilizing the market" and, at the same time, supporting the oil industry "in the short, medium and long term." Barkindo, aged 57, took office at the OPEC summit on August 1, 2016, and will lead it for the next three years. He originally comes from Yola, the capital of the northern state of Adamawa and one of the 36 states comprising the Federal Republic of Nigeria. After graduating from the Ahmadu Bello University, one of the most prestigious universities in West Africa, OPEC's current Secretary General completed his studies at Southeastern University in Washington, D.C. and at Oxford.

With the agreement on production cuts reached in November, can it be said that OPEC has returned to taking charge of balancing the oil market?

The most important aspect to note is that through a decision made by 24 producing countries, 13 OPEC and 11 non-OPEC (led by Russia), the aim is to work together to balance the oil market. This would have a huge impact on the oil industry and for producing countries, with extended benefits for the entire global economy.

We are experiencing a truly historic event because, for the first time, we have OPEC countries and a number of non-OPEC nations united in the signing of an agreement to balance the oil market.

The agreement is paying off: the downward trend has reversed. What do you see happening next? How far up can oil prices go?

The aim of this declaration of cooperation between OPEC and non-OPEC countries is to balance the market. The agreement has completely changed the atmosphere of the oil industry in a positive way: we have already seen the beginning of a restructuring in the market and we now have the power in our hands to make this declaration credible. As for the rest, rather than price targets, we prefer to think of a stability target: our current goal is to bring the market back into balance, building a fair relationship between demand and supply in order to ensure stability.

The agreement comes after eight years of misunderstandings between OPEC countries. How important is this agreement in terms of your internal balances and OPEC's ability to effectively impact the crude oil market?

Along with the other 11 non-OPEC countries, OPEC has written a truly historic page for the global oil industry that outlines the challenges we have ahead of us. Now we have to work together to stabilize the oil market and support it in the short, medium and long term.

Do you think there will be issues when implementing the agreement? Several analysts are concerned that not all OPEC countries will comply with the cuts.

This declaration of cooperation has only been effective since January. Over the past weeks, we have had discussions with the countries that signed the agreement, and we are working with all participating nations to do our best to begin to implement this historic decision.

Will non-OPEC countries keep their promise to work



together to reduce global output?

At present, all I can say is that I do not know the level to which each of the 24 countries—OPEC and non-OPEC—have expressed their views based on a voluntary commitment at the time of signing the agreement.

Will Nigeria and Libya's increased output, which has been faster than expected, and America's increased shale oil production, curb prices?

In the short, medium and long term, oil demand remains positive and robust. Therefore, we ask all producers, including Nigeria and Libya, to continue to play their role to meet demand and to supply the market with their production. All countries have an important role to play to continue to ensure that the market is supplied continuously to meet the demand: our goal is to maintain stability on a sustainable basis.

President Donald Trump has recently taken office at the White House: what impact do you think he will have on the energy industry and, specifically, on the oil sector?

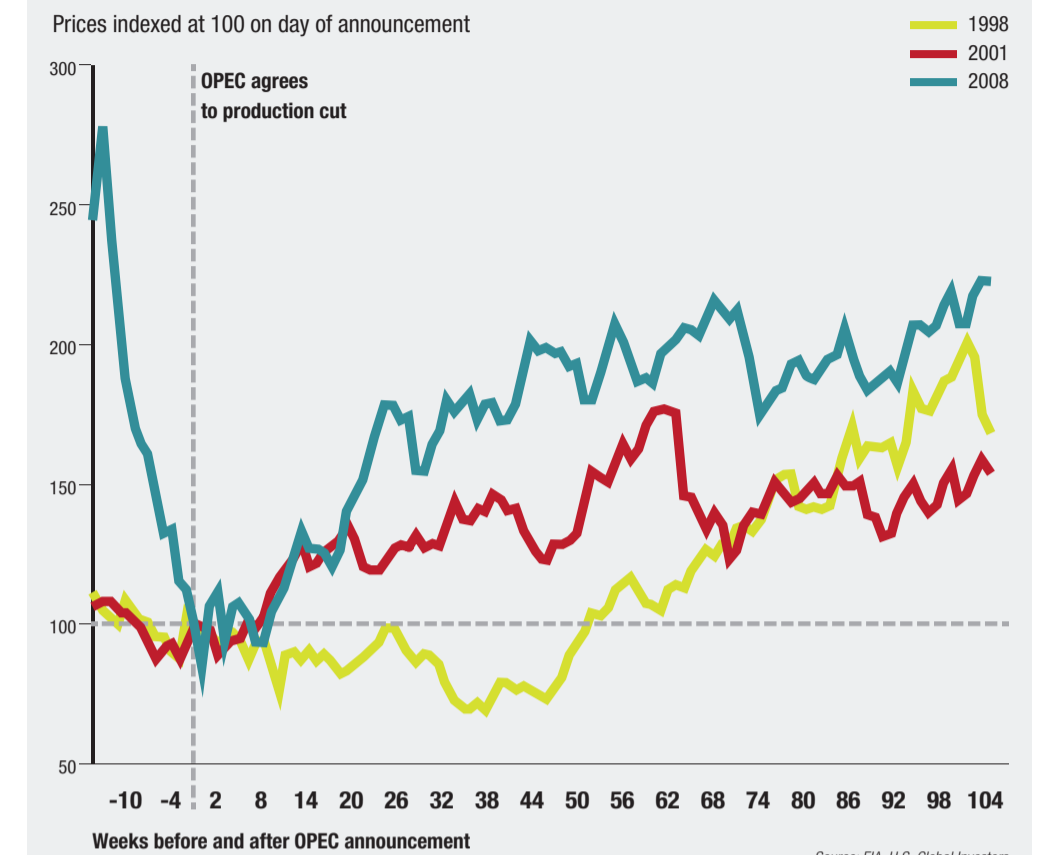
Firstly, we are waiting to see what policies President Trump will implement.

We certainly support continued investment in the energy industry and specifically in the oil sector, in order to ensure that the global economy is continuously replenished with oil to maintain and assist its growth.

Before we finish up, given your origins, can you tell us how you see Nigeria's geopolitical situation?

As Secretary General of OPEC, I prefer never to comment on the internal affairs of individual member countries. But here I will make an exception, only to say that now the situation is better. For now.

MARKET REACTIONS TO OPEC'S PREVIOUS CUTS



On the last three occasions when OPEC decided to reduce production (1998, 2001 and 2008), crude oil prices rose for the next two years. Of course, past performance does not guarantee future results.

Over a half century, through thick and thin

The 1960s

OPEC's formation occurred at a time of transition in the international economic and political landscape, with extensive decolonization and the birth of many new independent states in the developing world. The international oil market was dominated by the "Seven Sisters" multinational companies and was largely separate from that of the former Soviet Union (FSU) and other centrally planned economies (CPEs). OPEC adopted a 'Declaratory Statement of Petroleum Policy in Member Countries' in 1968, which emphasized the inalienable right of all countries to exercise permanent sovereignty over their natural resources in the interest of their national development.

The 1970s

OPEC rose to international prominence during this decade, as its Member Countries took control of their domestic petroleum industries and acquired a major say in the pricing of crude oil on world markets. On two occasions, oil prices rose steeply in a volatile market, triggered by the Arab oil embargo in 1973 and the outbreak of the Iranian Revolution in 1979. OPEC broadened its mandate with the first Summit of Heads of State and Government in Algiers in 1975, which addressed the plight of the poorer nations and called for a new era of cooperation in international relations, in the interests of world economic development and stability.

The 1980s

After reaching record levels early in the decade, prices began to weaken, before crashing in 1986, responding to a big oil glut. OPEC's share of the smaller oil market fell heavily and its total petroleum revenue dropped below a third of earlier peaks, causing severe economic hardship for many Member Countries. Prices rallied in the final part of the decade, but to around half the levels of the early part, and OPEC's share of newly growing world output began to recover. This was supported by OPEC introducing a group production ceiling divided among Member Countries and a Reference Basket for pricing, as well as significant progress with OPEC/non-OPEC dialogue and cooperation, seen as essential for market stability and reasonable prices. Environmental issues emerged on the international energy agenda.

The 1990s

Prices moved less dramatically than in the 1970s and 1980s, and timely OPEC action reduced the market impact of Middle East hostilities in 1990-91. But excessive volatility and general price weakness dominated the decade, and the South-East Asian economic downturn and mild Northern Hemisphere winter of 1998-99 saw prices back at 1986 levels. However, a solid recovery followed in a more integrated oil market. Breakthroughs in producer-consumer dialogue matched continued advances in OPEC/non-OPEC relations.

The 2000s

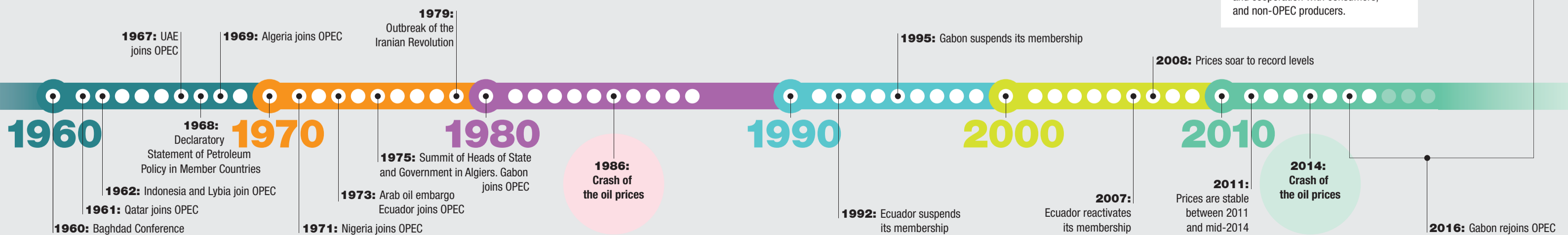
An innovative OPEC oil price band mechanism helped strengthen and stabilize crude prices in the early years of the decade. But a combination of market forces, speculation and other factors transformed the situation in 2004, pushing up prices and increasing volatility in a well-supplied crude market. Oil was used increasingly as an asset class. Prices soared to record levels in mid-2008, before collapsing in the emerging global financial turmoil and economic recession. OPEC became prominent in supporting the oil sector, as part of global efforts to address the economic crisis.

2010 until now

The global economy represented the main risk to the oil market early in the decade, as global macroeconomic uncertainties and heightened risks surrounding the international financial system weighed on economies. Escalating social unrest in many parts of the world affected both supply and demand throughout the first half of the decade, although the market remained relatively balanced. Prices were stable between 2011 and mid-2014, before a combination of speculation and oversupply caused them to fall in 2014. Trade patterns continued to shift, with demand growing further in Asian countries and generally shrinking in the OECD. The world's focus on multilateral environmental matters began to sharpen, reaching a UN-led climate change agreement. OPEC continued to seek stability in the market, and looked to further enhance its dialogue and cooperation with consumers, and non-OPEC producers.



November 30, 2016
The members of the organization reached an agreement to reduce oil production by 1.2 million barrels per day. On December 10, 11 non-OPEC producing countries, led by Russia, decided to cut their production by an additional 600,000 barrels per day.



Source: OPEC

Intervention/Market performance and energy policy

Running to a standstill

To thrive in the coming decades, the oil industry will have to maintain efficiency and discipline and continue to invest and increase its strategic commitment to developing sustainable technologies



LAZLO VARRO



I.E.A.'s Chief Economist, he served previously as Head of Gas, Coal and Power Market in the same organization. Varro was the Director for Strategy Development at MOL Group and he worked as the Head of Price Regulation at the Hungarian Energy Office.

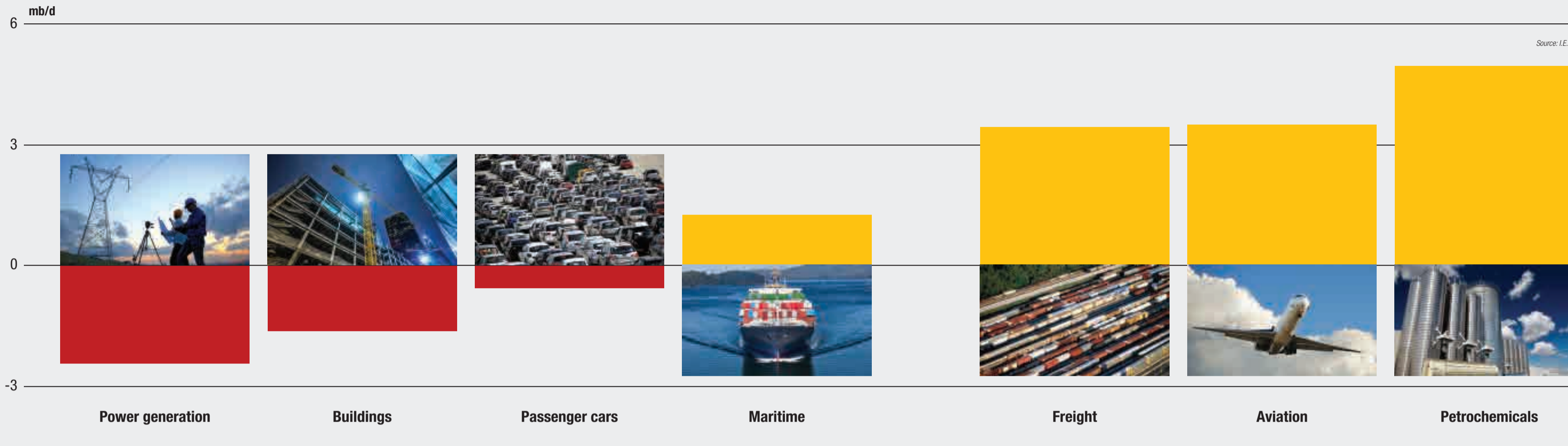
ven by their tumultuous standards, oil markets have had an exciting two years. Prices collapsed to unimaginably low levels following a half-decade of high and seemingly predictable prices, then recovered sharply. Capex programs were cut, costs went into free-fall, and efficiency ruled the day. The political environment was quite volatile as well, with major producers like Russia, Iraq, Libya and South Sudan, which together account for a substantial portion of global oil production, all getting tangled in geopolitical issues. Meanwhile, the signing of the Paris climate agreement cast a big question mark over the future of fossil fuels. And for the first time in a century, the accelerating technological progress of electric cars raised the prospect of technology competition aimed squarely at the citadel of oil demand—the transportation sector. From drilling costs to divestment movements, the industry is facing an unprecedented range of uncertainty as it charts its strategy forward.

The importance of prices over the last two years

But reports of oil's death are premature. It is true that electric cars are progressing remarkably and have the potential to grow further. The cleanliness and efficiency of the electric engine, coupled with consumer excitement and Silicon Valley-type entrepreneurial determination, is creating a compelling combination for growth. But for all the excitement surrounding them, for now electric cars only displace 0.01 percent of global oil demand. The past two years have also reminded us of the importance of prices. At the International Energy Agency (I.E.A.), we have consistently been revising our assessment of oil demand in one direction: up. Altogether, demand is now about 2 million barrels per day (bpd) higher compared to our expectation when oil was at \$100 per barrel. From S.U.V. sales in China to increased driving in the United States, examples of consumer reaction to lower prices abound. But looking forward, the picture is more complex. Technological developments and energy policies will affect the demand trajectory.

The I.E.A.'s *World Energy Outlook 2016* shows oil demand associated with passenger cars declining in the next 25 years. This is an astonishing result considering that the global car fleet is expected to add a billion vehicles in the next quarter century. Some of these vehicles will be electric but the bulk will have more efficient engines. But one often-overlooked fact is that passenger cars represent only a relatively minor share of global oil demand growth. The bulk of that in the next decades →

Change in oil demand by sector 2015-2040



Source: I.E.A.

The global fleet of passenger cars has doubled, but efficiency gains, biofuels and an increase in electric vehicles have reduced oil demand for cars; growth elsewhere has pushed total demand higher.

will come from elsewhere, namely transportation outside of personal vehicles and petrochemicals. Shipping, aviation and heavy duty trucking will grow robustly as emerging markets experience rising incomes and increased integration to the world economy. Since 2009, for instance, the number of air passengers grew by 50 percent. Manufacturing of modern consumer goods, everything from televisions, refrigerators and electric cars have supply chains spanning several continents all being shuffled around by internal combustion engines. The other major driver of oil demand growth in coming years comes from what is perhaps the most visible symbol of modern life—plastics. Forty years of social and political efforts to recycle packaging, for example, have only succeeded in eliminating one year of average global plastics demand growth. The growth in petrochemical demand alone is bigger than the reduction we expect to see from adding more electric cars. Taken together, this explains why, under current policies, the outlook still sees robust oil demand growth for several years to come.

A trajectory that must be changed

It is very true that energy policy can and should change this trajectory. The scale of the climate challenge is way beyond the simple replacement of coal with gas; the energy transition will have to affect all fossil fuels, including oil. The energy trajectory that is consistent with the agreed climate goals (the *World Energy Outlook's* 450

Scenario) has global oil demand peaking in 2018. It then declines by around 900,000 bpd every year by the 2020s. The question becomes whether this is possible in the absence of a global recession, and what the implications are for the oil industry. The I.E.A.'s 450 Scenario is not a forecast. It shows what needs to happen to achieve certain climate goals, rather than what countries are collectively doing in real life. In other words, it rests on policy assumptions that are significantly beyond the ones that are being implemented. Under that scenario, oil demand's relentless growth is reversed by three main changes. First, a strong climate implementation accelerates the take-off of electric cars within a decade, leading to five times more electric cars by 2040 than the number current policies would imply. Getting there will require the sustained political will for large subsidies for several years before electric cars can become competitive on their own, as well as further technological developments of batteries and major charging network infrastructure rollout. No matter how fashionable, electric cars alone can't put oil demand on a climate stabilization path. Efficiency standards for the hundreds of millions of internal combustion engines that will still be sold, especially trucks, will need to be strengthened. Transportation systems will also need to smarten up, with public transit systems and congestion charges reducing driving and high-speed trains replacing short-haul aviation. While there are no technological hurdles to

this, social and political barriers are formidable.

The technology for a low-carbon future

Finally, achieving this goal of curbing oil demand growth will involve expanding technologies such as advanced biofuels, hydrogen and high efficiency processes. These are natural extensions to the technology and project management skills of the oil and gas industry, and will provide a natural transition for oil companies into a low carbon economy. It is possible—and from a climate change point of view even desirable—to have a peak in global oil demand in the foreseeable future, but this will require measures that go well beyond those being implemented today. Regardless of the considerable degree of policy and technology uncertainty shaping the investment outlook, one main strategic conclusion remains: the oil industry needs to keep investing in its upstream sector. The large majority of upstream investment is not needed to meet demand growth; rather it is needed to replace depletion of existing production. But strong climate policy pathways will change the pattern and scale of investment, and long lead-time, high capital intensity projects could be especially questioned. Some lessons from the previous cycle will need to be heeded. The period between the financial crisis of 2008 and the collapse of oil prices in late 2014 was characterised by high and seemingly stable oil prices. Perhaps unavoidably, several years of

smooth fluctuations between \$100 and \$110 per barrel created the illusion of predictability. Capital investment kept creeping up, but so did the cost of upstream projects. Large projects critical to the strategic future of the industry experienced delays, cost overruns and technical disappointments. The industry had to run faster just to stand still: major oil companies experienced declining returns even at high prices while swelling capital investments were needed to support stagnating production. While some major oil-producing nations wisely saved part of their windfall in sovereign wealth funds, the oil price needed to balance their budgets kept creeping up while their long-discussed economic diversification policies did not materialise. The industry had never had it so good, but below the surface its vulnerabilities were also growing. Ironically, it was not climate policy or electric cars that ended that cycle and unleashed a painful but necessary adjustment. Rather, it was the oil industry's own innovativeness and technical ingenuity that precipitated this outcome. The oil and gas industry is often seen as quintessential "old economy," and certainly some of its biggest names have been around for more than a century. Nevertheless, it has proven quite capable of disruptive innovation, for instance, by deeply incorporating big data and digitalisation into its operations. Of course, the most important disruptive innovation has been hydraulic fracturing applied to shale. Even though it is widely discussed, the scale and im-

portance of the turnaround in the prospects of domestic production in the United States is still hard to grasp. Just a decade ago, the main topic of U.S. energy policy discussion was the apparently unstoppable growth in oil and gas imports, and what it meant for energy dependency. Political declarations for energy independence were ridiculed in policy circles and late-night comedy shows as empty rhetoric. Today, with rapidly shrinking oil imports and net gas exports, the U.S. industry is having the last laugh.

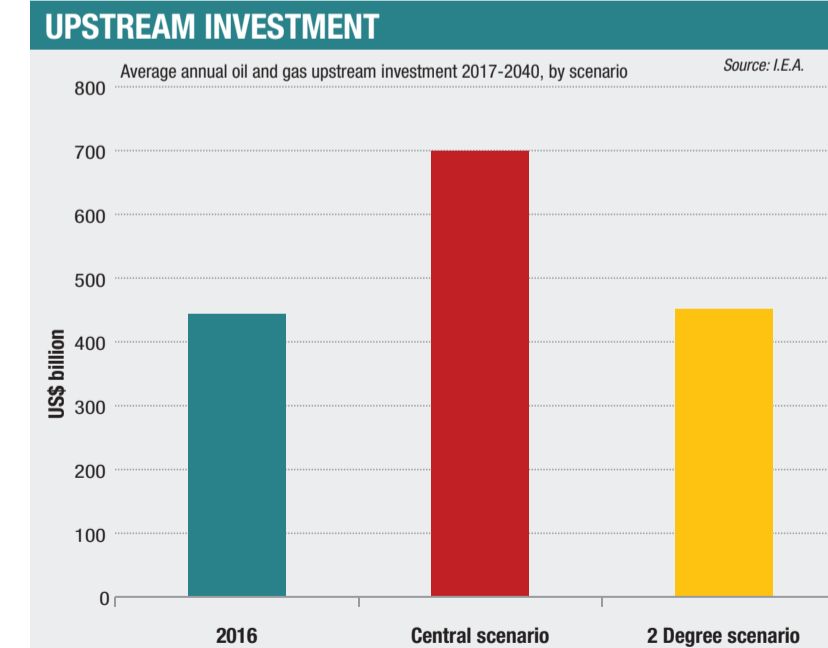
The long-term turning point of the American oil industry

It is important to keep in mind that America's turnaround was no free lunch. In the first half of this decade, more capital was committed year after year to oil and gas upstream projects in the U.S. than in Russia and the Middle East combined. This was way beyond the financing ability of U.S. independents that represented a substantial proportion of all corporate bond issues. Even before 2015, rapid learning by doing and technological progress kept costs stable in a high oil-price world while the rest of the industry struggled with cost inflation. In the end, the rapid upswing of production was possibly the single most important reason for the oil price collapse. The last two years will likely prove to be a fruitful experience for the industry. Investment cuts of 20% two years in a row were unprecedented in the industry's history. A decade of cost inflation was wiped out by a relentless focus on ef-

iciency and reengineering projects. And just as it had during the production ramp up, the U.S. shale industry led this change as well: in two years, the cost of shale project development was cut in half. There are legitimate concerns that costs may creep up once more as investment recovers, but there is no doubt that a considerable share of the cost savings is structural and can be maintained. This results from a combination of technology and management dedication. Digitalization of the oil industry enables better targeting of drilling, higher ultimate recovery

rates as well as lower outage rates and higher capacity utilization. The shale industry specifically benefits from longer horizontal sections and better targeting of sweet spots and multi-pad drilling, both factors that lead to optimizing logistics. Perhaps as important as hard technology are the softer, managerial changes such as a relentless focus on reengineering, streamlining and standardizing projects. In the meantime, major oil producing governments are acting with a new sense of purpose in reforming energy subsidies as well as investing in the non-oil growth po-

tential of their countries. While there is a legitimate disagreement over the timing and intensity of technology competition to oil, there is no doubt that it is coming. The question is when, rather than if. Going forward, maintaining technological momentum and management discipline will be necessary. The U.S. shale industry came perilously close to losing access to capital, and major international oil companies borrowed over \$100 billion in order to maintain dividend payments. Activist investors are raising legitimate questions about incorporating climate policy into the industry's strategy. The industry prospered through the ups and downs of the 20th century thanks to its commitment to innovation and its perseverance in the face of challenges. To prosper in this next century, the oil industry will need to maintain its efficiency and discipline, continue to drive innovation and increase its strategic commitment to new sustainable technologies.



Upstream oil & gas investment remains significant even in a decarbonization scenario in order to compensate for major declines in output from existing fields between now and 2040.



Read on www.abo.net the articles by Demosthenes Floros, Molly Moore and Paul Sullivan on the same subject.



Interview/Theophilus Ahwireng,
C.E.O. of Petroleum Commission Ghana

A promising future

The higher the price of oil, the more the Ghanaian economy will benefit. Black gold and, above all, gas are resources that may act as a driving force for a country aiming to “create value” and promote increased access to energy

PEC's decision will help “boost oil prices,” hopefully to a “range between \$60 and \$90,” a price that will balance the needs of both producers and consumers. A result, as Theophilus Ahwireng, C.E.O. of the Petroleum Commission, explains to *Oil*, that would hold great value for Ghana, which currently produces 140,000 barrels per day (bpd), as the higher the price of a barrel, the greater the government's revenue. Ghanaian energy demand “is growing by over 10 percent per annum, and this demand is a clear indicator of the country's economic growth.”

Oil also contributes to GDP, of which “the largest component will be gas.” But Ahwireng states “we do not want the country to ease up in the wake of this acquired revenue. We want to see the creation of added value, an added value on which the country is working strenuously, partly because,” says the C.E.O., “I firmly believe that one of the engines for Ghana's growth will be oil.”

After OPEC's decision to cut production, the energy market is changing and the price of oil has stabilized, with many observers forecasting a price rise over the course of 2017. In your opinion, what will the future bring? Do you foresee any important changes in the global energy scenario?

The reality is that for the next few decades, petroleum will still be the greatest source of energy in the world, and I estimate that within petroleum products, gas will be the greatest component. What we have seen over the course of the last year or so, with the price of oil dropping from over 100 dollars to the region of 40 to 50 dollars, has been a great shock to the industry. I agree that the level around 100 dollars was a bit too much, and it hurt many economies around the world. But the sudden reduction was also a big blow to the industry. Remember that if you sell crude oil at 100 dollars a barrel, 50 dollars a barrel is not a 50 percent reduction, because the 50 dollars includes your cost of production. If your cost of production is 40 dollars, it means you move from a margin of

60 to a margin of 10. That is a gun to one's head, and it's a big issue. In Ghana, when we set up production at the Jubilee field, we were lucky to have good oil prices until the recent slump, and that reduction alone reduced the Government's income significantly. That is a concern. What we expect with the OPEC decision is that there will be a gradual increase in oil prices. I want to believe that an oil price regime of something between the 60 to 90 dollar range, depending on a lot of factors, will better balance the interests of both producers and consumers.

In particular, what are the effects of OPEC's cuts and of a possible price rise on Ghana?

Currently what is happening is that we have moved from no production in 2010 to 100,000 barrels a day. In August, we started production from the TEN fields, which are currently producing about 50,000 barrels a day. So, barring all the challenges that we have at Jubilee, we'll be producing 140,000 barrels a day. The contribution from petroleum will be really significant if we bounce back to the 100 dollars a barrel price regime, so clearly an increase in price will boost government revenues. To give a basis for comparison, in 2014, the government's receipts from petroleum amounted to about a billion dollars, and this figure declined to 300 million dollars in 2016, so you can see how significant a factor it is. Obviously if the number increases, we're going to see the contribution increase as well. So, as much as consumers around the world would like to see low prices, I believe we should have a price range that puts both producers and consumers in good standing.

President Nana Akufo-Addo expressed the hope that Ghana can meet the challenges of the energy sector. What are Ghana's most pressing energy goals in the future?

The good news is that our energy demand is rising annually above 10 percent and that is a very good sign. If your energy demand increases, it indirectly indicates that your economy is growing. But the real challenge has been the availability of power. I know in certain environments that is not an issue, but it has been an issue in Ghana. Ghana started very well in terms of energy, when in the 1960s,



our first president developed the Akosombo Hydroelectric Power project, Ghana suddenly became a net exporter of energy. We were producing close to 1000 MW, and what we needed was about 300 MW, so we were producing about 3 times what we required. After a while, we used up our reserves and became a net importer of electricity. What is happening now is that we have moved from 100 percent hydroelectric to the region of 50-50 between hydroelectric and thermal power, and in the thermal component a large percentage is fired by gas. If in the next year the OCTP Sankofa-Gye Nyame project delivers on both oil and gas, Ghana is going to be producing about 200,000 barrels of oil a day and about 300 million standard cubic feet of gas a day. That will make a significant contribution to electricity generation in Ghana.

Ghana's GDP is growing and according to many experts, this is also linked to the increase in oil production and

exportation. Do you think perspectives are positive for oil resources?

The oil contribution to GDP is growing, but we do not want to be a country that sits on revenues as we are very much interested in value addition. If we take the component that comes from oil revenue and add on the component from value addition, Ghana will do very well. I'll give you some practical examples. We took a bold decision in Ghana to not flare any gas at all, so from our first field we decided to build the Ghana Gas plant, and today I'm pleased to say that almost all the gas produced from the Jubilee field is actually processed by the Ghana Gas Company.

As a result, it is producing lean gas for power generation and providing about 50 percent of the liquefied petroleum gas needed in Ghana. So by continually generating revenue from related services, the contribution of oil to GDP total is going to grow. Our view of adding value to oil is aptly manifested in all the things we do, as for example in the area of local con-

The Petroleum Commission

The Petroleum Commission was established on July 2011 by Act 821 of Parliament in order to regulate and manage the exploitation of petroleum resources and to co-ordinate the policies related to them. The Commission is the regulator of Ghana's upstream petroleum sector and is mandated to regulate, manage and coordinate all activities in this sector for the overall benefit and welfare of Ghanaians.



MARILIA CIONI
AND **SIMONA MANNA**

Marilia Cioni is content producer and press office of Eni. Previously she worked for the AGI news agency, where she managed international relations.

A journalist, Simona Manna works for the *Oil Magazine*. She previously worked for the AGI news agency and, before that, in the print media (*Corriere della Sera*, *Il manifesto*, *El País*) and radio (AGR, RCS MediaGroup).

Theophilus Ahwireng

He is C.E.O. of Petroleum Commission Ghana. Originally a geophysicist by training, with a 1st degree in Physics from the University of Science and Technology in Ghana, Ahwireng joined the GNPC (Ghana National Petroleum Corporation).

Energy in Ghana

Area: 238,533 sq km
 Capital: Accra
 Population: 26,908,262
 Language: english (official)
 Government: Presidential republic

MAIN ECONOMIC INDICATORS

GDP (official exchange rate): 42.76 billion dollars
 GDP real growth rate: 3.3%
 Public debt: 73.7% of GDP
 Inflation rate: 17.8%

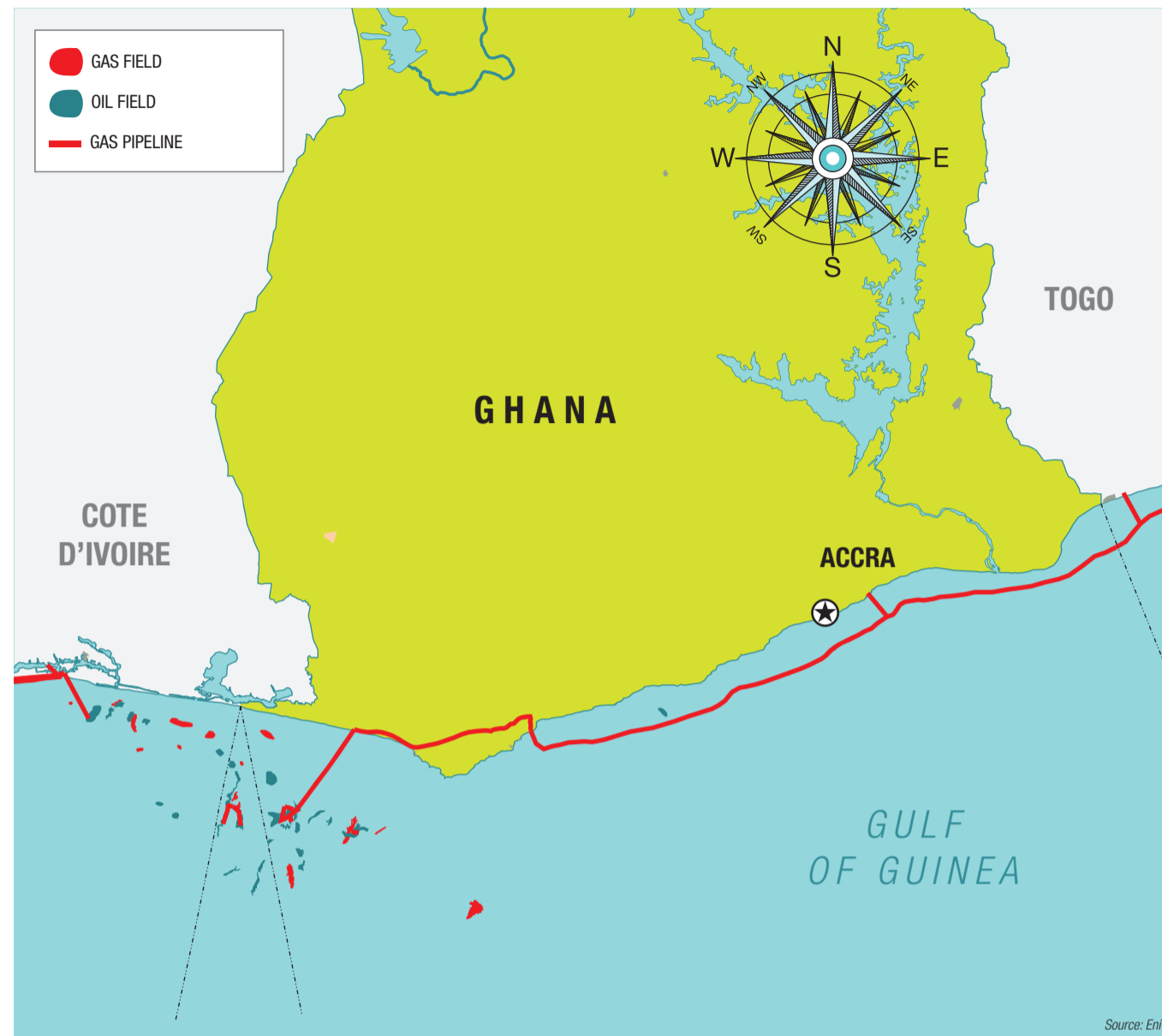
OIL

Production: 106 thousand barrels/d
 Consumption: 110 thousand barrels/d
 Reserves: 659 billion barrels

GAS

Production: –
 Consumption: –
 Reserves: 27 billion/mc

Source: CIA Factbook, World Oil & Gas Review 2016



tent. In the OCTP project we estimated that the value of contracts going to indigenous companies would exceed 20 percent, and for a six billion dollar contract we are talking about somewhat over one billion dollars, and that really is a significant contribution. We are adding value in many ways through the capacities being developed in the area of product fabrication, as there could be synergies in the utilization of these capacities. These synergies could contribute in shipbuilding and in the mining sector, and by so doing the ability of the nation to add value will increase. I strongly believe that one of the growth poles for the country is going to be petroleum.

In Africa when we talk about energy, we often talk about access to energy. How is Ghana operating in this sense, and what are the goals for the future? Is Ghana planning to invest in renewable energy sources too?

Access to electricity in Ghana is about the highest in the Sub-Saharan region, but we are not resting on our oars. We believe much more needs to be done. Right now the growth in energy demand could be met by thermal sources such as gas fired thermal plants so the addition of these gas resources is a fantastic opportunity. In Ghana, we try to be efficient so most of our plants are combined cycle, which gives more efficiency to the gas that is being produced as well.

There is also the West African gas pipeline infrastructure, which brings indigenous gas from Nigeria through Benin and Togo to Ghana. The government is determined to re-discuss these issues with Nigeria to ensure that even as we produce local gas we can increase gas imports from Nigeria as the quantity we receive now is much less than what we were originally supposed to receive. With these varied sources, it is clear that we will increase our ability to deliver energy. Looking beyond

hydro and thermal, Ghana's geographical positions are well placed to deliver high solar resource. But I concede we haven't done much in this area of solar, and this is why we invite the international investor community to look at the possibility of undertaking a large solar power project. At the end of the day, it boils down to the economics: if the price per kilowatt-hour is good, then we will be happy to leverage that opportunity.

We have a very large suppressed demand as well; there are certain industries in Ghana today that are not functioning because of lack of power. So the potential for consumption is present and fortunately through the West African power pool arrangement for excess power in Ghana, it is possible to transport this excess to nearby countries, including Nigeria itself. So I see that as an exciting opportunity, and I invite the international community to look at Ghana as a destination for investment in solar.



Read on www.abo.net, the Oil book entirely devoted to Ghana entitled "The central african gold coast."

OPEC/The implications of a big agreement



A new role

OPEC's recent ability to unite and find common ground on production cuts suggests that the frequent predictions of its demise were not only off-target but also missed its potential to become newly relevant



JAMIE WEBSTER
 He is a Fellow at Columbia University's Center for Global Energy Policy. He is an expert in energy markets and geopolitics.

In November of 2014, OPEC delivered a sizeable blow to oil bulls still hoping for the organization to pull the market out of a tailspin. The decision to leave production unfettered by targets, quotas or any other constraining mechanism caused a sharp five dollar plus price drop that day, en route to an eventual low point in early 2016. The decision was driven in large part by Saudi Arabia, which felt it could not successfully contend with surging non-OPEC production after years of high prices. U.S. shale was a big part of this, but the role of Canada and others, as well as relatively weak demand, were also recognized. In the first six months, the policy helped to boost OPEC production by nearly two million barrels per day (MMb/d), while shale only belatedly began falling, after gaining

nearly 300 kbd from November to April 2014. The delayed fall in U.S. production served to highlight the concern within OPEC that a production cut would only be replaced by production elsewhere, causing total revenues to fall from both components, price and volume. The policy to let OPEC production go where it would be based on the view that volumes were controllable while global balances (a stand-in for price) could not.

The conditions that led to an agreement

The route between the November 2014 decision and the agreement that both OPEC and non-OPEC countries reached in late 2016 was paved with multiple bilateral and group conversations, a willingness to

compromise, and changes in the market. These changes stemmed from four conditions:

- 1 | SHALE AS A THREAT.** In 2014, U.S. shale production grew more than all global demand, an untenable position for stable prices. Since the price fall, the cost cuts, reduced production and perceived slower response time have all contributed to the belief that shale will no longer grow at a level that is unsustainable for the global system.
- 2 | OPEC PRODUCTION GROWTH.** It is difficult to gain an OPEC cut, or even a freeze, when one or more countries is still growing strongly. This was the case for Iraq and Iran as production grew for different reasons and at different time intervals between the key 2014 and 2016 OPEC meetings. →

As each hit its zenith, the barriers to an agreement were reduced.

3 | SHARING OF CUTS. Many were expecting or at least hoping that Saudi Arabia would shoulder the burden of the cuts in late 2014 at the beginning of the price decline. But the Saudis saw little advantage in taking on all the pain of a production cut while the benefits were socialized. Sharing cuts across eleven OPEC members and several other non-OPEC producers allowed the OPEC core to contribute substantial volumes (~800 kbd) while benefitting from cuts elsewhere.

4 | FALLING PRICES. The reduced oil price has dented the financial situation of all OPEC member countries to one extent or another. But a falling price has also caused many to behave tactically rather than strategically as they stayed focused on maximizing revenue in the degrading price environment. The talk of a freeze at Doha and then a final delivered deal helped to boost prices nearly \$25/b over the course of the year, more than sufficient to persuade countries that a production cut was not only possible but could increase overall revenue.

Early data suggest that compliance in the early part of the agreement has been very high, with some assessments showing a level above 90 percent. The 1.2 MMB/d cut of the OPEC communiqué was quickly followed by another 600 kbd cut pledge by non-OPEC countries. The OPEC cut paid for itself and gave a return the same day as the announcement. The non-OPEC agreement, made several days later, had a similar effect. The physical impact of the cut, which the public reporting agencies largely took at face value as announced, was less certain, though none thought it would immediately reverse the 10+ quarters of oversupply into a deficit. While most of the price impact occurred before the agreement—the forward curve began to dip back towards backwardation after the agreement—a condition suggesting tightening fundamentals, and with it the beginnings of the release of a portion of the 1.3 billion barrels of accumulated crude and products since the price rout began. The capacity of the OPEC organization to strongly rally around an agreement as well as extend its influence beyond its members causes some pause that perhaps the oft-forecast “Death of OPEC” is not only wrong but that the group is on the verge of new relevance in balancing the global oil market. The market is changing and OPEC is changing with it, but there are several reasons this strong compliance level is likely to be a high-wa-

ter mark as OPEC's power again recedes and it continues to remake itself in a market vastly different than what existed even in the hey-day of shale's boom time.

Future risks

Risks to OPEC's current high cut compliance are multi-fold but stem from the issues set out above. The first risk is external to the organization, as shale has already shown a quick uptick in activity, with horizontal and directional rigs up more than 125 units in the 10 weeks after the OPEC agreement. Shale activity responded rapidly during the price slide as companies cut costs, reduced the rig count, focused on the core areas and increased efficiency. These steps have allowed average productivity per well to more than double for most plays since the price fall. But overall shale production dipped slowly from the price shock. The incentives of shale producers towards prices is asymmetric, as they have

struggled to maintain production in the face of declining capex, they will be able to hold onto some of these gains permanently, upwards of 60 percent. This increases the risk that the price uptick will sharply boost U.S. production. Most estimates of 2017 production growth range from 0.3 to 0.8 MMB/d, and the necessary return of drilling to non-core areas will counter some of the efficiency gains, but there remains the possibility that a sufficient price signal could return the industry to a time when analysts were woefully under-forecasting shale growth for several years running. The second risk is from inside OPEC itself. Libyan and Nigerian production have been hampered by different forms of internal strife with Libya also managing some maintenance issues that hampered production in the latter part of 2016. Libya production has risen from the erratic but low levels of 200–400 kbd to more than 700 kbd in early 2017, with a plan to increase to 1.2 MMB/d,

enough to offset much of the OPEC cut and extend the oversupply for another 2–3 quarters. There are several hurdles to overcome as this production level rises amid higher oil prices. The potential to double or triple oil revenues year over year will put pressure on an Egypt still emerging from the weak state capacity that became entrenched over decades of rule by Muammar Gaddafi. As revenues rise there is risk of a strike, unrest or other issue, all of which could swiftly reverse production gains in the country. While Libyan outage risks increase as prices increase, the opposite is true for Nigeria. The range of outcomes is smaller for Nigeria than Libya, with a production recovery of up to 300 kbd near the maximum of its production. The higher prices and revenue as well as the anti-corruption campaign of President Buhari hold the potential for more revenue to be available to the Niger Delta states. This could reduce unrest and outage risks. Nigeria and Libya

are part of OPEC but were exempted from the organization production cuts. However, their production levels, likely to be higher than last year even with the risks, make it harder for OPEC to deliver the needed production cuts for the global balance.

If member states don't stick to their promises

Risks also come from the potential for members to increase production in the months to come. The December 2008 agreement in Oran, Algeria to cut more than 3 MMB/d from OPEC production also had its best compliance in the first few months after the agreement. The OPEC core met its agreed-to obligations by cutting more than 1.1 MMB/d, a compliance level of more than 100 percent. The other seven members also cut by a similar amount, but this was only about half of what they agreed to do. Venezuela only cut about 100 kbd after agreeing to cut nearly 650 kbd and was a large part of the missed pro-

duction cuts. The OPEC core, both individually, and as a group, maintained its obligations over the next year while the other members saw its compliance fall sharply to only about 23 percent of the agreement. The most recent OPEC agreement is seeing a similar pattern in the early data, with some countries, particularly in the OPEC core, cutting more than was agreed to in Vienna. As time extends into this initial six-month agreement there is a higher and higher likelihood of some members seeking to regain some of the “lost” revenues from lower production. This is likely to also be true for non-OPEC countries, who are unaccustomed to cutting production and also suffer from weakened oil revenue. This temptation to reduce compliance will rise over time but should the oil price retreat further verbal entreaties by OPEC ministers may fail to rally the market as it did time and again in 2016. There is a potential that OPEC is able to hold the line across the

board this time. On the surface, there is even an argument that can be made that its market power is at a maximum given the agreements extend to cover several non-OPEC countries. But maintaining this stance will take several elements given OPEC has no punitive authority. The first is countries will need to clearly see the financial upside in adhering to the production cut. Even in a rising price environment this will prove tough, and the free rider issue will likely cause countries to no longer see the incremental revenue upside from the initial cut, instead focusing on the lost revenue from reduced production levels. Even if the cohesiveness of the broader group is maintained, the group must have the largest, and most flexible volumes of all the elements available for market balancing. U.S. shale is not a party to the non-OPEC agreement, and despite the history of the Texas Railroad Commission, it is unlikely to join in anytime soon. Shale has al-

If...

...THE PRICE OF OIL GOES UP, U.S. SHALE PRODUCTION WILL INCREASE

Shale activity has grown rapidly, with an increase in horizontal and directional drilling systems by more than 125 units in the 10 weeks following the OPEC agreement. The shale industry reacted quickly to the price collapse, with companies cutting costs, reducing the number of drilling systems, turning their attention to the major areas and increasing efficiency. These measures allowed oil companies to more than double average productivity per well since the fall in prices.



1

...PRODUCTION INCREASES IN LIBYA AND NIGERIA, EQUILIBRIUM WILL BE AT RISK

Nigeria and Libya were exempted from the cuts in production. However, their production levels, which will probably be higher than last year in spite of the risks, make it more difficult for OPEC to implement the necessary cuts in production to achieve global equilibrium.



2

...OPEC PRODUCTION INCREASES, THE AGREEMENT WILL BE AT RISK

Another source of risk stems from the potential increase in production by OPEC members in future months. As the first six months of the agreement unfold, it is increasingly probable that several members will try to regain some of the revenue “lost” as a result of lower production. This temptation will only increase over time if the price of oil falls and new pleas from OPEC country ministers do not manage to get the market to pick up, which is what happened repeatedly in 2016.



3

ready shown its ability to be a disruptive force in global markets after upending the supply-demand balance in 2014. These fast moving volumes are not sufficient in either size or speed to balance the market on its own in short order, but they are of sufficient size to undercut efforts by OPEC or a broader OPEC/non-OPEC coalition to balance the market. The market balancer is not a battle between OPEC and shale. The reality is much more complex, and should include the growing importance and volumes of stored oil in the market balance. The oil market is moving from the uni-polar market balancing world of OPEC to a multi-polar world of several balancers that can shift barrels at different points on the time scale and at different price points.

The market will not easily return to a “new normal”

In a market consistently oversupplied, it can be forgotten that for OPEC to recapture its prior status, it must also be able to flex production up as well. The low prices have sharply reduced capex spending for companies, and capex for exploration is back at 2006 levels. This is only one harbinger of a potential shortfall in supply in the future, and OPEC at this point is ill-equipped to accommodate any dramatic increase in the call on OPEC given the increased production from the organization over the last two years has come at a cost of reduced spare capacity. OPEC's cut of November 2016, along with the subsequent agreement by non-OPEC to also cut production, provided a boost to prices and helped pull forward forecasts of when the global balance would again emerge. But the oil market of today is different even from that of 2014, with the ongoing issues of OPEC such as the free rider issue and low spare capacity continuing to reduce the overall effectiveness of its long-term market management capabilities. Producers have benefitted from the heroic action taken but should be cautious in believing that the market will now return to a “new normal.” The market and the roles of new and existing players is still evolving, and OPEC is unlikely to step smoothly back into its old role.



Read on www.abo.net the articles by Demosthenes Floros, Colin First and Ian Bremmer on the same subject.



12 keywords

SENTIMENT

AGREEMENT

SHALE OIL

PRICE

SWING PRODUCER

RUSSIA

TRUMP

STOCKS

DEFICIT

OPEC

CRISIS

IRAQ

MOISÉS NAIM

He is a distinguished fellow at the Carnegie Endowment for International Peace, in Washington. His latest book is *The End of Power*.

The Arab spring and Libyan civil war triggered a significant increase in oil prices, which remained at an average of nearly \$100 per barrel during this period of political turmoil, roughly between 2011 and 2014. High prices allowed shale oil producers in the U.S. to increase their activity, which helped the country to nearly double its total production, from some 5.3 million barrels per day (bpd) in 2011 to almost 10 million bpd in 2014, and to reduce oil imports by about two million bpd during the same period. This was not good news for OPEC oil producers. Not only was the U.S. decreasing its dependence on OPEC oil but its booming oil production at home fed a global oil glut, which created strong downward pressures on prices. The economic slowdown of big oil consumers such as China and an anemic global economy also added to the weakening of oil prices. Increasing concerns about this turn of events led OPEC to deemphasize its goal of "protecting" oil prices and favor instead a strategy designed to protect and, hopefully, increase the cartel's market share. To achieve this goal OPEC decided not to react to declining oil prices and to keep production levels high, a move led by Saudi Arabia. The target of this strategy was the U.S. shale oil production, which would for the most part become uneconomical at prices below \$50 per barrel. This strategy worked for almost two years, between 2014 and 2016—U.S. shale oil production dropped by almost one million barrels per day during this period. But this approach proved unus-

tainable as OPEC members started to feel the pinch. In Saudi Arabia, for example, fiscal deficits in 2016 soared to 12 percent of GDP, oil revenues in 2015 dropped to half of those in 2011, imports were significantly curtailed and unemployment rose to about 12 percent. By the end of 2016, Saudi debt had risen to 15 percent of GDP and was projected to reach 23 percent of GDP by 2018.

A turnaround
In general, OPEC members suffered a large and painful reduction in their income from oil exports: it plummeted from \$753 billion in 2014 down to an estimated \$341 billion in 2016. This proved to be too much to swallow for Saudi Arabia, and the government decided to change course and seek higher prices through significant reductions of its production levels. Following this lead, in December 2016 OPEC decided to cut its overall oil output by about 1.2 million barrels per day, with Saudi Arabia absorbing almost half of the production cut. Iran, Nigeria and Libya were exempted from the cuts, while volume reductions assigned to Venezuela and Ecuador were very modest, of no consequence in the global context. Oil production cuts were also promised by non-OPEC nations, particularly Russia, Azerbaijan and Mexico, bringing the intended decrease in global oil supply to about 1.8 million barrels per day. OPEC estimated that with this volume of production cuts the price of oil would climb to about \$60 per barrel by early 2017. Indeed, as soon as the OPEC announcement was made, oil prices increased between 10 and 15 percent. Shares of oil companies rose, lifting the Standard and Poor index to a new record high. Shares in the biggest U.S. shale producers also rose between 8-10 percent, as this sector could smell victory over Saudi Arabia in what they had considered a price war.

Five critical factors
By early 2017 oil prices still are in the range of \$53-54 per barrel. This would suggest that the initial psychological impact of the production cut on global markets has been weaker than on previous occasions. The dominant sentiment in the market is not that we live in a world where hydrocarbons are scarce but rather that supply is abundant and growing while demand continues to be contained by a weak global economy and the surprisingly rapid inroads made by renewables like wind and solar. Higher oil prices are also held back by several other factors.
1 One is high inventories. Despite some declines of their levels in late 2016, global inventories stand at →

Analysis/The OPEC agreement and a Nash equilibrium

OPEC and oil prices: What have we learned?

The organization is no longer what it was—its power to influence stock prices continues to decline. Five key factors will push back against its efforts to stabilize oil prices



THE FAST SUPPLY RESPONSE OF U.S. PRODUCERS

U.S. oil production has risen more than 6 percent since mid-2016 and shale oil output is back to late 2014 levels.

5.7 billion barrels, a high volume that weighs heavily on price dynamics.

2 | A second factor that conspires against higher prices is the fast supply response of the United States producers to higher prices. U.S. oil production has risen more than 6 percent since mid-2016 and shale oil output is back to late 2014 levels. Baker Hughes, an oil services company, reports that since mid-2016 U.S., drilling units in operation experienced their largest increase of the last four years.

3 | A third factor is an old and unsolved OPEC challenge: how to maintain price discipline among its members. According to Saudi Arabia's Energy Minister OPEC's oil cuts are taking place according

to plan. Yet, previous oil cuts have revealed frequent cases of cheating among the members of the organization. This time Iraq could be one of the weakest links in the chain, due to the poor control they exert over oil production in the Kurdish zone. Since OPEC producers such as Iran, Libya and Nigeria are exempted from the agreement, proper monitoring of compliance to the cuts will be difficult.

4 | A fourth factor is Russia, the world's second largest oil producer. According to its Energy Minister their aim is long-term market stability rather than high oil prices. He also noted that Russia's budget for 2017 is based on oil selling at \$40 per barrel. High oil prices would help, he said, but "do not matter" for Russia as much as for cash strapped OPEC members. Moreover, Finance Minister Anton Siluanov has stated that Russia's fiscal situation should be in balance as long as oil prices remained in the \$40-45 range for the next three years. If anything, Russian priorities would seem to favor an increase in oil production. And, of course, the evolution of the economic sanctions that the United States and Europe have imposed on Russia as a result of its invasion

of Crimea and its intervention in Ukraine will also bear on the impact of Russian oil on world prices.

5 | Finally, we have the Trump factor. The new U.S. president is bullish on increasing domestic oil production and this will have a downward impact on prices. OPEC oil cuts will most probably generate, in the medium term, an oil price increase, one likely to be weaker than expected. The U.S. Energy Information Administration (U.S. E.I.A.) predicts that oil prices will increase to only about \$55-56 per barrel during the next two years, as U.S. production increases by about 500,000 barrels, partially offsetting OPEC's oil cuts. In the meantime some of the more financially pressured OPEC members could be forced to increase their production, further weakening the effect of OPEC's measures. The presence of the U.S. as a non-OPEC swing producer seems to have introduced an important change in what used to be an OPEC dominated oil price game.

The Nash equilibrium

Such a new balance promotes what game theorists refer to as a Nash equilibrium. There will be no incentives for OPEC to cut oil production any further as long as the U.S. keeps in-

creasing its own oil production to compensate for OPEC's cut. Of course, there is always the possibility that such a delicate balance could be disturbed by unilateral actions from one or more large oil producers with an urgent need for more oil revenues at any cost. But perhaps the most salient conclusion is that recent oil market dynamics reaffirm the reality that OPEC is not what it used to be. Its ability to influence oil prices has been waning for decades and the very limited impact of its recent attempts to influence the market confirm that this trend has not changed. A second important message is that while structural factors point to a protracted period of relatively low oil prices, this market is prone to sudden price surges caused by geopolitical accidents. And 2017 started with a heightened sense that the list of possible accidents that can drastically disrupt oil markets is longer and more ominous than it has been for a while.



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Dialogue/Christoph Frei, Secretary General, World Energy Council

An inevitable step

While the world's chancelleries appear to analyze the world's energy fate based on the outcomes of oil agreements, many of them seem determined to use production and consumption models focused on other sources. What will the new balance be?

or some time, Vienna has been the center of the world's energy fate, and more. For example, many global economic growth projects depend on the results of the OPEC agreement on oil production cuts, painstakingly reached there in November of 2016. On the other hand, a growing portion of the international community is now willing to strongly defend the results of another agreement—that reached in Paris during COP21—that aims to safeguard the planet from the increasingly ominous effects of climate change. At the center of this shift are a wide array of international institutions, including one of the most prestigious, the World Energy Council (WEC). We have therefore felt it appropriate, in the pursuit of complete information, to request the authoritative opinion of Christoph Frei, Secretary General of this major international organization. We met Mr. Frei in Rome during the presentation of the 2016 World Energy Scenarios.

GIANCARLO STROCCHIA

A journalist, he was a contributor to newspapers like *La Voce di Montanelli*, *Euronews*, *Rai Format*. He worked at the Department of Public Information of the United Nations in New York and has practiced corporate and CSR communication.

In your opinion, what effects will the cut in oil production expected from the latest agreement between OPEC countries have on the global energy sector and what countermeasure will be played out by the role of non-OPEC producers?

I think it is necessary to make a distinction between long and short-term prospects. Looking at the short term, we can see that, historically, low oil costs have always favored growth. In the same way, this situation inevitably also involves some disadvantages: during a period of low prices, producing countries suffer, with direct and indirect consequences on the global economy. This is a phenomenon we have already witnessed, and this is why I believe it is in the world's interests to find a balanced price. I believe that the measures implemented so far have been taken for this purpose and, to some extent, seem to be working. The same situation, in my opinion, if assessed over a long distance, has negative connotations. Low prices, especially when they involve economies centered mainly on energy resources, affect

the possibility of investing and supporting consumption, therefore affecting global growth.

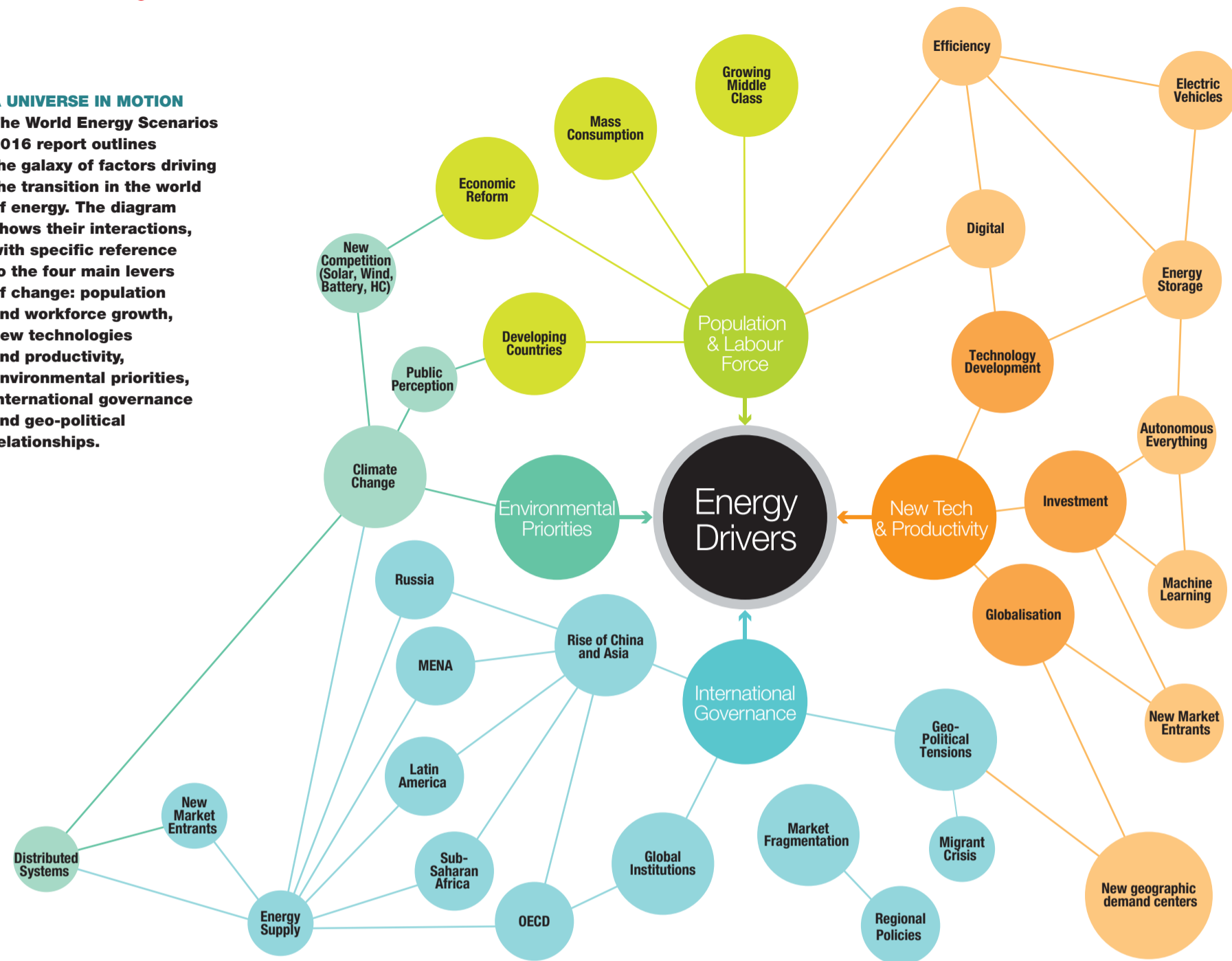
OPEC's action has often been hampered by the positions taken within the organization itself. What were the elements this time that enabled the agreement to be reached?

I would bring attention to the two key principles that, in my opinion, have made OPEC a successful cartel. First, the most obvious and predictable: by reducing the overall production of crude oil, prices increased immediately. But there is an even more important principle that results from a reality defined by an economist called Harold Hotelling. By constraining the volume of production, positive effects are not only seen in the short term, but also in the long term, because the marginal value is expected to go up due to innovation and other external factors. Now, putting that into the context of stranded reserves, the marginal utility of resources no longer goes up but, actually, the opposite happens. This is why the international community is encouraged to increase its oil reserves as quickly as possible, which goes against the price logic. On the one hand, in the short term, there is a strong global interest in maintaining a degree of equilibrium. While on the other hand, these dynamics seem to clearly suggest that, in the long term, there is not necessarily a sound basis so that oil prices can continue to go back up. OPEC and many other countries are seriously trying to get to grips with this situation. We have seen how Saudi Arabia is restructuring its policy and I sincerely think that the future reality is different from what we have seen in the past, including in OPEC.

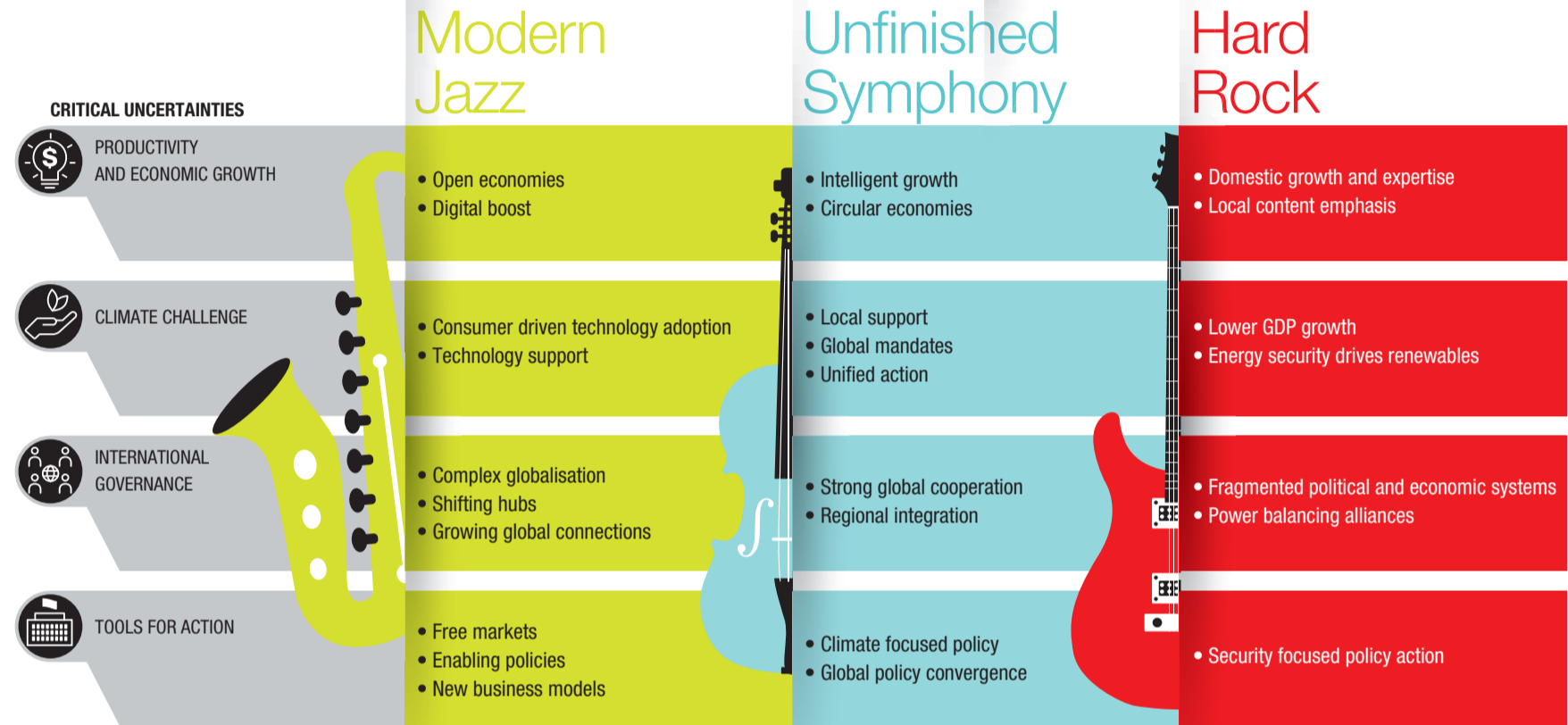
Apart from the agreements reached, what role will high-energy demand countries, such as India and China, for example, play in the formation of crude oil prices?

China has proven to be extremely proactive, by investing mainly in renewables and implementing, in a manner I call symphonic, a series of possible measures for combatting energy poverty, which affects around a billion people. Beijing is currently trying to get away from coal, by increasing its energy efficiency levels, decreasing the water footprint, and addressing a whole range of issues in a very thoughtful way. So, I think China may, going forward, take on an increasingly important role, both nationally and internationally.

A UNIVERSE IN MOTION
 The World Energy Scenarios 2016 report outlines the galaxy of factors driving the transition in the world of energy. The diagram shows their interactions, with specific reference to the four main levers of change: population and workforce growth, new technologies and productivity, environmental priorities, international governance and geo-political relationships.



PRE-DETERMINED ELEMENTS	FACTORS THAT SHAPED WORLD ENERGY 1970 TO 2015	PRE-DETERMINED ELEMENTS 2015 TO 2060
POPULATION / WORKFORCE	• Global population grew 2x (1.7%)	• Global population will grow by 40% (0.7%)
NEW TECHNOLOGIES	• ICT revolution • Productivity growth rate of 1.7% p.a.	• Pervasive digitalisation • Combinational impacts and productivity paradox
PLANETARY BOUNDARIES	• Four planetary boundaries already crossed • 1,900+ GtCO ₂ consumed	• Water stress in high risk regions • 1,000 GtCO ₂ to 2100 to avoid 2°C
SHIFTS IN POWER	• Rapid growth of non-OECD countries • Growing role for global institutions e.g. UNFCCC, IMF, WTO and G20	• 2030: India is most populous country • 2035-45: China is the world's largest economy



India, for its part, on the other hand seems to have remained behind, but is starting to look at solar power as an opportunity. "King Coal" is still in India, but I think that solar power is making its way, together, obviously, with the new business models we have seen everywhere. These new opportunities will change the reality also in other countries, beyond China and India and including those in Africa. As regards the emerging countries, the question is different, and is that which we have asked in the past: can we imagine a leap forward in the energy sector? In past years, it was always that this would not be possible. However, business models now show that there may truly be possibilities for these countries, which do not yet have the infrastructure needed to take a real leap forward.

An energy scenario, therefore, that moves between the rebalancing of the energy market and the increasingly strong drive towards what seems to be an inevitable transition towards alternative sources and renewables.

First, from the global scenario, it is clear that the transition process is already on the way, unlike what we would have predicted just three years ago. If I had to sum up in four key points the current context and changes in the global energy scenario, I would say that, first, we are entering a totally different growth reality from the past. To date, we have been used to a reality characterized by steady economic growth and positive development prospects for certain types of activities. Following the sharp slowdown in population growth, the per

capita energy demand will reach its peak before 2030. This doesn't mean that all aspects of energy peak. Gas and electricity are two key components that are continuing to grow, but the peak will mainly affect sectors such as coal and oil, and this is where the final per capita demand will increase. Secondly, according to statistics on growth, there are three main factors that can lead us to change. The first is decarbonization, or the acceleration of the process of taking the global percentage from 1 to the 6 percent that it would take to prevent the temperature of the planet from exceeding the "critical" two-degree increase threshold. The decarbonization plan obviously means that some countries have to deal with the phenomenon of stranded resources such as coal and oil. But the decarbonization process is also inevitably linked to the policies implemented as part of global trade agreements, and more.

The second significant factor consists of a new business model, and I believe that this is the topic of most interest to businesses. Concepts such as decentralization, the full transition to digitalization and the question of zero marginal cost are naturally coming into energy. This is added to the fact that, nowadays, there are no major obstacles for accessing the market of the various types of energy, unlike in the past.

The third factor affecting the growth in energy demand is resilience. What are the risks of cyber-attacks in the energy sector? The changes recorded in this sector are nothing short of dramatic, and a lot of work has been done to understand how best to prepare for bad weather. I believe that we are faced

with a very significant period of transition, in a scenario characterized by a different type of growth and driven by decarbonization, with new business models and new risks that require great stamina in the face of adversity.

According to you, what is the best way to react to such rapid changes? Is the world of energy prepared to respond to all this?

The only way to respond to the speed of changes and the clouds of uncertainty is to look at the portfolio that ensures greater flexibility, allowing you to look at the talent required in this predicament. The current situation expresses a complexity that is greater than ever. Therefore, the key to everything is to look at the talent that is capable of understanding the three driving forces for change in a different context and actually make the decisions. Developing the talent is not trivial. I think it takes an unprecedented effort to implement all possible measures to provide the leadership and develop the talent needed to cope with this transition. I believe that all efforts must go in this direction.

In your opinion, what role could the major national and international institutions, such as OPEC itself, play in such a context?

On the institutional side, the World Energy Council has compiled scenarios that enable us to better understand their role and, in summary, I think I can say that the future that awaits us is not perfect, but we will be able to reach many objectives

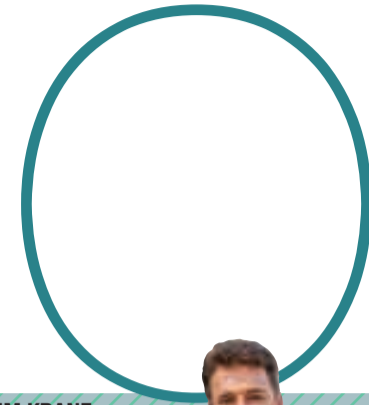
in terms of energy. Specifically, technological innovation will be greater, in terms of energy efficiency; the change advancement process will be faster. If, on the other hand, you build up trade barriers, the opposite happens. Therefore, the first task is to make sure that these technologies are disseminated in an efficient, widespread way.

Secondly, the institutions must not stand away from the importance of continued progress and climate agreements. The decisions made in Paris are only a third of the way from what really needs to be done to meet the two-degree threshold increase in global temperature. I believe it is crucial to acknowledge this reality. Great progress has been made, but the process is still underway and is part of a much longer road and we are not yet at the end.

Third point: if we consider the solutions to resilience, such as the challenges and the fact that we need to share the greenest and most effective resources, regional integration is a significant part, so it is important to have the support of international institutions, to work with development banks and with the governments of the various countries to promote integration.

MUSICAL ENERGY NOTES

The world of energy could follow several different paths between now and 2060, leading to 3 potential energy development models. To describe them, WEC, the World Energy Council, has borrowed music metaphors: MODERN JAZZ, led by a "digital disruption" and innovation, UNFINISHED SYMPHONY, in which more sustainable economic growth models prevail for a low-carbon future, and HARD ROCK, characterized by weaker economic growth and a political world turned in on itself.



JIM KRANE

He is the Wallace S. Wilson Fellow for Energy Studies at Rice University's Baker Institute, where he specializes in Middle East energy geopolitics. He is the author of the 2009 book *Dubai: The Story of the World's Fastest City*. His forthcoming book looks at the politics of energy in the Persian Gulf. Follow him on Twitter at @jimkrane.

nce ardent Cold War adversaries, Russia and Saudi Arabia joined forces in November to push through an historic cut in crude oil production, an impressive feat of diplomacy involving 13 OPEC and 11 non-OPEC countries that took place outside the usual multilateral forums. Even more impressive is that the agreement overcame stark geopolitical divisions among the signing parties. The ceremony brought together many of the proxy combatants supplying opposing sides in the Syrian civil war: Russia and Iran, both backers of the Shia-oriented Syrian government and its allies; and Saudi Arabia and the Gulf monarchies, which mainly support Sunni rebel groups. How did it come about? Simple economic self-interest is the straightforward answer, but dismissing the achievement as a mere financial move would underplay its significance.

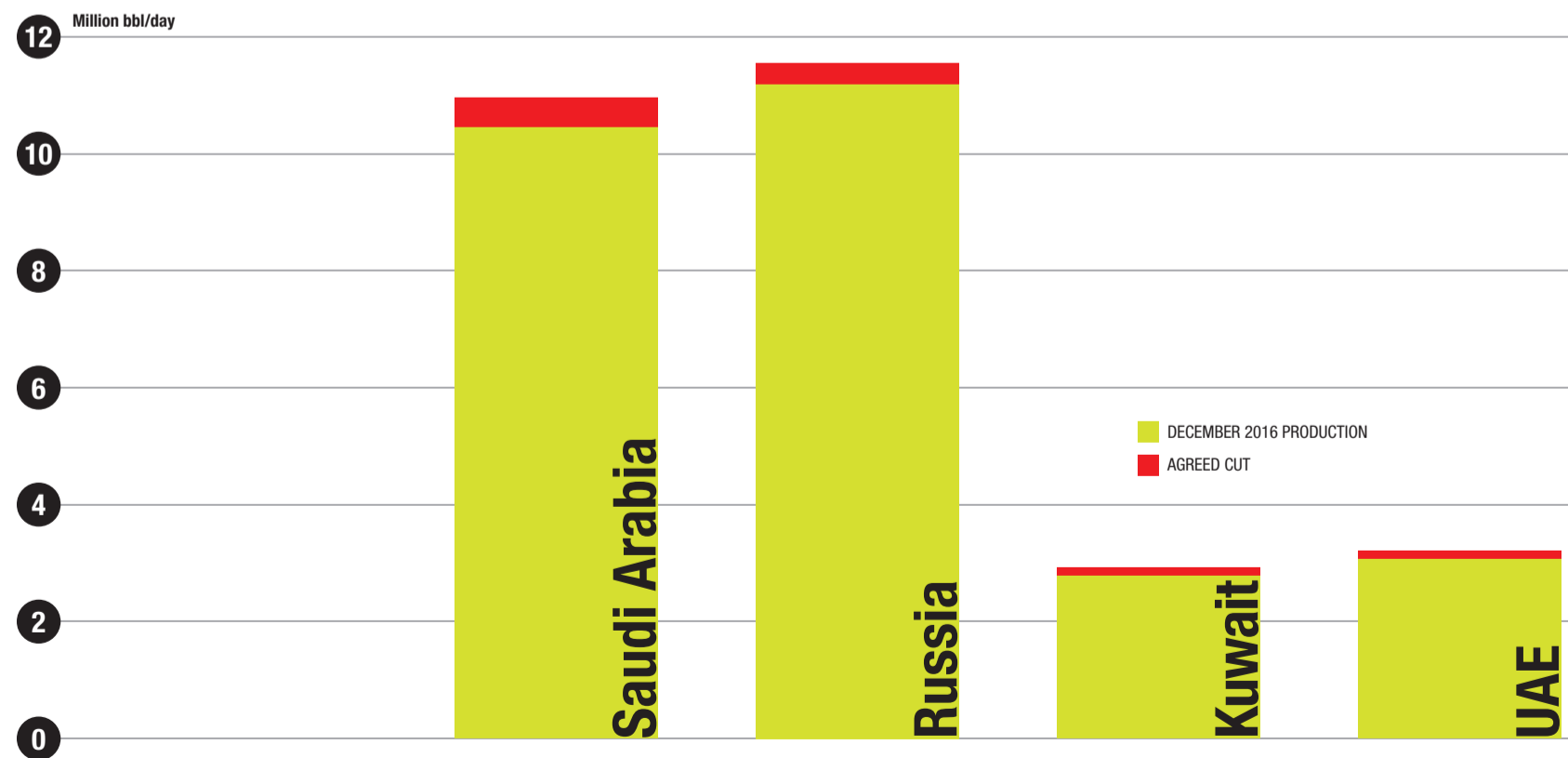
An agreement between adversaries: a landmark in the history of energy

Constraining global oil supply has always been a knotty collective action problem. But collective action has only grown more complex since the days when a smaller OPEC cartel, the Texas Railroad Commission, or even Standard Oil could clamp down on producers to maintain "reasonable" oil prices. The November agreement assembled no fewer than two dozen states, many of them strategic competitors and even arch-rivals. The players agreed to trust each other long enough to share the pain of as much as 1.8 Mb/d in production cuts in return for the prospect of disproportionate gains in revenue. The sprawling deal of historic magnitude simply would not have materialized without major efforts by the two largest players, Saudi Arabia and Russia, to find common ground and to bring others along. Now the question is: Was Russia's cooperation with the oil cartel an ad hoc opportunistic venture, or is the Russian-Saudi nexus something more permanent? On the one hand, the success of the November deal, brought together by two countries that find themselves increasingly at odds with Washington, signals enhanced willingness for Russian-OPEC cooperation. The deal also provides an unprecedented opportunity for Russia to build ties with Saudi Arabia, one →

Scenarios/Future relations between the United States, Saudi Arabia and Russia

Washington tips the balance

The OPEC agreement, strongly pursued by Moscow, was an extraordinary diplomatic feat among countries that have not always been "friends." Will the agreement last? This largely depends on the White House's new directives



Current oil output and agreed cut for Saudi Arabia, Russia, Kuwait and UAE. Russia's cut relative to output is smaller than that of three big OPEC producers.

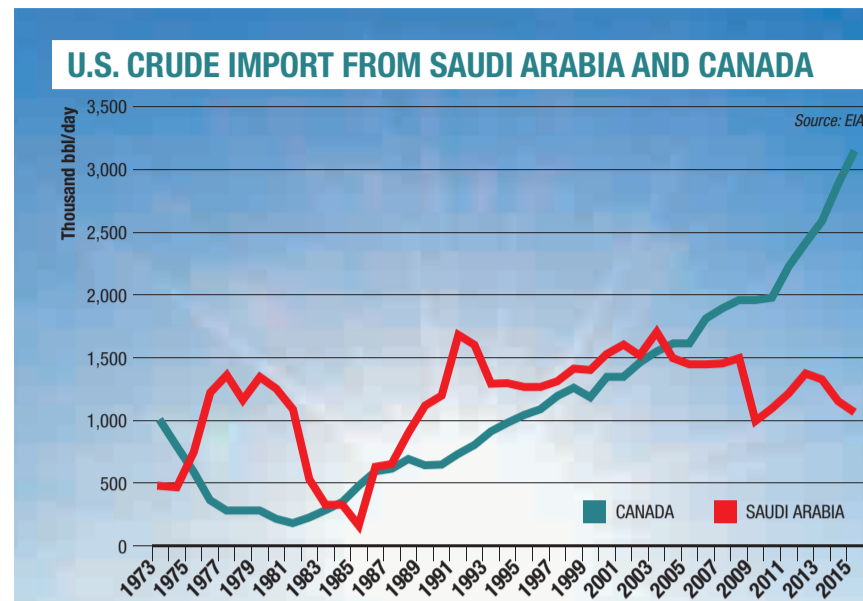
Source: OPEC 2017

of its most vehement Cold War foes. On the other, Russia's commitment to fighting alongside sectarian Shia forces in Syria, including Iran and Lebanon's Hezbollah militia, implies opposing geopolitical orientations that would weigh against closer alignment. The November agreement came together in the way that political compromises typically play out, with leaders twisting arms and offering sweeteners to build coalitions. Saudi Arabia, OPEC's de-facto leader by virtue of its spare production capacity, took care of its corner. The kingdom secured the agreement of the Gulf monarchies and the other Arab members of the cartel along with others, like Oman, Sudan and Bahrain, which produce oil outside of OPEC. Russia's cooperation starts with President Vladimir Putin, who saw obvious merits for his country. For the price of a gradual 300,000 b/d cut, about 2.6 percent of its peak 2016 output by the time the cuts reach their full extent, Russia has already begun reaping the benefit of a 20 percent increase in Urals crude sale prices. For Moscow, the November agreement has already proven its financial benefits. By contrast, the Saudis agreed to cut 486,000 b/d, and by January the kingdom announced that it had already surpassed that level. Other big cuts were promised by the United Arab Emirates—139,000 b/d, and Kuwait, which promised to trim 131,000 b/d and surpassed that level in January.

Russia also saw a unique opportunity to leverage its geopolitical advantage in the Gulf, the strategic heartland of U.S. energy security. In fact, the Persian Gulf monarchies are so important to Washington that protecting their sovereignty gave rise to the 1980 Carter Doctrine. The doctrine, which says the U.S. will use force if necessary to protect its interests in the Persian Gulf, was actually promulgated in a reaction to a Russian threat, the Soviet invasion of Afghanistan in 1979. The Carter Doctrine was enforced in 1991, when a US-led multinational force famously pushed the invading Iraqis out of Kuwait. Now, America, flush with shale oil and tiring of various unsuccessful attempts at reshaping the Middle East, seems to be taking a relaxed attitude toward Russian inroads in the Gulf.

Moscow acts quickly to secure the deal

Unsurprisingly, Putin seized the initiative. He and Russian Energy Minister Aleksandr Novak were among those working hardest to secure the deal, demonstrating Russia's credibility to cut production, while bringing on board a recalcitrant Iran and former Soviet producers Azerbaijan



Saudi Arabia and Canada compete for the U.S. import market.



and Kazakhstan. This time around, Russia's stance was more credible than promises it made in 1998, the last time Russia joined an OPEC cut. In those days, much of the Russian oil sector remained in private hands, and the botched post-Soviet privatization handed the keys to the economy to a handful of oligarchs who had little interest in promoting strategic interests of the state. Thus, cheating on Russia's quota was rampant. Since Putin's gradual re-nationalization of the biggest oil and gas companies, and his installation of key political subordinates at the head of those firms, the president's promises of production cuts carry more weight. Enforcement of quotas is also eased by state ownership of Transneft, the monopoly owner-operator of Russian oil pipelines. Novak and his Saudi counterpart Khalid al-Falih are said to have hammered out the core principles of the November agreement during meetings that took place over a year, often meeting in secret. After

the cuts, both ministers made statements suggesting that cooperation would continue. Novak went as far as to describe the close working relationship on energy as the first signs of an emerging "strategic partnership." "It is an historic moment, in my view," Novak said. Surprisingly, al-Falih echoed the sentiment, arguing that the deal "cements and prepares us for long-term cooperation." In January, al-Falih again called for a long-lasting partnership with Moscow, but was careful to frame cooperation in OPEC-Russian terms, rather than Saudi-Russian terms. "We at OPEC aim to optimize our relationship with Russia for the long term," al-Falih was quoted as saying. "A quick fix is not a big objective. We want this to be a lasting partnership. We have to be flexible when we intervene. Our partnership will evolve over time." Such statements raise questions as to what the ultimate parameters of this partnership might look like. Putin's

participation allowed the deal to surmount the increasing animosity between the Saudis and Iran. Seven months earlier, Saudi-Iranian squabbling toppled the attempt to forge a similar agreement in Doha. At that time, Saudi Arabia had demanded that Iran make cutbacks, and Iran responded that it would only consider cutbacks once its production had reached 4 Mb/d, the level it held prior to the imposition of international sanctions on its nuclear program. Those sanctions were lifted in 2016. This time around, Putin brought Iran on board by first ascertaining that Saudi Arabia would indeed agree to bear the largest production cuts of any participant. However, the Saudis did not want to be seen as conceding too much to Iran. Learning this, Putin is said to have phoned Iranian President Rouhani, with whom he has a cordial relationship, and quickly secured his agreement. Iran would play along, without being asked to make any cuts, and would refrain from gloating that

it had won a "victory over the Saudis." The surprising result: Saudis wind up cutting more than 500,000 b/d. Iran, by contrast, was permitted a 90,000 b/d increase in production.

The balance of power between OPEC and non-OPEC producers

As the old animosity between Russia and the Gulf producers appears to ease, one has to wonder about the balance of power between OPEC and non-OPEC producers. In the long run, the twin pressures of climate change and huge resource discoveries outside of OPEC bode ill for the cartel's market power. However, heightened cooperation, particularly with Russia, may erode Washington's influence on the Saudis, and by extension over the oil market itself. A decade or two ago, this would have been unthinkable. During Soviet times, Saudi Arabia and the United States were joined in a strategic partnership that moved in virtual

lock-step. At every opportunity, the Saudis backed U.S. efforts to combat Soviet and communist inroads around the world, including in Egypt, the Congo, Angola, Nicaragua, and most successfully, Afghanistan. At the same time, Saudi Arabia used its spare oil production capacity to bolster various U.S. interventions in the Middle East. Whether it was the loss of Kuwaiti production in 1990, the civil war-driven outages in Libya since 2011, or the nuclear-driven sanctions on Iran, America worked in concert with the Saudis to ensure that disruptions in oil supply could be covered without imposing undue pain on importing states, and in particular on the American motorist. In return, the United States provided hard security protection to the otherwise weak Gulf monarchies. The old oil-for-security deal always featured an unspoken tenet: Russia would be kept at arm's length. In 1951, Saudi King Abdul Aziz famously told a U.S. general who commanded the U.S.

airbase at Dhahran: "If you can find a communist in Saudi Arabia, I will hand you his head." Nowadays there are plenty of Russians in the Gulf, although few of them can be described as communists. Gulf resorts, particularly Dubai, have long attracted big-spending Russian tourists. The Burj al-Arab, with rooms at USD 1500 per night, is so popular with Russians that the hotel hires Russian speaking staff. The traffic goes both ways. In December, OPEC essentially bought a share of Russian oil production, albeit one that remains under control of the Russian state. The Qatar Investment Authority teamed with Swiss commodity trader Glencore in a USD 11 billion agreement to buy a 19.5 percent stake in Rosneft, one of the world's largest publicly traded oil firms. The Russian government retains a majority stake. If the deal concludes, the Rosneft sale would be one of the biggest energy transactions in recent months, representing a blatant end-run around Western sanctions on Russia. The deal is notable in part because Qatar, a U.S.-allied sheikhdom, apparently felt comfortable investing in Russia despite hosting the forward headquarters of the U.S. Central Command at the sprawling al-Udeid Airbase outside Doha.

The "understandable" position of the United States

Meanwhile, the United States appears to be enabling Russia's inroads by stepping away from the Middle East and gradually downgrading its ties with Saudi Arabia. America's stance is partly excusable. The U.S.-Saudi relationship lost much of its strategic rationale after the 1991 breakup of the Soviet Union. Since then, America has been buffeted by involvement in costly and unsuccessful wars which have done nothing to stanch the chaos in Syria, Libya, Yemen and Iraq. Deterioration in U.S.-Saudis ties accelerated under President Obama, who openly disdained the relationship. Obama withdrew U.S. forces from the region and sympathized openly with Arab Spring protesters in Egypt and Tunisia. The pro-revolt stance alarmed Saudi Arabia, especially the withdrawal of U.S. support for longtime Egyptian President Hosni Mubarak, deposed in 2011. The Saudis also decried Obama's unwillingness to forcefully intervene in the Syrian civil war. Most alarming for Riyadh was U.S. participation in the 2015 agreement in which Iran froze nuclear development in return for the lifting of Western sanctions. The nuclear agreement cleared the way for Iran's re-emergence into oil markets, and more importantly, as a strategic com-

petitor with Sunni regimes across the Gulf. Former Saudi ambassador to Washington, Prince Bandar bin Sultan, predicted that the nuclear deal would "wreak havoc in the Middle East" because it aids Iran, "a major player in the destabilization of the region." OPEC has also been drawn to Russia and other non-OPEC states because two of the biggest oil producers, America and Canada, lack the wherewithal to control oil production within their own borders. Washington and Ottawa have almost zero state influence on production decisions of more than 10,000 private operators in their oil sectors. The shale revolution allowed America to attain self-sufficiency in natural gas and move closer to self-sufficiency in oil. While Saudi Arabia remains the No. 2 supplier of U.S. oil imports, it is losing market share to Canada. If the Keystone XL pipeline is built, it could lose a further share of the strategic U.S. market.

With Donald Trump in the White House, it is anybody's guess whether the U.S.-Saudi relationship prospers or falters further. On the one hand, Trump campaigned on further reductions in American commitment to the region and made disparaging comments about Saudi Arabia, arguing that U.S. imports of Saudi oil—and perhaps U.S. military support—would be predicated on Saudi action in the fight against the Islamic State, or ISIS. On the other hand, Trump's appointment of former Exxon Mobil C.E.O. Rex Tillerson as secretary of state suggests the possibility of strengthened ties not only with Russia, but also with Saudi Arabia and other oil-producing countries with whose leadership Tillerson is on good terms. Changes in the U.S.-Saudi-Russia dynamic will unfold over the long term, held back by structural hurdles. Russia's wherewithal to penetrate the U.S.-allied Gulf, with its U.S. bases and national militaries that remain interoperable with America's, remains limited. At the moment, Russia's backing for Shia rivals to the Sunni monarchies also stands in the way of further inroads. At the end of the day, when there is trouble in the Middle East, it is still Washington that gets the call.



Read on www.abo.net the articles by Demostenes Floros, Giuseppe Acconcia and Bassam Fattouh on the same subject.



White House/Independence is again a priority

American Energy First

President Trump's energy policy confirms the energy sector-friendly goals he set during the campaign, with emphasis on the relaunch of drilling and the abandonment of Barack Obama's environmental policy

For



MOLLY MOORE

She is a Senior Vice President of Sanderson Strategies Group, a Washington, D.C. media strategies firm, and a former *Washington Post* foreign correspondent.

or the fossil fuel industry this much is clear about the direction of the next four years in the United States: The industry has a champion in the White House. While the details of President Donald Trump's energy and environmental policies remain in flux, his intentions couldn't be more clear: From day one the president began efforts to unravel the energy and environmental policies implemented by his predecessor, many of which had been viewed as hostile to the oil and coal industries. He immediately took steps to get the Keystone XL and Dakota Access pipelines back on track, started the process for stripping away environmental regulations he considers cumbersome to the fossil fuel industry and began scaling back the role the U.S. government will play in combatting climate change. Many

of Trump's plans could take months or years to implement and many others will be challenged in court and thwarted by slow-moving government bureaucracy. But the trends are evident. The new administration is focused on jobs and the economy as top priorities, and his predecessor's priorities on climate change and environmental protections are not merely on the back-burner but face all-out assault. Industry is cautiously optimistic, environmentalists are aghast and the American public is bitterly and deeply divided.

Watchword: energy independence

Trump's shoot-from-the-hip, get-the-facts-later operating style is disturbing to friends and foes alike. In announcing that he was re-opening

the process that would allow the Keystone XL and Dakota Access pipelines to go forward, Trump also said he would demand that only U.S. steel be used to build those pipelines. Requiring U.S. steel would be a violation of the World Trade Organization agreement, one that only allows such actions in cases of national security, an exception that would not apply to the pipelines. His administration also backpedaled after he announced the U.S. would start building a wall on the U.S.-Mexico border and that he'd use a 20 percent tax on imported goods to pay for it. That immediately alarmed the oil and gas industry and other sectors, prompting at least a partial retreat by Trump on the amount of a potential border tax. It is of significant concern to the oil and gas industry that Mexico has pur-

**REX TILLERSON**

Businessman and diplomat, he is the 69th U.S. Secretary of State, serving since his confirmation on February 1, 2017. Born in Wichita Falls, Texas, Tillerson has a degree in civil engineering from the University of Texas at Austin and, in 1975, he joined Exxon Company U.S.A. as a production engineer. After being appointed Senior Vice President in August of 2001, he was appointed President of ExxonMobil and made a member of the Board in March of 2004. In January of 2006, he assumed the role of C.E.O.

**EDWARD SCOTT PRUITT**

Administrator of the Environmental Protection Agency (E.P.A) A lawyer and Republican politician, in 2010 he was elected Attorney General of the state of Oklahoma. In this capacity he expressed views opposed to environmental protection regulations, Pruitt also conducted or participated in 14 lawsuits against the E.P.A. Despite the American press's identification of him as a "denier" with respect to the problem of climate change, during the Senate hearing for final confirmation of his nomination to head the E.P.A. he declared that "climate is changing, and human activity contributes in some way to this situation."

**RYAN ZINKE**

Head of the Department of the Interior Zinke served in the military and retired from the U.S. Navy Seals with the rank of Commander in 2006. He has been a member of the House of Representatives for the State of Montana since January of 2015. A Republican, he has been called by President Trump to lead a department whose principal responsibility is to protect the country's natural resources, a responsibility that includes the management of state lands and parks. Zinke will be called upon to change some of the rules introduced by the Obama administration, specifically those promulgated to limit the use of American national lands, by banning fracking and drilling oil in the Arctic.

**RICHARD PERRY**

Secretary of the U.S. Department of Energy James Richard "Rick" Perry served as the 47th Governor of Texas from December 2000 to January 2015. A Republican, he was elected Lieutenant Governor of Texas in 1998 and assumed the governorship when then-governor George W. Bush resigned to become U.S. President. Perry was the longest-serving governor in Texas history and, at the time he left office, the second longest-serving current U.S. governor. Perry ran unsuccessfully for the Republican nomination for President of the United States in 2012 and 2016. On December 14, 2016, Donald Trump announced his intention to nominate Perry as Energy Secretary.

chased more than half of all U.S. natural gas exports in the past two years. Trump's pronouncements create just the kind of uncertainty that can be unsettling to the very industries he has vowed to help the most. Trump has posted the general outlines of his energy plans on the White House website under the title "An America First Energy Plan" which he says is "committed to achieving energy independence from the OPEC cartel and any nations hostile to our interests. At the same time, we will work with our Gulf allies to develop a positive energy relationship as part of our anti-terrorism strategy." At home, Trump said his administration "will embrace the shale oil and gas revolution," in part by opening more federal lands to "untapped shale, oil and natural gas reserves." On environmental regulations, the new White House states: "For too long, we've been held back by burdensome regulations on our energy industry. President Trump is committed to eliminating harmful and unnecessary policies such as the Climate Action Plan and the Waters of the U.S. rule," which were his predecessor's initiatives to protect waterways and reduce greenhouse gas emissions. The new webpage statements provide no specifics, however, and do not go much beyond Trump's campaign platforms. Energy and Natural Resources Chairwoman Lisa Murkowski, a Republican senator from Alaska and a strong proponent of oil and gas interests, said she did not expect many specific details of the new administration's energy policy to emerge within the first 100 days. "I figure my job as chairman of the energy committee is to remind the administration of the significant opportunities that we have within the energy space and why it's so important to put it at the top of the nation's priority list."

All the President's "energy" men

Trump's move to the White House has emboldened Republican lawmakers to introduce a torrent of pro-fossil fuel, anti-E.P.A. legislation that could win the support of the new administration. However, many of those early pieces of legislation seemed as poorly drafted as some early Trump policy pronouncements and have been quietly withdrawn. Aside from Trump's frenzy to undo many of his predecessor's policies and the vague policy pronouncements on the White House website, some of the clearest vision for his administration's future policies on energy and the environment came in the often acrimonious U.S. Senate hearings questioning cabinet nominees who will be heading the agencies most responsible for carrying out Trump's

**ALASKA: A NEW FRONTIER**

The new administration has promised to grant additional drilling areas in Alaska, off of the U.S. coasts and on public lands. In the photo, a platform at Prudhoe Bay.

wishes and informing the creation of Congressional law. The men Trump chose to fill key cabinet posts are all friends of the fossil fuel industry. The former C.E.O. of Exxon-Mobil, Rex Tillerson, is secretary of state, the administration's highest profile emissary with foreign countries. Rick Perry, former governor of oil-rich Texas, was picked to head the Department of Energy, even though he once advocated abolishing the agency. Scott Pruitt, former attorney general of Oklahoma, another oil state, was Trump's choice to run the Environmental Protection Agency. Pruitt has filed at least 14 lawsuits against the agency in his six years as attorney general. U.S. Rep. Ryan Zinke of Montana, an avid angler and hunter who supports expanding drilling, mining and logging on federal land, was tapped to head the Department of Interior. Each of these appointees has expressed varying degrees of skepticism over the cause and impact of climate change. Some of the cabinet nominees have been highly critical of the agencies they were selected to lead. Perry, while running for president, proposed eliminating the Department of Energy, but at his nomination hearing he sought to re-assure senators that he has changed his mind: "My past statements made over five years ago about abolishing the Department of Energy do not reflect my current thinking. In fact, after being briefed on so many of the vital functions of the Department of Energy, I regret recommending its elimination."

Backtracking on climate?

Trump and the men he chose for his cabinet appear to be softening their positions on climate change. Trump has backed away from campaign rhetoric that called it a hoax perpetrated by the Chinese. "I believe the climate is changing," Perry, who once identified as a climate skeptic, told senators, "I believe some of it is naturally occurring, but some of it is also caused by manmade activity. The question is how do we address this change in a thoughtful way that doesn't compromise economic growth, the affordability of energy, or American jobs." "Science tells us that the climate is changing, and that human activity, in some manner, impacts that change," Environmental Protection Agency nominee Scott Pruitt, testified. And secretary of the interior nominee Ryan Zinke said climate change is not a hoax, but, "I think where there's debate is what that influence is, what we can do about it." Even so, some policy directions are becoming clear by their absence. Within hours of Trump taking office, all climate change pages vanished from the White House website.

New life to coal

While the president can make numerous executive decisions with the stroke of a pen, the implementation of new policies could face countless bureaucratic, political and legal obstacles. In other cases, technology and market forces will have greater impact than all the intentions of new policies

and leadership. Nowhere is that more likely than the energy sector. For example, while the Trump White House can ease policies that govern hydraulic fracking, it is state and not federal governments that have control over the permits and regulations that govern industry operations. The same holds across all energy sectors. For many environmental regulations, federal rules set minimum standards, but states have the authority to impose stricter versions. Trump and his cabinet members have vowed to eliminate many of the environmental regulations that often tie up industry operations and to speed permitting requirements that can delay shovel-ready projects for months, if not years. However, many environmental groups are beefing up their legal teams in preparation for court battles that, even if not successful, could delay implementation of Trump policies until his presidential term ends. Even greater driving forces are current market conditions, rapidly evolving technologies and growing consumer demands for greater corporate responsibility. One of the pillars of Trump's campaign rallies was his promise to return jobs and prosperity to coal communities. But the decline of the coal industry is just as much, if not more, the result of cheap gas and new technologies as it is of tougher environmental regulations. West Virginia Rep. David McKinley, a Republican from coal country conceded: "We're not going to get back to the 50s and 60s, I understand that." The Trump admin-

istration has promised to open more areas to drilling in Alaska, off the U.S. coasts and on public lands. But with depressed oil prices and the dramatic rise in hydraulic fracking, fewer oil companies may be willing or financially able to expand drilling operations to new areas, especially the financially and environmentally daunting Arctic. Trump and his cabinet members also say they plan to take aim at Obama laws that tightened restrictions on greenhouse gas emissions and water pollution. They will find powerful support in the Republican-dominated U.S. Congress for many of those efforts. The news site Politico asked outgoing E.P.A. chief Gina McCarthy, who presided over the implementation of those regulations: "When you look at the E.P.A. under a Trump administration, what is keeping you up at night?" Her response: "Just about each one of those issues is keeping me up at night, and the combination of them might keep me up for the next 10 years."



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U.S. Politics/The limits and possibilities of the Trump energy policies

Red, white and blue energy

Led by President Trump, the U.S. has taken a sharp turn to the right on energy and climate policies. Their impact will be limited by a host of market and local factors. The administration would do well to cultivate key energy relationships

SARAH O. LADISLAW

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The U.S. is blessed with ample natural resources, a strong economy, a vibrant system of universities and civil society groups, and world-class private companies. Each has contributed to its position as one of the world's largest energy producers and consumers, and a leading source of innovative energy technologies. The U.S. faces a world in which the energy system is very much in a state of flux. Oil markets are slowly coming back into balance after two years of oversupply accompanied by a dramatic fall in prices. The future price trajectory is uncertain—even with OPEC's recent decision to cut output. A bumpy ride at lower price levels seems likely and one cannot discount the possibility of major price spikes driven by supply disruption. Economic headwinds and uncertainty in major economies like China are likely to weigh on expectations for energy demand growth in all parts of the world. Technological, policy, and market changes continue to reshape established and developing electric power sectors in terms of generation mix, efficiency, and complexity of the grid. Geopolitical turmoil in certain key energy-producing regions of the world will continue to keep oil and gas markets on edge. A



wave of populism, anti-globalization, and political discontent continues to weaken institutions and create a crisis of governance in many countries around the world. On the climate front, the U.S. has established itself as a leader of global climate action and emissions reduction—but a huge amount of additional progress is needed to meet the stated global targets. Meanwhile, the center of gravity of global energy demand

growth has shifted to developing countries, making those regions the landscape of the bulk of new energy investment and leading all energy sector stakeholders to focus on connecting the world's poorest to modern energy services.

A sharp right turn

The election of Donald Trump as president has been characterized as an abrupt right turn for U.S. energy and

TRUMP PROMISES

Trump's campaign promises include rolling back environmental regulations, opening up more areas of oil and gas development, revitalizing the coal industry, pulling out of the Paris Climate Agreement, and making the U.S. energy independent.

market forces. For example, the process to roll back Obama-era leasing policies and environmental regulations is onerous and litigious, yielding very little long-term certainty for investors in the affected sectors. Climate change is the area most affected by these changes, despite the aforementioned uncertainty. Federal climate-related policies that would have expanded under a Clinton administration will almost certainly not advance (there is speculation over whether the state- and local-level complements to those policies may continue to hold). In the context of the global climate agenda that was seeking even greater emissions reductions than those pledged in Paris, simply holding the line on U.S. emissions reduction achieved to date is suboptimal, taking actions that increases emissions could be disastrous. Another example is the pledge to deliver energy independence, a goal the United States is closer to achieving today than any time in the last 40 years. Today, the U.S. is producing more energy than ever relative to its consumption and yet, it is just as tied to the fate of other countries as it was a decade ago, when our reliance on imported energy was at its highest. It is unclear whether any of Donald Trump's vague statements about standing up to OPEC and advancing energy independence will materialize

as anything other than pro-energy production policies which will be welcomed by the oil, gas, and coal industries. Investments may be limited by an oversupplied global market, at least in the next couple of years, and actual production impacts may be limited by the long time cycles involved in new investments coming to fruition. As for the U.S. posture toward OPEC and other major oil producers and consumers, this will likely be more affected by other foreign policy issues, like our stance on trade, changes to the Iran nuclear agreement and other security issues. As with other new administrations, Trump will inherit an energy system with its own dynamics and issues—only part of which is under federal control.

These days the energy sector is undergoing profound changes that will provide both obstacles and opportunities for the new administration to shape our collective energy future. Take, for example, the U.S. electric power sector. Just eight short years ago, half of U.S. power generation was met by coal; that is down to 32 percent due to abundant natural gas resources, stricter environmental standards on coal-fired power plants, and an increase in solar and wind capacity. The trend away from coal is likely to continue absent very significant government support. The U.S. has abundant gas resources, and existing state and federal policies and tax incentives, along with the declining cost of renewables, will keep renewables competitive. States across the country are experimenting with new pricing and regulatory models to accommodate a host of distributed energy resources from rooftop solar, to energy storage and demand response technologies. All the while electricity demand in the United States is flat to declining because of lower economic growth and higher efficiency rates, meaning that large changes to the fuel mix push out other sources. These trends will continue to challenge the role of coal and nuclear power. Eight nuclear reactors have announced plans to close and by some estimates, 15 to 20 more are likely to follow suit. Early next year, the U.S. District Court will decide the fate of the first ever sector-wide standard for carbon dioxide regulation as part of the Clean Power Plan regulation. The Trump administration has pledged to roll back this regulation along with many other environmental regulations affecting the electric power sector. While the new administration has the authority to effect some deregulation, the process will be long and the government will be sued by states and environmental organizations. The outcome will be greater uncertainty rather than a clear signal

toward more or less climate regulation over the lifetime of the long-term investments. Stakeholders across the sector recognize that these changes are stressing a system whose physical and regulatory structure was designed for a different time, and changes must take place to accommodate the new realities of a system in transition.

Changes in transportation and infrastructure

Change is taking place in the transportation sector as well. The U.S. vehicle fleet has caught up with its international competitors in terms of efficiency for the first time in decades. Ride and vehicle sharing is a growing phenomenon in most urban centers and the technology that enables it is largely considered to be the precursor for an entirely new transportation experience brought about by the eventual advent of fully autonomous vehicles. Amidst all this change, the nation's transportation system is stuck in a time warp. Highways, bridges, and rail systems remain woefully under-maintained and pose safety hazards as well as a general drag on the economy. Many state and local communities are modernizing their transit infrastructure but much more can and should be done.

The Trump administration campaigned on a promise to invest in the nation's infrastructure, much of which includes the transportation sector. Smart infrastructure policies and reinvestments could be a very welcome and needed advancement in this sector.

Meanwhile, the U.S. oil and gas production revolution continues. Despite two years of low oil and natural gas prices, U.S. production remains higher than it has been in decades. U.S. oil production is playing a central role in global oil market dynamics and U.S. natural gas exports are being used as a symbol of the potential for a larger role for gas in the coming decades. Concerns over the environmental impact of production, especially onshore, has spawned efforts by advocacy groups to stop producing all fossil fuels by directly targeting pipeline infrastructure development projects to ensure large onshore resources do not get developed. Ironically this is happening at the same time that much of the nation's oil and gas infrastructure is reaching maturity and is in need of replacement. Several recent oil spills and gas leaks speak to the need to update and maintain this infrastructure. Building new pipelines like Keystone XL and Dakota Access will get the most political attention in a new administration but the challenge to modernize existing pipeline infrastructure and continuing to improve the environmental performance →

Toward energy independence

The America First Energy Plan, recently released by the White House, outlines the key tenets of the Trump administration's energy policy, as follows:

- 1. Energy** is an essential part of American life.
- Seek freedom from **dependence on foreign oil**.
- Reduce energy costs** for hardworking Americans and maximize the use of American resources.
- Increase wages** of the energy sector by more than \$30 billion over the next 7 years.
- Eliminate policies** such as the Climate Action Plan and the Waters of the U.S. rule.
- Embrace the **shale oil and gas revolution** to bring jobs and prosperity to millions of Americans.
- Seek **energy independence from the OPEC cartel** and any nations hostile to American interests.
- Take advantage of the estimated \$50 trillion** in untapped shale, oil and natural gas reserves, especially on federal lands.
- Work with our Gulf allies** to develop a positive energy relationship as part of our anti-terrorism strategy.
- Refocus the E.P.A.** on its essential mission of protecting our air and water and preserving our natural reserves and resources.

of the nation's burgeoning oil and gas production will be critically important to address as well. The new administration has a tremendous opportunity to harness these changes and make some much-needed reinvestments that will benefit the U.S. economy, and can even choose to do so in a way that is acceptable to both political parties. One of the few areas of agreement in this year's deeply divided race for the presidency was on the need to rebuild the nation's infrastructure and use the energy sector as a source for job creation and growth. While

one party favored growth from so-called clean energy sources and the other focused more on oil, natural gas, and coal, the underlying recognition of potential opportunity was present in both political parties. Several bills drafted in the current Congress, as well as the U.S. Department of Energy through its *Quadrennial Energy Review* and the U.S. Department of Transportation with its *Beyond Traffic* report, have laid out some good ideas about current infrastructure needs and challenges that must be addressed to face the energy infra-

structure challenges of the future. The Trump administration would do well to rely on these documents and the insights they provide to inform their decision-making.

The innovation agenda

Another area of bipartisan agreement is on the innovation agenda. The United States is a world leader in energy, automotive and agricultural technologies of all varieties, and supporting the innovation ecosystems that allow that competitive advantage to thrive is another area where real

contributions to our long-term energy outlook can be achieved. The federal government plays an important role in its contribution to that innovation ecosystem. It would be a mistake to cede the country's competitive advantage on energy innovation by giving into short-sighted budget cutting exercises predicated on a small, rather than effective, government ideology.

One further key message from this year's election experience is that there is a great deal of dissatisfaction in both parties about the status of economic and social mobility. This concern is likely to permeate energy debates at the national and local level on both the right and the left of the political spectrum because energy is often tied to economic opportunity and job creation. For the last several elections both political parties have suggested that economic growth at both a national and local level could be achieved either through low-carbon energy deployment or fossil-based energy production and low energy prices.

What no politician is willing to admit is that our understanding of how energy fits into economic and social mobility is underdeveloped and self-serving. This is an area where a bipartisan effort to truly understand energy's role in social and economic mobility and improve our policies and investments would make a lot of sense. Finally, it is very important that the new administration not lose sight of the important energy relationships it has around the world. For much of the last forty years, U.S. energy policy has been driven by the need to provide energy security through broad and open trading relationships, especially for oil, within the global market. For the last ten years or so, that core objective has been joined by the overarching priority to reduce energy related emissions to combat climate change. This administration is driven by neither of these priorities but instead focused on making the most out of U.S. energy sources – a notion very closely tied to the idea of energy independence. Regardless of how much energy the U.S. has, it would be wrong to ignore the economic and security benefits derived for a globally or regionally integrated energy markets. Energy plays an important strategic role in the strength of the U.S. economy and our relationships with other countries. While the Trump administration's campaign agenda will be constrained by both process and market factors, a dynamic energy industry affords a great many opportunities as well. They are opportunities worth taking.



United States/The oil & gas industry under President Trump

A new era in energy policy



Under the new administration, the prospects for the oil and gas industry are positive, though causes for concern remain, among them the possibility of a federal carbon tax



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With the election of President Obama in 2009, the American oil and gas industry found itself facing an administration that was less interested in promoting domestic production and exploration, and instead focused on pushing heavy-handed regulations and taxes. Now, with the election of Donald Trump, the industry is looking at a new era in domestic energy production and exploration, as the White House and Congress have already begun rolling back a number of Obama era regulations that discouraged energy production and use. While the overall outlook for the U.S. energy industry is positive under Trump, there are still areas of concern, such as calls from some former lawmakers for a federal carbon tax, and plans to tax energy consumption and carbon emissions that are making a resurgence among state legislatures from Alaska to South Carolina.

A federal carbon tax?

Recently, a group of GOP economic advisers and statesmen, among them James Baker, George Schultz, and Henry Paulson, have begun advocating for a burdensome new federal carbon tax outlined in a plan called the "Conservative Case for Climate Action."

The Carbon tax pushed by the group is strikingly reminiscent of the \$42/ton fee that Hillary Clinton refused to support during the election. Emails from the hacked inbox of John Podesta show that the Clinton campaign believed the tax to be unpopular and regressive. It is highly unlikely that Donald Trump or Congressional Republicans would ever support an environmental policy that even Hillary Clinton found to be too extreme.

On the campaign trail, President Trump came out firmly against the

idea of imposing a carbon tax, and in May he tweeted, "I will not support or endorse a carbon tax!" These sentiments have thus far been echoed during the Trump presidency by his choices of Scott Pruitt for E.P.A. Administrator and Rick Perry to lead the DOE—both oppose government overreach and regulation. These appointments indicate a continuation in the president's policy of deregulation; a senior White House advisor reportedly told Bloomberg News that the president rebuffed Elon Musk's suggestion for implementing a federal carbon tax. As a businessman by trade, Donald Trump likely appreciates the fact that imposing a carbon tax at the proposed rate of \$40/ton would create economic shockwaves that would not be confined to the energy sector. Modelling a \$20/ton tax, the National Association of Manufacturers found that "the increased →

costs of coal, natural gas and petroleum products due to a carbon tax would ripple through the economy and result in higher production costs and less spending on non-energy goods." The study further reported that a carbon tax would reduce real wages and manufacturing output, and would generate minimal tax revenue for the federal government.

Baker, Schultz, Paulson et al. rightly point out that the extensive body of environmental regulations passed under the Obama administration have had a deleterious effect on the energy sector's ability to plan for the future, and that capital investment has consequently decreased. Calling the elimination of excessive environmental regulations the "final pillar" of their plan, these Republicans hit upon one area of policy reform likely to be enacted, though not in the manner they prefer.

With Scott Pruitt at the E.P.A., environmental regulations such as the Clean Power Plan, which Pruitt has spent his career challenging in court, will undoubtedly be on the chopping block. Thus, while deregulation is a positive for the energy sector, there is no need for it to be used as a bargaining chip for imposing a carbon tax as some are advocating. This regulatory rollback will likely happen regardless under Pruitt and Trump, no need for a grand carbon tax bargain.

Progress on deregulation

Trump has proven himself to be consistently amenable to deregulation, beginning with the issuance of his "1-in-2-out" executive order in the first three weeks of his presidency. Moreover, energy advocates are already celebrating the recent repeal of the Securities and Exchange Commission's (S.E.C.) Resource Extraction Rule (Section 1504 of Dodd-Frank), a regulation that had the potential to subvert the IP advantages of American companies. The rule would have required U.S. companies to disclose proprietary information, and its enforcement was estimated to cost as much as \$385 million per year. Congress's repeal of the Resource Extraction Rule is an encouraging sign that the Republican legislature will support domestic companies and create the conditions for a thriving energy sector.

Another promising step forward in energy policy is the House's repeal of the Bureau of Land Management's (B.L.M.) Methane Rule, a duplicative and costly restriction on methane emissions during the extraction of natural gas. The rule was passed during the final year of the Obama administration despite concerns that it would impose a heavy financial burden on energy producers and American families. Although the rule is still

awaiting a vote in the Senate, current conditions indicate that the time is ripe for the Methane Rule's repeal. Additional restrictive and economically inefficient regulations that may be rolled back during the new administration include the E.P.A.'s Ozone Rule, the Corporate Average Fuel Economy (CAFE) standards, which are certain to be reviewed no later than 2018, and the Obama administration's ban on Arctic drilling. The repeal of this final policy could make an estimated 130 trillion cubic feet of natural gas available to American energy producers, and could usher in a new era of prosperity within the energy sector.

All in all, the repeal of costly and burdensome energy regulations would have an immense impact on American jobs and economic prosperity, and we are already beginning to witness the inexorable deconstruction of the Obama administration's vast regulatory apparatus.

Trump's promised "phenomenal" tax proposals will also have a huge effect on businesses operating within the energy sector. Trump's stated priorities include lowering the corporate tax rate to 15 percent while moving toward a "territorial" tax system and allowing businesses to fully and immediately deduct the cost of business purchases like equipment and buildings. These policies present the potential for explosive growth in every sector of the American economy, but especially among companies that are engaged in producing and exporting shale gas. Hydraulic fracturing is the fastest growing sector of U.S. crude production and is expected to reduce the trade deficit to the tune of \$180 billion by 2022. By 2025, this innovative process of oil extraction will support 3.9 million jobs. In sum, the hydraulic fracturing industry is leading the charge on the economic issues that are most important to the president. The Trump administration's focus on fostering the domestic economy will certainly lead to a mutually beneficial economic partnership between the administration and oil and gas producers. At the state level, there is renewed potential for pro-growth energy policy.

This year, Republicans will have full control of the legislative and executive branches in 26 states, while Democrats will have full control of the legislative and executive branches in just four states. This means a majority of states will likely have the support they need to advance productive legislation, while alternatively stopping legislation that seeks to grow the regulatory burden and increase taxes on American businesses and residents. Such a shift in Republican control in the states is key this year; a number of state legislatures are con-

sidering legislation that would impact energy producers and, thus, increase costs on the businesses and residents that depend on affordable and reliable sources of energy.

Threats from state laws

While Republicans do control the executive and legislative branches in a majority of the states, there are still some threats to pro-energy policy. In fact, twenty-one state legislatures are considering new proposals for fuel taxes—including traditionally red states like Tennessee, Mississippi, South Carolina, Oklahoma, and Alaska. During the first of their hearings on the bill, the House Transportation Committee in Alaska found that the average Alaskan commuter may see the total price he pays in gas taxes triple, jumping from \$133 to \$399 per year. Drivers in Alaska already face some of the highest gas prices in the country, and such a substantial tax increase would necessarily impact oil consumption within the state.

Another alarming trend is a push in some states for the implementation of carbon taxes. In Massachusetts, Senator Mike Barrett introduced S. 1747, a bill that would establish a carbon fee of \$10 per ton, increasing by \$5 annually, with a \$40 ceiling. In New York and Rhode Island, the situation is even more dire. New York's carbon tax legislation proposes an introductory fee of \$35 per ton, increasing by \$15 annually with a ceiling of \$185 per ton. The New York proposal is projected to increase the state gas tax by \$1.58, more than doubling the current gas tax and pushing the state closer to having the highest gas tax in the nation. Meanwhile, the Rhode Island proposal for a \$15 per ton carbon tax is unlikely to face significant opposition within the state's Democrat-controlled House or Senate. In addition, the Governor of Rhode Island, Gina Raimondo, has aggressively pursued a reduced carbon footprint. Even in Washington State, where in November voters overwhelmingly rejected a referendum to institute a carbon tax, climate activists continue to push legislation that would stifle the energy sector. The irony of the failure of the Washington carbon tax referendum in 2016 is that the majority of opposition came from the environmental left, who thought the tax proposal did not go far enough. This serves to highlight just how implausible any bipartisan agreement on a "carbon tax bargain" would be.

The group "Alliance for Jobs and Clean Energy" already released a plan to introduce in the legislature a new tax on carbon emissions. Opposing the carbon tax will be an uphill battle in Washington State, where Republicans very narrowly hold the Senate (25 Republicans, 24 Democ-



NEW FUEL TAXES
Twenty-one U.S. states, including traditionally red Tennessee, Mississippi, Carolina South, Oklahoma and Alaska, are considering the introduction of new fuel taxes.

rats, 1 Independent) but Democrats control the House and the executive. Additionally, Washington's governor, Jay Inslee, has previously advocated for a cap-and-trade system. Even if the carbon tax fails to pass the legislature, the Washington Environmental Council is already discussing a renewed carbon tax ballot measure next year. A final policy to watch at the state level will be cap-and-trade, or, as Oregon chooses to brand it, "cap and invest." This optimistic and pro-growth rhetoric however, cannot conceal what is just another iteration of the same misguided policy that has already been implemented in California. Oregon policymakers admit

that the "invest" portion of the policy's title refers to how the revenues from permit auctions will be used; this does not in any substantive way affect the model by which cap-and-trade programs operate. Oregon senators plan to introduce this "cap and invest" legislation later in 2017, and since Democrats currently control the legislature and the executive, their proposal may have a profound impact on companies' ability to operate in Oregon.

No one will be surprised to learn that during the Trump presidency, California will continue to be a thorn in the energy sector's side. As companies adopt new technologies that make harnessing energy easier, cheaper,

and safer, and as the federal government removes regulations that serve as barriers to economic progress, California continues to resist the changing fiscal climate. Still embracing environmental activism at the expense of local businesses, the California Air Resources Board aims to tighten the carbon cap beyond what is required by state law. Although the cap-and-trade system is currently being challenged in court, California lawmakers have a number of contingency plans in the event that the policy is overturned. These contingencies include a potential carbon tax, and in 2016, the legislature passed a resolution to urge the U.S. Congress to enact a carbon tax.

An auspicious start

California aside, entrepreneurs in the energy sector should be reassured that when it comes to energy policy, the Trump administration is off to an auspicious start. Despite the urgings of former leaders within the GOP, the Trump administration does not seem amenable to implementing a carbon tax. The president's campaign was successful precisely because he is different from the career politicians who have grown so out of touch with the real economic needs of everyday Americans, and he has persisted in his own maverick brand of politics during the first few weeks of his presidency. He has also remained committed to the tenet of

deregulation, and early successes in repealing misguided regulations indicate that we may soon see a repeal of the Ozone Rule, the Methane Rule, and other harmful policies. Although fuel taxes, carbon taxes, and cap-and-trade systems will remain a persistent concern in the states over the next few years, the difference in economic policies between the Obama administration and the pro-growth, pro-energy Trump administration cannot be overstated.



U.S. Energy/Hope for shale, though bearish factors remain

Shale versus sheiks?

U.S. tight oil production will not be sufficient to undermine the effect of the OPEC agreement. A widespread increase in production would require even higher prices over a longer time period



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In the fall of 2014, oil prices began a long period of depression. The initial causes of the decline were macro-economic, and most closely linked to slowing Chinese demand on the back of a broad policy of economic transition begun by Beijing. But it was conscious OPEC policy (or more accurately, Saudi policy) set in reaction to softening prices that kept prices down for so long. Namely, Riyadh refused to cut supply in response to lower demand, setting a new course for policy expectations in the market and potentially ushering in an era of OPEC irrelevance. The recent OPEC deal seemed to reassure some in the market that OPEC was not really “dead,” and that a new-found appetite for market management among producers may signal the price floor that they had been so desperate to enforce over the previous two years. Proponents of U.S. oil production could also feel hopeful, since such a scenario could end the battering of American shale oil and see a production turnaround. Hope tends to distract from accurate market expectations, however, and macro trends as well as specific national variables are likely to derail a price rally that is based on overestimations of the deal's real impact.

The reasons for the decline

It is useful to start with how we got here. The reasons for the 2014 Sau-

di decision were multiple, and as with many top-down policy decisions, they were perhaps more parochial than analysts looking for grand strategic narratives tend to presume. Indeed, the rise of American light-tight oil (LTO, or shale) was the result of prices high enough to support this relatively expensive process, and Arab producers watched resilient U.S. rig counts with some interest through 2015.

But rather than “shale versus sheiks,” the U.S. was not, as it is perhaps inclined to see itself, the primary focus of foreign economic policy thinking. Often it is useful to presume the most straightforward and myopic of intentions for bureaucratic policy change. In this case Riyadh looked around the OPEC table at its partners and remembered the early 1980s. Why should it shoulder the burden of so much lost revenue from a production cut, especially if partners were unlikely to follow in good faith, and if in addition, the move 30 years ago failed to bolster prices, leaving the country with a low price, diminished market share, and a dangerous budget shortfall? It was something of a bonus that lower prices would do nothing to help Tehran as it sought to revive production and its wider fiscal fortunes. And so prices fell.

Players in the commodity markets were too eager in 2015 to call the price floor, repeatedly pointing to relatively inconsequential or short term data points as an excuse to rally. Those rallies were predictably short-lived. LTO production came under pressure, but the uniquely fractionalized collection of often small producers were tenacious at finding opportunities for cost-cutting, mostly by squeezing service providers, but sometimes with genuine technical innovations and efficiency improvements.

The unusual availability of liquidity from financial markets also allowed them to hold out longer in the hope of a turnaround, and hope is a powerful influence when a couple of rigs are the basis for one's entire small business and livelihood.

Eventually, though, even those measures were not enough, rigs were shut down, and despite a budget shortfall Saudi Arabia seemed determined to stay on course.

Changing political winds in Riyadh after the death of King Abdullah in January 2015 reinforced the impulse to stick with the strategy, as a young clique surrounding Mohammed bin Salman (MbS), soon to be Deputy Crown Prince, saw an economic future for the kingdom that did not rely on oil. The brunt of market forces was good political cover for subsidy reform and the wider economic transformation program to come.

Assessing the real impacts of the deal

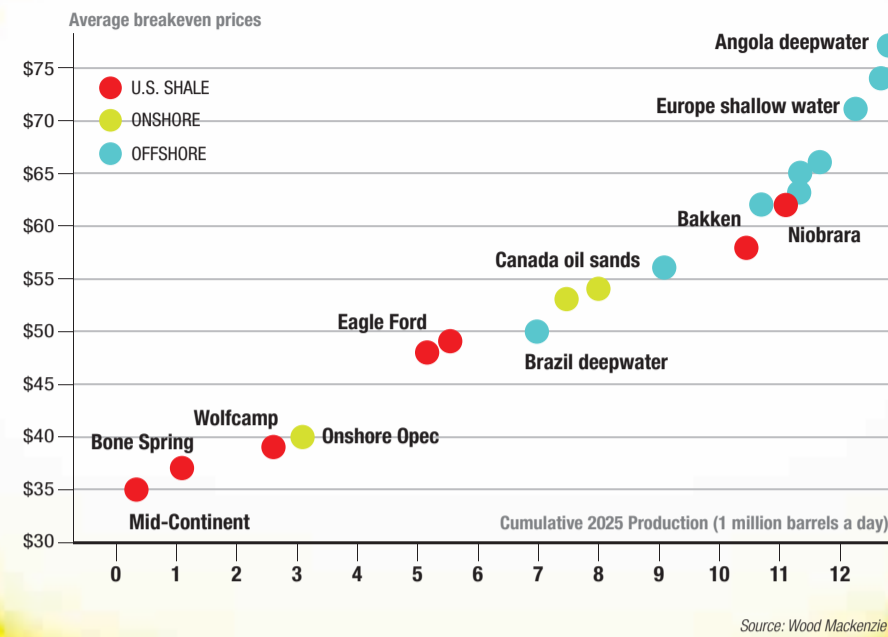
Fast forward to December 2016, and the OPEC deal. Khaled al-Faleh had been elevated from Saudi Aramco CEO to Minister of Energy and Industry, rather than simply of Oil, and the “Davos man” face of the Saudi reform effort. The market's confidence in his judgement is testament to his relatively rational and non-ideological approach to economic management, oil prices, and the market itself. Against the background of unfolding competition in the Middle East among rival power blocs, al-Faleh was shrewd enough to see an opening for cooperation with 11 non-OPEC producers and with Russia in particular. The optics of unity among OPEC members and non-cartel partners could bolster confidence in Riyadh's continuing influence, with limited impact on Saudi revenues or market share. An earlier effort at production freezes within OPEC had quickly been seen for the ruse that it was. Producers who could were mostly pumping flat-out already, and a freeze would lock out Iran and Iraq, whose production and export capacities were recovering despite low prices. The new deal seemed more genuine, with exceptions for Iran and Iraq, and a buy-in from Russia. The market responded accordingly, and the price rally has been more robust than any other in the past two years. Judging the deal's longer-term price impact, however, requires looking at the deal's impact on the real oil economy. That means two main factors. First, in the past, real oil flows were often only marginally affected by such deals due to non-compliance and exceptions.

Iran and Iraq, as well as Nigeria and Libya, continue to raise production because of their opt-outs. As for the others, early indications from tanker watchers were that export volumes from non-Saudi Gulf producers were not changing, and were evidence of the usual cheating. More recent analyses offer data to counter that presumption.

A late January Reuters survey found 82 percent compliance with output cut pledges, well above the 60 percent compliance rate of the last effort in 2009. The accuracy of the Reuters data is based on shipping data analysis, but also on self-interested sources like oil companies and OPEC itself, and should be taken with a grain of salt. No matter the precise compliance rate, Riyadh continues to dominate the reduction figures in practice, and al-Faleh has predicted that global oil inventories should return to their 5-year averages by mid-2017. That is probably optimistic, but such expectations about



Most low-cost oil is in U.S. shale reserves



Comparing potential future global oil projects by their average breakeven prices, we find that, contrary to what is commonly assumed, the cheapest oil to be extracted is found in some American shale oil fields (Woodford in the Mid-Continent, Bone Spring and Wolfcamp in the Permian Basin). In the last two years, average production costs per barrel in these oil fields have fallen from 30 to 40 percent.

commercial stock draws can underpin short-term price gains anyway, with implications for the second factor—how those price gains affect production. The impact on renewed production of the price rally kicked off by the OPEC deal matters—and that depends on dynamics within the U.S. LTO sector. That sector has evolved over the past two years, and there is reason to believe that production is unlikely to snap back once a certain break-even point is reached. Consolidation has meant fewer players in the sector, with diverse well portfolios representing a wide range of production costs, within and among different oil fields.

As price rises, these larger players will be more cautious about restarting operations, and will begin with lower hanging fruit, particularly given uncertainty about prices further into the year. Rig counts have indeed increased in the U.S. in January, and that has led to concern about whether American production could drown out the gains of the OPEC deal. But a robust rig count is so far a limited story about the Permian basin, and uncompleted wells that can be brought on cheaply and quickly are only a portion of the greater collection. Significant new production in Bakken and Eagle Ford will need sustained prices at something north of 60 dollars. In

short, stickiness and a jerky price elasticity curve make U.S. production responsiveness uneven and less dramatic than simple headline numbers may suggest.

Trump and other market unknowns

Oil prices in 2017 and beyond will depend on much more than the OPEC deal and its immediate effects. It seems impossible these days, despite one's most desperate efforts, to avoid talking about Donald Trump. The perennially vague policy agenda of the new American regime does not lend itself to much nuanced analysis, and when it comes to energy so little is known that

much beyond reading tea leaves is just speculation. But the broad outlines already point to the scrapping of regulations and an increase in tax incentives, both of which seem likely to increase U.S. production. However the lag time for new conventional production (say on federal lands) is several years, and it is unclear whether there will be appetite for large new projects in difficult terrain such as the Arctic in such an uncertain price environment. More generally, however, U.S. production should stay robust given slowing legacy decline rates as well as new wells in West Texas. All of this could portend a balanced market quite a bit later than mid-year, and

even in 2018, keeping prices reined in. The real price spikes are likely to come further down the road, perhaps in 2019. Upstream investment hasn't been sufficient to keep up with conventional field declines, and shale oil will not be enough to offset that in the short term.

On the demand side, low prices over the past two years have done little to spur extra demand or to kick-start economic growth. China continues to experience large overhangs in its manufacturing capacity, indicating suppressed growth rates to come, and concerted government efforts to reduce smog will put pressure on Chinese demand. A stronger dollar also continues to put downward pressure on oil demand globally. A strong dollar and expectations of American economic growth both depend on how the market responds to Donald Trump's erratic governing in 2017—and a trade war could certainly put both elements at risk along with U.S. oil demand.

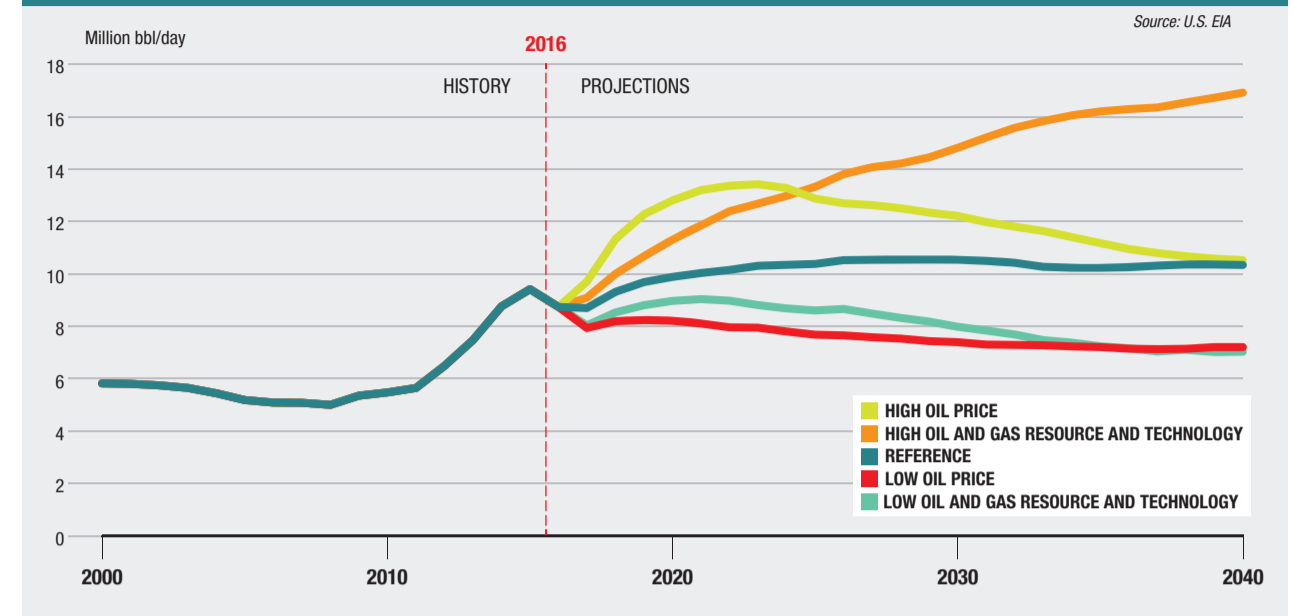
Finally, while fundamentals are key to the direction of the oil price, market positioning can also play a role. At the moment, traders and institutional funds have a pronounced bias toward long positions, and with so many buyers in that position, any beginnings of a reversal will cause a rush to exit. This "crowded trade" dynamic has been borne out in the past, and seems to presage a price correction in the coming months.

A long-term prospect

Looking forward, price volatility is likely absent an effective swing producer, and shale oil will not play that role effectively. If previous experience serves as a guide, the industry is likely to experience more dramatic boom-bust cycles over shorter periods of time. Despite the American shale revolution, oil production is set to become increasingly concentrated in a few OPEC producers. Output growth among OPEC countries is led by Iraq and Iran, but both countries face major challenges: the risk of instability in Iraq, alongside weaknesses in infrastructure and institutions; and the need in Iran to secure the technology and large-scale investment required for expansion. The International Energy Agency (IEA) estimates that \$630 billion in annual upstream oil and gas investment—the total amount the industry spent on average each year for the past five years—is required just to compensate for declining production at existing fields and to keep future output flat at today's levels. The current overhang in supply should give no cause for complacency about oil market security.

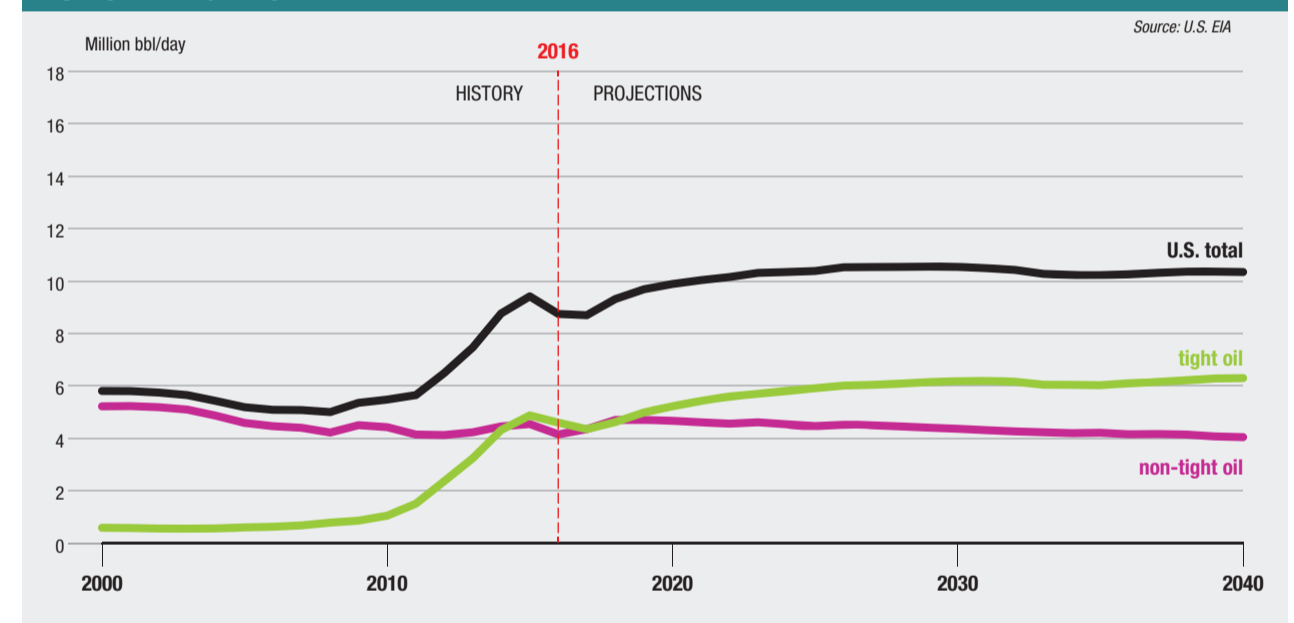
The potential for a price spike by the

U.S. CRUDE OIL PRODUCTION



United States crude oil production depends on oil prices as well as resource availability and technological improvements. In the EIA's benchmark scenario, output in 2040 will exceed 10 million barrels per day.

NOT ONLY TIGHT OIL



Tight oil dominates U.S. production in the reference case of the Energy Information Administration, but other types of oil production continue to yield significant volumes.

end of the decade is predicated on fundamentals in conventional oil production and investment rates. The onus will be on oil companies to develop flexible project management to be more responsive to price. Price volatility itself could also have impacts on consumer behavior, incentivizing widespread hedging among industrial customers and pushing individuals to consider alternative modes of transport as electric and autonomous vehicles become more widespread. However "peak demand" is a far-off prospect.

A sign of change

The OPEC deal has been a sign of change, in that producers seem keen to re-engage with market manage-

ment. However the deal and its implementation are not game changers themselves. Compliance seems better than expected, but it remains to be seen whether that continues. The U.S. LTO landscape is a varied one, and a widespread ramp up of shale production will require prices that are higher than today's for a sustained period. In all, supply and demand trends point to continued market softness in 2017 despite the OPEC deal. While that agreement may have helped to shore up the oil market, bearish factors remain. The real crunch will come later in the decade.

Saudi Arabia/Riyadh on the path of economic and social differentiation

The next move

Undertaking the biggest economic transformation in its history while attempting to gauge the constantly shifting dynamics of the oil and energy markets, the Saudi Kingdom faces key decisions in the year to come

BASSAM FATTOUH



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The shift in Saudi oil policy in 2016—from pursuing a market share strategy to engineering an output cut—has come under close scrutiny. Some have argued that this shift is a recognition by Saudi policymakers that their policy so far has been a “pretty comprehensive strategic failure” due to “a mixture of hubris, inexperience and, most important, a failure to understand ... how a genuine market economy works, which is why all the rhetoric about new economic plans for the country built on a fairy tale presentation from consultants is going nowhere...”.¹ Others are of the view that Saudi Arabia has finally blinked, conceding defeat in its war against U.S. shale. Others argue that Saudi Arabia is in “financial crisis” and “panic mode” and therefore “desperate” to reach an output deal. While such accounts tend to capture the public imagination, they are of very limited use for understanding the evolution of Saudi oil policy. They tend to see the oil market as static and in black and white. These accounts also embody an implicit assumption that Saudi oil policy is constant and cannot be based on a rational calculation of the benefits and costs that tend to change over time. But, as has been argued by this author on multiple occasions, Saudi oil policy is shaped by various sets of factors that include: developments in the local economy, dynamics associated with OPEC and non-OPEC producers, the nature of the oil market shock, and the change in oil market conditions. As these factors change and as new information becomes available, Saudi oil policy will also adapt.

Four phases of Saudi oil policy

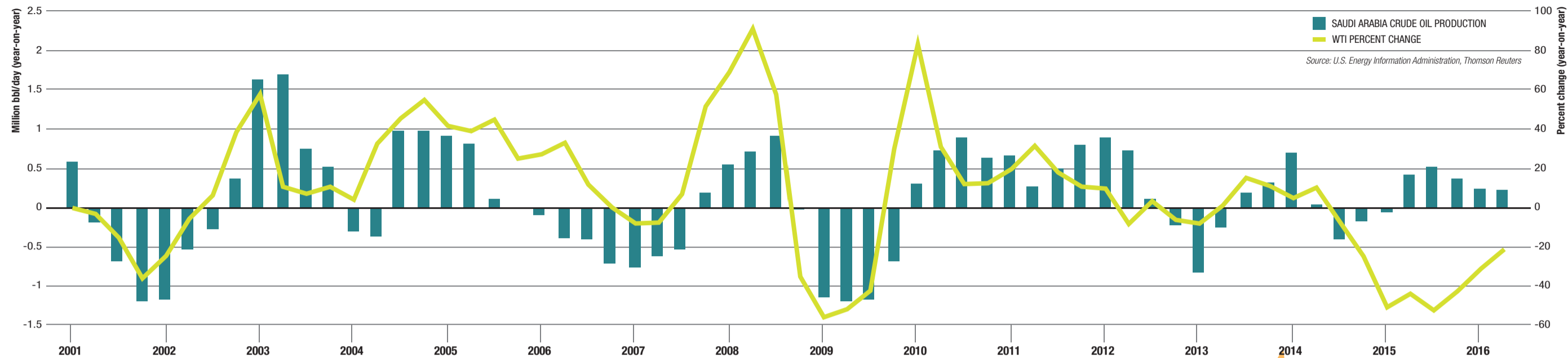
Since 2008, Saudi oil policy has

passed through four distinct phases. In the first phase, one that followed the collapse in oil demand in the aftermath of the 2008 financial crisis, OPEC implemented one of the biggest cuts in its history, with Saudi Arabia accounting for the bulk of the cut. Saudi Arabia also sent a strong signal about its preferred price of \$75 per barrel. As the global economy recovered and as oil demand started picking up, oil prices stabilized around \$75 per barrel for the second half of 2009 and for most of 2010. But prices started rising at the end of 2010 with the start of the “Arab Spring” in Tunisia and as the risks of spillovers to other Arab countries were becoming more visible. Between 2011 and 2013, the market witnessed some serious supply disruptions, mainly from the Middle East and North Africa. During this second phase, Saudi Arabia played its preferred role: increasing output to offset the supply disruptions. Saudi oil output mirrored closely the supply disruption at the time. The first surge in Saudi output occurred in the aftermath of the Libyan disruption in 2011, while the second followed the imposition of sanctions on Iran, which cut Iran’s exports sharply. In 2011 and 2012, Saudi Arabia’s production increased by 0.96 mb/d year-on-year and 0.41 mb/d respectively, reaching 10.1 mb/d in August 2013. These output increases were not enough to compensate for supply outages and the market had to rely on the rapid increase in U.S. shale oil to meet the supply gap. As supply disruptions eased, Saudi output declined below 10 mb/d towards the end of 2013 but remained above 9.5 mb/d until the end of 2014. During this phase, Saudi Arabia revised its preferred price upward to \$100/barrel, indicating



Price & Output

Oil production levels in Saudi Arabia before 2016 affected, almost synchronously, the trend in crude oil prices. However, if the OPEC agreement is fully complied with, the situation could take a different turn.



that the preferred price was a moving target reflecting market conditions at the time. The oil minister at that time, Mr. Ali Al-Naimi, warned against very high international oil prices, which were bad news for Europe, the U.S., emerging economies and the world's poorer nations. The Kingdom would therefore act to lower a soaring oil price, and Mr. Ali Al-Naimi sent clear signals that \$100 was a fair price for everybody: consumers, producers and oil companies. These relatively high and stable oil prices generated both strong demand and supply responses, especially from U.S. shale. In the first half of 2014 U.S. supply growth alone exceeded that of global demand, contributing to a large build of stocks in that year.

Limited options and reactive policy

In mid-2014 Saudi Arabia was reacting to a huge market imbalance caused by the economic forces unleashed by high oil prices. Faced with this imbalance, the Kingdom was left with two options: either cut output, or leave it to the price mechanism to balance the market. In November 2014, Saudi Arabia opted for not cutting output and instead ramped its output in an attempt to increase its market share at the expense of high-cost producers. There are multiple factors that shaped Saudi Arabia's decision at the time:

- The size of the market imbalance in Q4 2014 was relatively large.
- Saudi Arabia has been unwilling to act unilaterally to balance the market. This is a fundamental principle which was shaped by events in the mid-1980s, when its attempt to protect the oil price resulted in a large loss of volumes of production and market share, without succeeding in increasing prices. This resulted in a significant loss of revenues.

- There was difficulty reaching an agreement within OPEC and with non-OPEC producers. Many producers had not felt the pain of lower revenues at that point, and hence they did not show much willingness to act. Also, key producers such as Iraq, Kuwait, and the UAE were increasing output and had ambitious plans to increase productive capacity, and they did not want to be subject to any quota system. Saudi Arabia was also not keen to lead the negotiations, perhaps in the belief that such efforts would not result in a meaningful agreement with other producers.
- During the boom years, Saudi Arabia had built strong fiscal buffers by accumulating large foreign reserves and reducing its debt to very low levels. This may have created a general belief among Saudi policymakers that the Kingdom could withstand lower prices for longer.
- The rise of U.S. shale introduced a new set of structural uncertainties, particularly relating to U.S. shale supply response and, more generally, to the nature of the shock hitting the market.

In an environment of structural uncertainty and non-cooperation from other producers, it can be shown in a game theory framework that Saudi Arabia is better off not cutting output. During this third phase, therefore, Saudi Arabia ramped its output sharply. In 2015, Saudi Arabia was one of the main contributors to supply growth (the other was Iraq), adding more than 400,000 b/d. In 2016, Saudi output reached a record level of around 10.8 mb/d.

The cost-benefit calculus

Any policy is associated with both costs and benefits, and the policy of pursuing market share adopted by

Saudi Arabia back in November 2014 is no different. The increase in output did allow Saudi Arabia to maintain, or even increase marginally, its share in global oil supply, but the increase in output did not compensate for the decline in oil revenues. In 2015, Saudi Arabia's revenues fell by almost 50 percent from the previous year. In the long term, such a market share strategy could result in higher revenues if existing sources of supply exited the market or potential suppliers were deterred from entering. However, as noted by Robert Mabro, "prices have to fall a long way and price expectations have to remain depressed for a long time for a significant improvement of the market share." Maintaining such a strategy thus requires that an oil exporting country is financially resilient if faced with a prolonged period of low oil prices. It should be able to: rely on its fiscal buffers, adjust its economy to the low oil price environment, or reduce reliance on oil revenues by diversifying its economy. But fiscal buffers are temporary and can erode fairly quickly, especially if the government's spending unexpectedly increases. Adjusting the economy can be very painful and not all governments are capable of shifting the burden of adjustment to their populations. Diversifying a country's economy is a long-term process that has eluded most oil exporting countries. Saudi Arabia is no exception, and its economy, despite many efforts to diversify and build a vibrant private sector, still relies heavily on oil revenues.

While the costs of such strategies can be large, the size and the timing of benefits are uncertain, as these will depend on the adjustment processes of other producers. High-cost producers can reduce their cost structure through efficiency, high-grading, and cost deflation in the supply

chain. Furthermore, the long lead times of capital-intensive projects mean that the supply response to low oil prices is not immediate, even for very high-cost producers. Finally, for low-cost oil producers, the response to price signals may take longer, especially if they pursue a policy of maximizing production at any cost in an attempt to boost revenues.

A calculus that changes over time

A key point is that the cost-benefit calculus is not static and is a function of time. Oil output did decline in many parts of the world in response to the sharp fall in the oil price from its peak in June 2014. Despite efficiency gains, U.S. shale has been leading the way, with annual growth turning negative in 2016. In mature areas such as Mexico, China, and Colombia, output declines have been sharp. Even in some parts of OPEC outside the Middle East such as Venezuela and Nigeria fiscal crisis and instability have resulted in large losses of production. These declines in output, accompanied with fairly robust demand in 2015 and 2016, helped the market to rebalance, but perhaps not as quickly as many were predicting. Some key producers mainly in the Middle East and Russia continued to invest in their energy sectors and increased their output even in the low-price environment. Projects sanctioned in the high oil price environment continued to come online, offsetting some of the declines in supply.

But while the oil market was showing signs of rebalancing, the Saudi economy was feeling the pain of lower revenues. Despite its relatively strong fiscal buffers in comparison to other OPEC countries, the Saudi economy has been squeezed by low oil prices. After achieving an annual



1 If other countries do not comply with the agreement on production

Saudi Arabia could decide to move towards a policy aimed at increasing production, thereby reducing the expected advantages of non-compliance.

Which horizon?

Despite the consensus offered by the OPEC agreement on oil production cuts, Saudi Arabia keeps a watchful eye on the behavior of its direct competitors in order to maintain its leadership position in the global crude oil markets.

Below are four possible scenarios that could prefigure in the event of international "turnarounds".

4 If the market shrinks more rapidly than expected, due to, for example, interruptions in supply

Saudi Arabia could attempt to place a ceiling on oil prices by increasing production, or it could allow stocks to run out more quickly, with a risk of further increasing prices.

2 If U.S. shale production were to snap up the market share vacated by OPEC's cut in production

Riyadh would likely increase its production again, as the cuts would result in too large a loss of market share and related income.

3 If the U.S. shale response proves to be moderate

The most likely scenario is that at the next OPEC meeting, an extension of the current agreement will be enacted.

A SLOW REBALANCING
Before the recent OPEC agreement, oil production plummeted in many areas of the world (including Mexico, China, Colombia, Venezuela and Nigeria) following the sharp fall in prices. This decline, along with a rather strong demand in 2015 and 2016, helped to rebalance the market, but less rapidly than expected.



real growth rate of 3.6 percent and 3.5 percent in 2014 and 2015 respectively, economic growth is projected to have slowed down to 1.2 percent in 2016. Lower government spending and tighter credit have had knock-on effects in the private sector, which still relies heavily on public spending. Growth in the private sector almost stalled, while that in the non-oil sector turned negative in Q4 2015 and Q1 2016, before recovering slightly in Q2 2016. Faced with a ballooning fiscal and current account deficit, the Saudi government has been forced to take a series of painful measures. Back in December 2015, it increased fuel and electricity prices, and some of these increases have been sharp, though from a very low base. Government spending on capital projects has also been cut. According to media reports, the finances of thousands of projects including transport, housing, and healthcare valued at about \$69 billion have been reviewed and as much as a third of them may be cancelled. The government has also cut public sector allowances. In addition to adjusting public spending, the government has been running down its

foreign reserves and increasing its local and foreign borrowing. For the first time, Saudi Arabia has tapped international bond markets, raising \$17.5 bn in a new bond issue. While these adjustments have been sharp and somewhat expected in an environment of lower oil prices, the country is neither in crisis nor in panic mode. The debt-to-GDP ratio is still relatively low and access to local and foreign debt markets is still open, with the latest bond issue showing great appetite from investors. Foreign reserves are still relatively high, the government has many attractive public assets earmarked for sale, and it has plans to boost revenues by introducing some indirect taxes such as VAT and other fees, charges, and excise duties. But low oil prices have forced the government to tighten the economy at a quicker pace than originally planned, and there is a realization that the persistence of the low oil price environment will limit the government's options looking forward. The slowdown in the private sector and in the non-oil economy implies that the much-needed job opportunities for the Kingdom's young population

will be expanding at a slower pace than originally anticipated, and the government's plans to rationalize public sector employment will face a setback. The valuation of some assets, such as the partial IPO of Saudi Aramco, will also be positively correlated to the oil price. In other words, while low oil prices have been conducive to kick starting reforms, a persistent low oil price environment will make these reforms more difficult both politically and socially and could derail Vision 2030 if the private sector and non-oil economy are further squeezed and job creation stalls.

The agreement on output cuts

One critical juncture for the oil market was the fall in the oil price below \$30/barrel at the beginning of 2016. Some were of the view that regardless of what happened to the oil price, there would be no reaction from the Kingdom. But Saudi Arabia did react, signalling to the market that the low oil prices in January 2016 were "irrational" and showing a willingness to cooperate with other OPEC and non-OPEC producers

to freeze production. The Doha Agreement in April 2016 was a missed opportunity for producers to reach an agreement to freeze output and it created a sense of overall bearishness in the market. It also created a feeling that producers could never reach an agreement, especially as the relations between Saudi Arabia and Iran continued to deteriorate and Saudi-Russian relations reached a new low at that point. But the efforts by producers to reach an agreement did not stop. As we progressed into 2016 the signal shifted from freeze to output cut; equally importantly, Saudi Arabia took a leading role in these negotiations with the appointment of a new oil minister Mr Khalid Al-Falih. But during this period, Saudi Arabia's output remained elevated, reaching record levels in the summer of 2016. This increase can't just be explained by heightened demand due to the rise in electricity demand during summer; Saudi Arabia was positioning itself for long and hard negotiations, and it is always better to negotiate from a higher level of output. The negotiations culminated in an agreement in November 2016 to cut the production

of OPEC member countries by 1.2 mb/d and eleven non-OPEC countries by 0.58 mb/d, led by Russia with 0.3 mb/d.

Potential explanations for the shift in policy

So the key question remains: What factors could explain this shift in Saudi behaviour? There are four potential explanations:

- 1 | Producers have shown more willingness to cooperate as oil revenues collapsed and the adjustment to low oil prices has become too painful.
- 2 | The market resolved a key uncertainty regarding U.S. shale response.
- 3 | The market has already rebalanced, so the expected benefit of the cut has increased and the cost of obtaining information about shale response on the upside is relatively low in a tight market.
- 4 | The cost of pursuing the market share strategy by Saudi Arabia has exceeded its benefits.

The first explanation is a possibility, but the producers' willingness to cooperate can be thought of as being more of an enabling factor in reach-

ing the output deal in 2016. Saudi Arabia has always made it clear that it would not act unilaterally, and any agreement should be part of a collective effort by both OPEC and non-OPEC producers. An enabling factor for the agreement has been the closer relations between Russia and Saudi Arabia following the meeting between President Putin and Deputy Crown Prince Mohammed bin Salman on the sidelines of the G20 meeting in China in September 2016. This initiated a process of greater cooperation between the two countries.

The second explanation is less convincing, as there is no evidence that uncertainty regarding U.S. shale in the market has been resolved, especially with respect to the U.S. shale supply response to higher prices. The jury is still out on the question of how quickly and how big the response of U.S. shale would be, and at which price level we could see sharp increases in U.S. shale to offset the agreed cuts. The third explanation is more plausible. The gain from an output cut has increased over time as the market has become tighter. In other words, the timing of the cut matters:

the cut in a tighter market will have a bigger impact on price and on revenues. Obtaining information on U.S. shale response can also be a side benefit of the output cut. The fourth explanation, based on cost, is perhaps the most plausible. There is plenty of evidence suggesting that oil-exporting countries, including Saudi Arabia, have been hit hard by low oil prices. But there are some potential variants for an explanation based on costs:

- | At the time when the decision to cut was made, the cost had become so high that the net gain from the market share strategy had become very small.
- | The cumulative costs since November 2014 have grown faster than cumulative benefits, wiping out the net gain from the market share strategy over time.
- | When the decision to increase production was first made in 2014, Saudi Arabia may have overestimated its financial resilience and its tolerance to the costs associated with adopting a market share strategy.
- | When the decision was first made, Saudi Arabia may have underestimated the cost of adopting a market share strategy, as not all information was available at the time of the decision.

Rather than a single factor, it is most likely that a combination of these cost factors, plus the higher expected benefit of a cut in a tighter market, all contributed to the shift in oil policy.

Possible scenarios looking forward

Given that Saudi Arabia's oil policy is constantly evolving, one should not exclude the possibility of further shifts in that policy in the next few months. But given that the costs associated with abandoning the output cut are high, only some extreme (but possible) changes in the behavior of other players, or in oil market dynamics, could push Saudi Arabia into shifting its oil strategy. Instead of trying to predict the next move, below are some potential scenarios:

- | If there is no adherence to the output agreement by other countries (this does not mean that there must be 100 percent compliance), then the most likely outcome is a shift in Saudi policy towards increasing output, as other producers will substitute the cut in Saudi output, reducing the expected benefit from the cut. That's why in addition to considering U.S. shale, it is also important to look at the production profile of other countries such as Libya and Nigeria that were exempt from the cut agreement.
- | If the U.S. shale response is big and fast and it substitutes for the

OPEC output cut, Saudi Arabia is most likely to shift back to increasing production, as the current decision to cut output would result in loss of market share without any durable impact on prices, and hence in lower revenues. So far, there is no strong evidence to suggest that there will be sharp increases in U.S. shale output strong enough to offset the entire OPEC and non-OPEC cut if prices remain at these levels.

- | If the U.S. shale response is moderate, and does not substitute for the agreed output cut, then the most likely outcome is an extension of the current agreement in the next OPEC meeting. This is a good scenario for Saudi Arabia as it would achieve three related goals: set a floor on the oil price, accelerate withdrawal of stocks (the key objective of the current OPEC agreement) and shift the forward price curve into backwardation.
- | If the market tightens faster than expected (for instance due to a supply disruption) Saudi Arabia can attempt to put a cap on the oil price by increasing output, or it can let stocks draw faster, at the risk of letting prices go higher. The decision will be shaped by many factors including the Kingdom's view on how quickly output in other parts of the world would respond to higher prices.

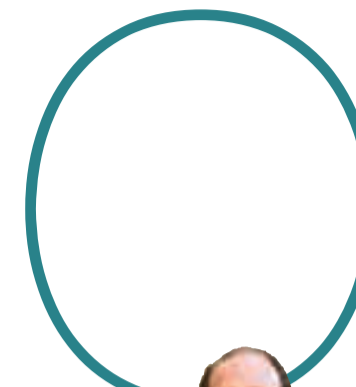
OPEC's decisions have always been important for shaping market dynamics but the decision to cut output in 2016 is critical, as it will not only be key to resolving a fundamental uncertainty about a shock hitting the market, but it will also shed more light on Saudi Arabia's behavior in a more uncertain world. In this uncertain world, the Kingdom is currently undertaking the biggest economic transformation in its history, reconfiguring its geopolitical alliances and facing different dynamics within OPEC with the comeback of Iran and Iraq, while still learning about a new source of supply with a different investment cycle and business model and the potential to achieve large efficiency gains.

1 Nick Butler, "The Saudis' Strategic Failure", *The Financial Times*, October 10, 2016.

Iran/Oil policy in an era of OPEC and Trump

A future of unknowns

Tehran views the OPEC agreement positively, with one caveat. Its positive short-term effects on prices and Iran's production capacity could be countered by a more hostile administration in Washington



GIUSEPPE ACCONCIA



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In September 28, 2016, after eight years of negotiations, OPEC finally reached a preliminary agreement in Algiers to reduce oil production quotas from 33.2 million barrels per day (bpd) to 32.5 million bpd. Saudi Arabia will reduce its production by approximately 500,000 bpd, while the UAE has seen a decline in its total production by 150,000 bpd. The agreement includes further reductions in production, amounting to 1.2 million bpd for non-OPEC countries such as Russia, which will cut its oil production by approximately 300,000 bpd. The announcement of the preliminary agreement quickly caused significant changes in oil prices, which increased from \$26 per barrel in February 2016 to \$54 in January 2017. However, this decrease in production may not be enough to produce significant long-term effects on oil prices. OPEC hopes for a possible increase in oil prices in the first quarter of 2017 to close to \$60.

The final agreement was formalized on November 30, 2016 during the meeting in Vienna of the 14 OPEC producing countries. This cut, less than one percent of global production, came after months of discussions between the major producing countries, especially between Iran and Saudi Arabia. Between September and November 2016, constant technical meetings were held between Saudi and Iranian delegates to finalize the agreement. The Iranian authorities have attempted to delay the reduction in oil production as much as possible. Tehran's goal during the negotiation stage was to return to production levels close to those of the period prior to the international sanctions imposed in 2003 before agreeing to any cut in production.

Therefore, the decision made in Vienna during the November OPEC meeting will not involve a reduction in Iranian oil production. Iran will continue to pursue its goal of increasing production in the domestic oil market, offsetting the reduced production levels of other countries, especially Nigeria and Venezuela. Meetings continued after reaching the agreement in Vienna, with the aim of creating a committee for monitoring the production cuts comprised of five OPEC and non-OPEC countries (Kuwait, Algeria, Venezuela, Oman and Russia). According to the data provided, the countries that agreed to cut their oil production are to date complying with the Vienna agreement. In February 2017, the committee began presenting a monthly report on the oil production cuts.

Iran's positions during the negotiation phase

The Iranian authorities immediately expressed their support for the pre-

liminary agreement in Algiers. Specifically, Iranian Oil Minister Bijan Zanganeh admitted that Iran could only look with favor towards a formal agreement for the freezing of oil production. The Iranian authorities, during the technical meetings held between September and November 2016, focused on an agreement providing for a ceiling to Tehran's oil production as close as possible to four million bpd.

According to some analysts, the Iranian authorities have finally given the green light to a first cut in production, as hoped for by the Saudis, only because this would not necessarily involve a downsizing in Iran's production capacity. In other words, despite the cut in oil production established by OPEC countries, Iran could also pursue its goal of increasing production in the domestic oil market. The ceiling to which the country can aspire, according to Iranian analysts, is 4.2 million bpd, approximately 13 percent of OPEC production. This is a very high level of production, considering the improved quality of Iranian technology in the oil sector and only a partial lifting of the international sanctions against Tehran following the entry into force of the Vienna agreement in January 2016. For these reasons, according to the *Financial Times*, Iran's capacity to increase production in a short period of time to up to 3.9 million bpd has yet to occur. Therefore, Saudi Arabia wanted to leave the current estimate of 3.6 million bpd in Iran unchanged. The Saudi authorities estimate the maximum level to which Tehran could aspire at this stage at 3.7 million bpd. The Vienna agreement in oil production cuts came in an encouraging context for the Iranian economy. According to the Iranian oil minister, the production level recorded at the end of 2016 was 3.8 million bpd, close to pre-sanction levels, 4.2 million barrels per day, when Iran was the second largest oil producer within OPEC.

Not only that, Iran has signed numerous oil industry contracts in recent months. The latest concerned the company Setad, which signed an agreement amounting to \$2.5 billion for the development of the oil wells of Yaran. Moreover, foreign investments have also involved other industries, especially the automobile industry. Italy, Germany and France, the three European countries that first unfroze billions of Iranian currency frozen in local banks, are competing for primacy of bilateral trade with Iran.

Iran's reactions to the OPEC agreement

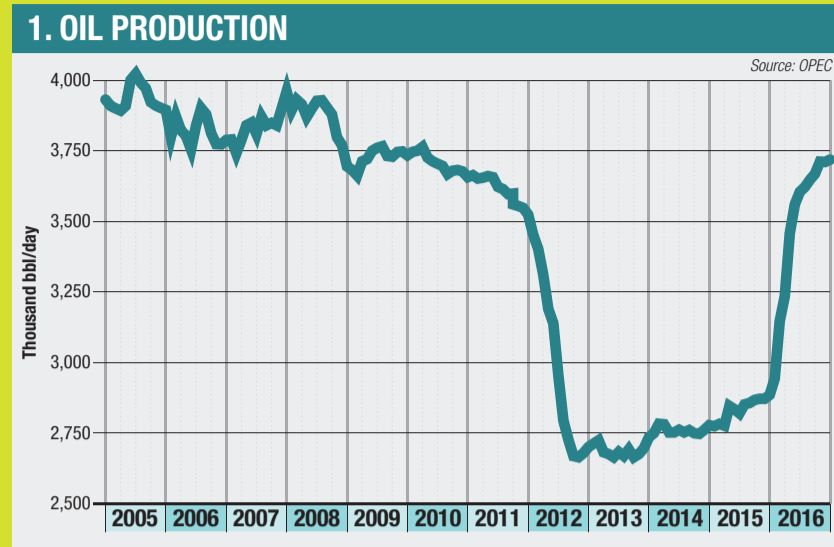
After the announcement of an agreement, Tehran immediately confirmed that it "will not cut" its oil produc-

Energy in Iran: a new course

The Vienna agreement on production cuts came in an already encouraging context for the Iranian oil sector. The data predict a period of growth in terms of oil production, exports and profits.

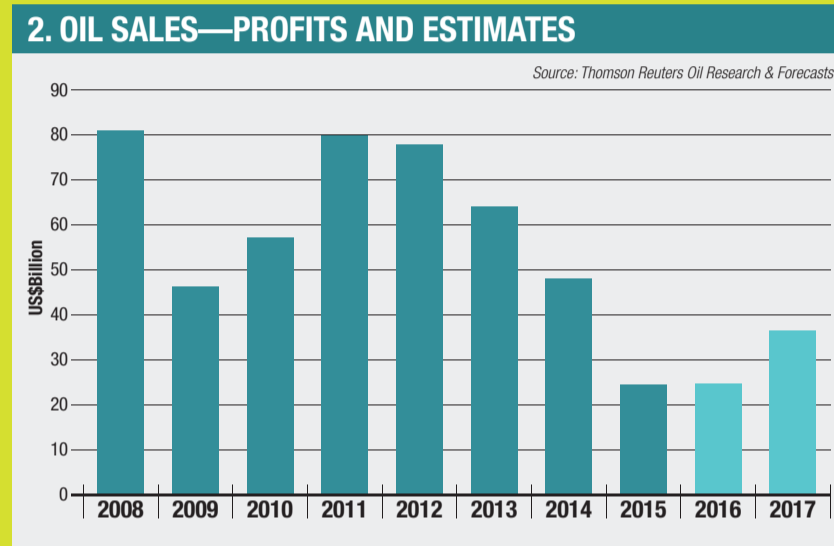
1. OIL PRODUCTION

Iranian oil production from January 2005 to October 2016—we see a drastic collapse in 2012 following the E.U.'s embargo against Tehran, followed by a steep rise in the final months of 2016, almost to pre-sanction levels.



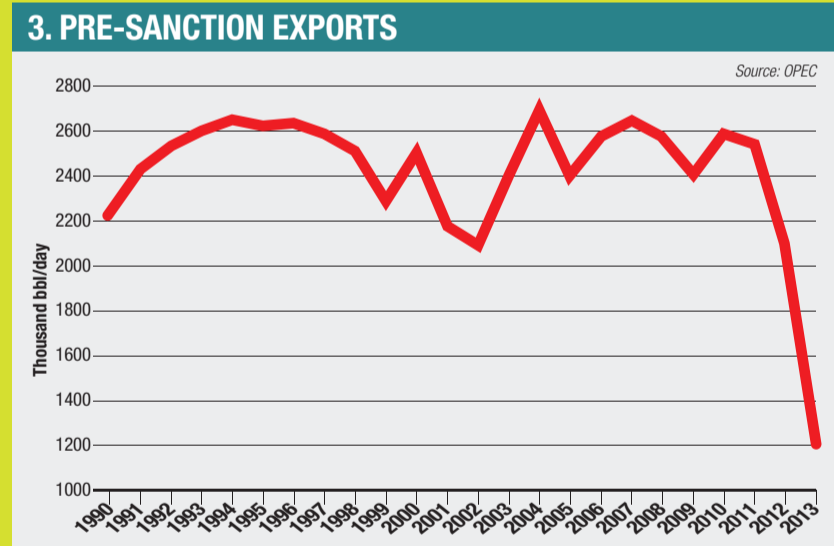
2. OIL SALES—PROFITS AND ESTIMATES

Profits from the sale of Iranian oil progressively declined from 2013 to 2015, finally leveling off in 2016. In 2017, the forecast is for an increase in profits.



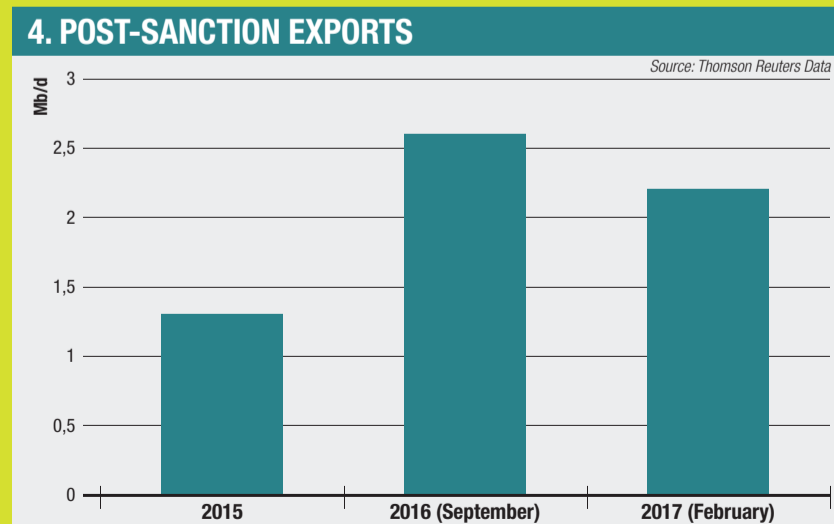
3. PRE-SANCTION EXPORTS

Pre-sanction Iranian exports underwent a dramatic decline. In the two years from 2011 to 2013, Iranian exports fell by 400,000 barrels per day, the largest decline ever recorded.



4. POST-SANCTION EXPORTS

Post-sanctions, total exports of Iranian oil has boomed in 2016, reaching more than 2.5 million barrels a day. In 2017, it still has not dropped below two million barrels a day.



tion. The agreement will instead allow Iran to continue to invite foreign companies to invest in its energy industry.

Even Iranian oil export levels are slowly returning to pre-sanction volumes. While in 2003 Tehran exported 2.5 million barrels of crude oil per day, in 2015 export levels declined to just 1.3 bpd and rose back up to 2.6 million bpd in September 2016, following the entry into force of the Vienna agreement on the nuclear issue. According to *Reuters* data, in February 2017, Iranian oil export volumes remain below September 2016 levels. This would suggest that Iran is experiencing difficulty in finding new buyers. Crude oil exports are expected to be 2.2 million bpd in February 2017, the lowest level since July 2016. However, Deputy Oil Minister Abbas Kazemi has assured that Iran's intentions are to significantly

increase oil production and export volumes in 2017, thanks to improvement in extraction technology. Iran's main customers are Asian countries, which will import 1.5 billion barrels of oil by February (*Reuters* data). Exports to Europe were 610,000 bpd in January 2017, down from the 800,000 bpd recorded in December. 70,000 bpd are sent to the Dutch market alone. Here, another taboo imposed by the sanctions against the Iranian nuclear program has been overcome. Iran is intensifying its delivery of foreign oil operating from the port of Rotterdam, this following the easing of restrictions on ship insurance approved in April 2016 as a result of the 2015 Vienna agreement. In recent months, large Greek and Croatian oil tankers have transported Iranian crude oil from the island of Kharg to Spain, Italy and Thailand. Thirty-two thou-

sand barrels of Iranian oil per day were delivered to Italy in January 2016 while 110,000 will be exported this February. Exports to Spain will grow from 30,000 to 70,000 bpd. According to *Reuters* data, as many as 25 European and Asian countries are transporting Iranian oil abroad. This has enabled the limits imposed by the international sanctions to be overcome must faster than expected. Until April 2016, the Iranian authorities had encountered many obstacles to exporting local oil. However, some companies remain skeptical regarding the possibility of doing business with the authorities in Tehran, especially due to the continued restrictions imposed by the United States. Despite this skepticism the Iranian Oil Ministry has promised new plans for the exploration of oil fields in the south of the country, and at least a dozen international

companies could be involved in the revival of the industry. According to Ali Kardor, Director of the National Iranian Oil Company (NIOC), the foreign companies involved in the recovery plan will be mainly European and Asian.

The nuclear deal and relations between Iran and the United States

Iran has effectively returned to the global market as a result of the Vienna agreement of July 2015 and the rapprochement between the Obama administration and the moderate presidency of Hassan Rouhani. However, the election of Donald Trump in the United States and his first executive orders have already produced an outcry from ultraconservative Iranians who could do well in the country's presidential elections in May 2017. Were they to prevail, it

could bring the country to a confrontation with the international community, a confrontation similar to that which occurred during the presidency of Mahmud Ahmadinejad (2005-2013).

Specifically, the appointments of Michael Flynn as National Security Advisor and Mike Pompeo as head of the CIA, both opposed to the agreement reached in Vienna by France, Great Britain, Russia, China, the United States and Germany (P5+1) in July 2015, could call into question and possibly reinstate international sanctions against Iran. This is why the outgoing director of the CIA, John Brennan, warned President Donald Trump that revoking the agreement with Tehran would be a "disaster" and "the height of folly." Possibly Moscow could mediate to facilitate a full implementation of the agreement, with the aim of reaching

FAVORABLE SHEAR

The Iranian authorities supported the OPEC agreement because it set the country's baseline at pre-sanctions levels and allowed the country to retain its production capacity. Pictured here (center), Oil Minister Bijan Zanganeh.



a shared solution with Washington on the Syrian crisis.

U.N. Security Council Resolution 2231, which acknowledges Iran's right to enrich its uranium for civil purposes, should ensure the air-tightness of the Vienna agreement. However, Michael Flynn warned the Iranian authorities that further breaches would not be tolerated, specifically referring to ballistic missile tests such as the recent one carried out by Tehran on January 29, 2017. According to Flynn, this would be a breach of Resolution 2231 and of the nuclear deal, which he assessed as "weak and ineffective." Iran's reactions to these statements were not long in coming. "Iran will remain indifferent towards Washington's threats" and "will not seek the permission of any country to defend itself," reiterated Ali Akbar Velayati, Advisor for International Affairs of the Supreme Leader, with regard to the warnings made by the U.S. authorities.

As if that wasn't enough, on December 2, 2016, the U.S. Congress approved a ten-year extension to the Iran and Libya Sanctions Act (ILSA). The U.S. sanctions against Libya and Iran were approved for the first time in 1996 and would have expired at the end of next year. The possibility that the U.S. would take a step back from the Vienna agreement soon provoked strong reactions in Iran. Specifically, Supreme Leader Ali Khamenei heavily criticized the new package of sanctions approved by the U.S. Congress against Iran. "There are no differences between the imposition of a new ban or the continuation of a previous one. The latter is an explicit denial of what was agreed with the Americans," said Khamenei. The Supreme Leader

added that the new measures are a breach of the nuclear deal. In response to the imposition of the new sanctions, Tehran immediately announced the start of a plan for the production of nuclear marine propellers and of legal action against Washington for failure to lift the international measures against Iran as provided for by the Vienna agreement. The announcement was confirmed by the Atomic Energy Organization of Iran (AEOI), previously accused by the Atomic International Energy Agency (AIEA) of having resumed the enrichment of uranium to levels above the limits set by the Vienna agreement as of November 2016.

In a letter written by Hassan Rouhani to the Iran's Chief Negotiator and Foreign Minister Javad Zarif, Iranian president reported on "delays in implementing the nuclear deal" and a "blatant breach" of the Vienna agreement in relation to the new sanctions approved by Washington. Therefore, the Iranian government continues to look towards Russia and Europe to balance the freeze in its bi-

lateral relations with the United States. The Iranian authorities have signed a memorandum of understanding for \$2.2 billion with Russian company Gazprom and another agreement with Royal Dutch Shell for the development of two of the country's major oil fields, Azadegan Sud and Yadavaran. Billion-dollar agreements have also been reached with France's Total, Germany's Wintershall, Holland's Schlumberger and Norway's DNO.

A program of expansion in international disputes

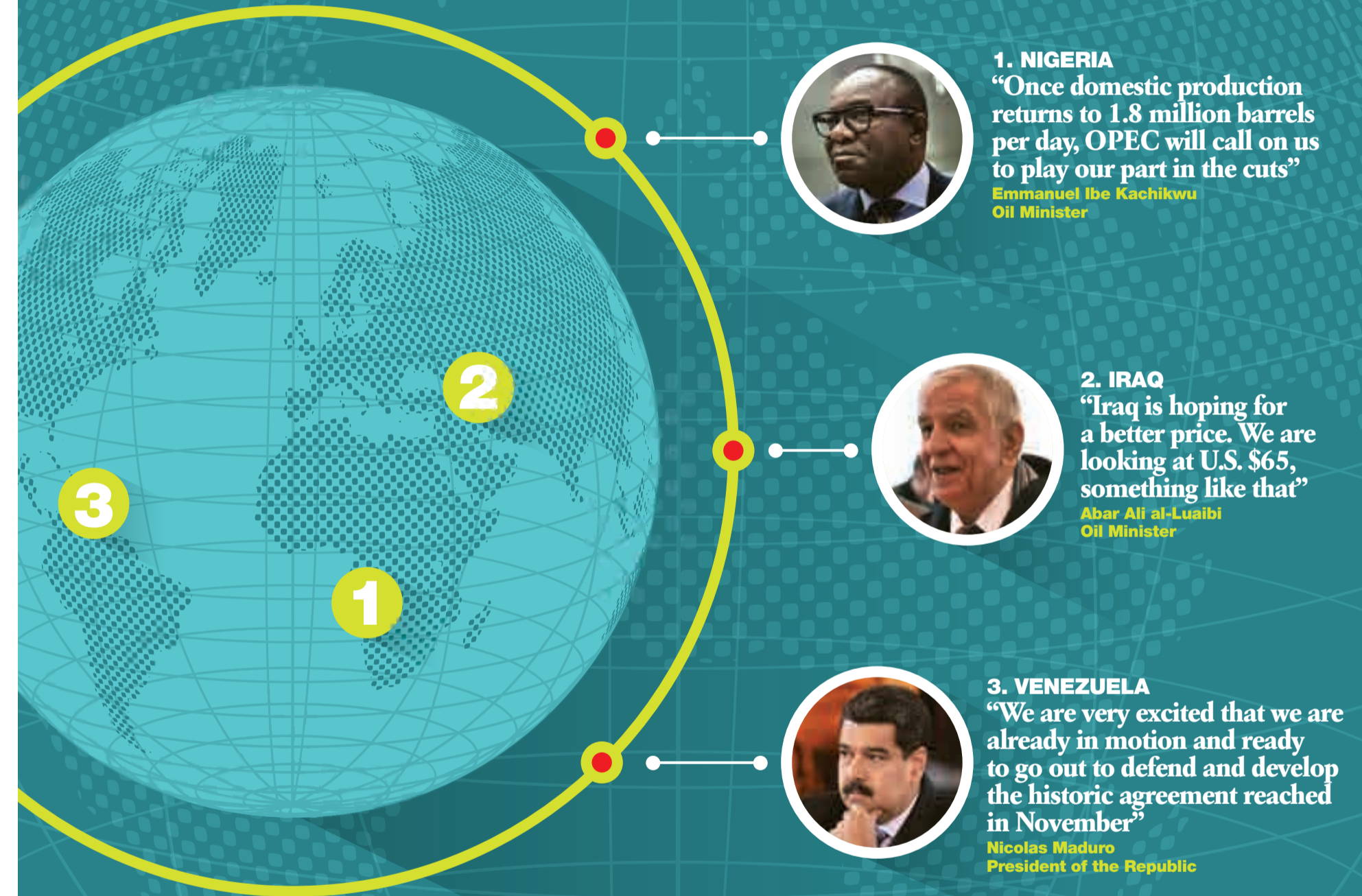
Since 2013 and for the coming years, the Iranian authorities have been and will be committed to following a policy of rapprochement with the international community, one drawn up by the former moderate president, Hashemi Rafsanjani, who died on January 8, 2017. This policy provides for the easing of the main international disputes, from the nuclear program to the downsizing of bilateral tensions with Saudi Arabia. In the first case, the Vienna agreement of July 2015 established Tehran's return

to the global market; in the second case, the agreements of Algiers and Vienna of September and November 2016 for the reduction in OPEC oil production reiterated Iran's right to return to pre-international sanction oil production and export levels. This latter decision could mark an expansion in the bilateral relations between Iran and Saudi Arabia, which are currently extremely tense as a result of the conflicts in Yemen and Syria. Curbing the enthusiasm of Iranian negotiators, on the one hand, is the skepticism of the conservative elite and Iranian radicals who never believed in a long-term rapprochement with the United States and, on the other, the Trump administration's new policies in the Middle. The temporary ban on entry into the United States of citizens from seven mostly Islamic countries, including Iran, has led to the approval of non-retroactive reciprocity measures by Iranian authorities. In addition bad feelings exist due to the delay in compliance by the U.S. in lessening international sanctions instituted by the outgoing administration of Barack Obama concerning the end of the banking sanctions against Tehran. Finally, despite the significant increase in oil exports to Europe and Asia, the return from foreign investments, especially European, and the achievement of one of OPEC's main goals, that is, the long-term increase in oil prices thanks to a reduced output, are not preventing an escalation in bad bilateral relations between Iran and the United States, which could result in a phase of continuous tensions between Iranian authorities and the Trump administration. A new phase of strengthened Iranian ultra-conservatives as a response to a tightening in U.S. foreign policy could lead to many setbacks on both the nuclear issue and as regards the end of international sanctions. Ultimately, this could downsize the short-term positive effects that a cut in oil production has caused, both in terms of oil prices and Iran's ability to return to good crude oil production and export levels, close to pre-sanction volumes.



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3 countries write their futures



The economies of Abuja, Baghdad and Caracas focus almost exclusively on oil, which is why the cities place their hopes for recovery on the beneficial effects of the OPEC agreement regarding oil quotas. However, they cannot ignore their problems concerning infrastructure, exports, internal order and international relations

Nigeria/International obligations confront popular expectations

In search of a new balance

Nigeria was exempted from applying the historic OPEC agreement on oil production cuts, due to severe problems that have halved its production capacity. The agreement, however, is likely to strongly affect the performance of the country's economy, and the development of the Nigerian oil market could have a significant impact on the sealing of the agreement.

In recent years, Nigeria's economy was among those most affected by the collapse in crude oil prices. In 2014, the country's gross domestic product (GDP) grew at a rate of 6.3 percent. In 2015, it slowed to roughly 2.7 percent. In 2016 Nigeria went into a recession for the first time in a quarter century, recording reductions in GDP for the first nine months of the year and losing (to the benefit of South Africa) the scepter of the continent's leading economy.

This was due not only to crude oil prices: endemic corruption and rigid monetary policies drained foreign currency reserves and continued insecurity substantially contributed to the crisis. However, for an economy that relies on oil products for 90 percent of its exports and 70 percent of state revenues, a crude oil price at historic lows is an unsustainable dead weight.

The impact of the OPEC agreement

The OPEC agreement can only have positive repercussions on Nigeria's economy. Oil Minister Emmanuel Kachikwu expects the global cut in production to bring crude oil prices to around \$60 per barrel, and estimates that this would lead to growth of the Nigerian economy reaching 2.5 percent this year.

This estimate is in line with those of rating agencies (2.6 percent according to Fitch and 2.5 percent according to Moody's), but is much more

optimistic than that of the I.M.F., which expects a GDP growth of around 0.8 percentage points. However, there is an important variable to consider. The government's forecasts are based on an oil output of 2.2 million barrels per day (bpd), a goal that currently appears very dif-

icult to achieve. The first few months of 2016 saw the Niger Delta region become the scene of frequent attacks by armed insurgents who, to induce the government to be more generous in the distribution of proceeds from exports, threatened and directly affected the interests of foreign

companies, to the point that, in May 2016, according to the state-run Nigerian National Petroleum Company (NNPC), oil production halved, amounting to only 1.1 million bpd. Nonetheless, the situation is improving. According to the latest data provid-

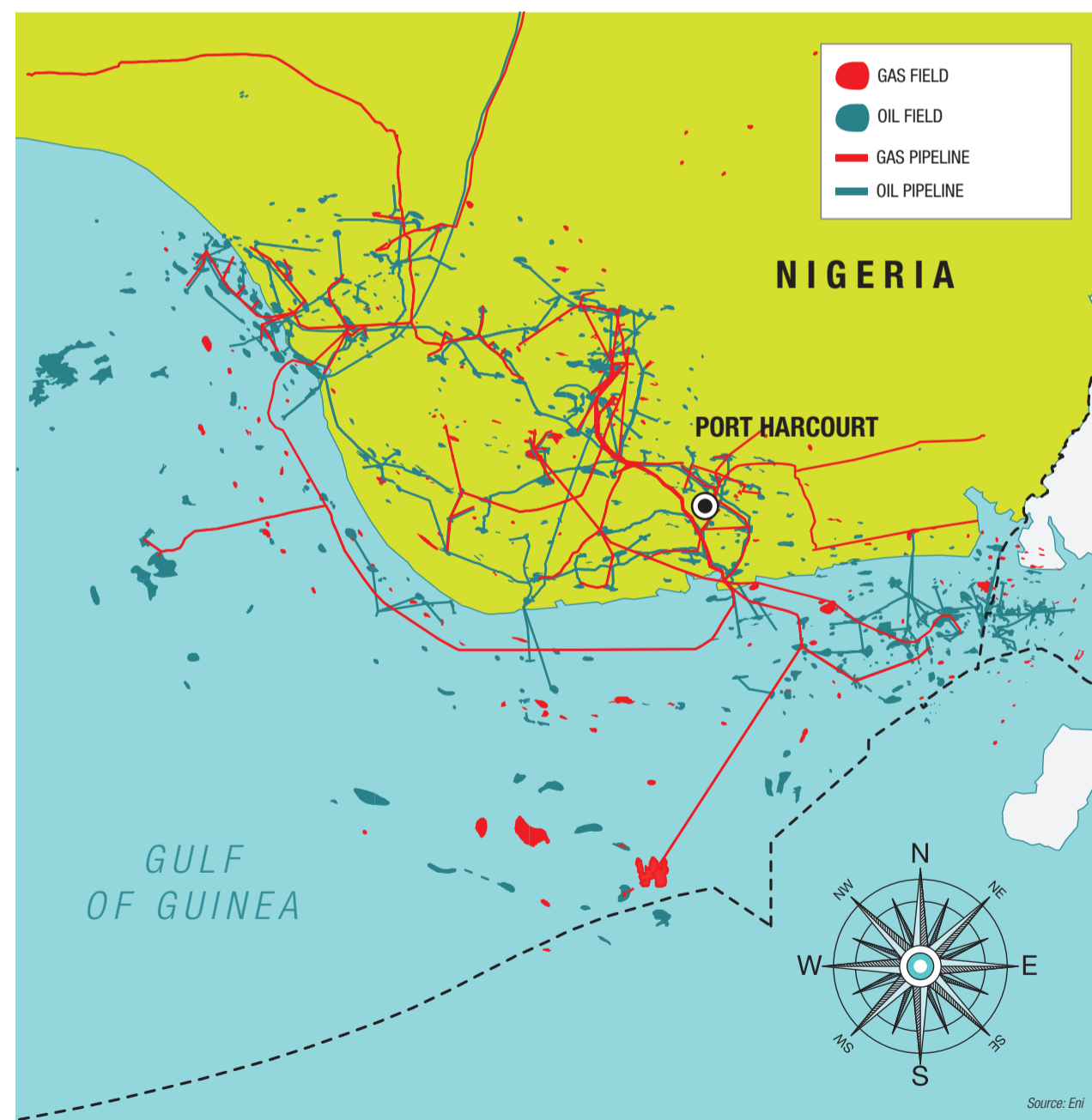
ed by OPEC, Nigeria produced an average of 1.6 million bpd in January of 2017 versus 1.37 million the previous month.

A significant increase, but not enough to regain its primacy (ceded to Angola last year) in the ranking of the largest oil producers in Africa. It is not even enough to reach the ambitious targets set by the federal government, which hopes to return to pre-crisis production levels.

For this reason, the Nigerian authorities have launched an intense diplomatic push aimed at appeasing the insurgents and also to secure the investments of foreign companies. Their efforts, however, have not yet led to the desired results. Currently, production is less than 30 percent than the levels expected by the federal government.

Towards two million barrels per day?

The Forcados oil terminal, the third largest in the country, remains effectively closed since February of 2016.



Energy in Nigeria

OIL
Production: 2,332 thousand barrels/day
Consumption: 264 thousand barrels/day
Reserves: 37,062 million barrels

GAS
Production: 42.57 billion cubic meters
Consumption: 18.01 billion cubic meters
Reserves: 5,284 billion cubic meters

Source: Eni World Oil & Gas Review 2016

The extent of the damage inflicted on the local economy has recently been defined by the NNPC itself, which estimates net losses for Nigerian exports at 300,000 bpd. At an average crude oil cost of \$45 per barrel, Nigeria has lost almost \$5 billion to acts of vandalism that have affected one of its main oil export routes. Overall, experts calculate that the African country loses approximately half a million bpd per day as a result of security issues.

During a debate on the Oil Ministry's budget in 2017, Kachikwu assured members of the Commission for oil resources of the House of Representatives that the reopening of Forcados is "a matter of weeks." Of the same opinion is Dolapo Oni, Head of the Energy Research Department at Ecobank, according to whom the oil pipeline that supplies the terminal could become fully operational again at the beginning of March. At that point, Nigeria's domestic oil production could rise to 2 million bpd. The difficulties encountered by the government in reviving production are likely to weigh on the recovery of Nigeria's economy, but are good news for OPEC, which can avoid the risk of an excessive increase in production by countries that have been exempted from the agreement of December 2016.

"Once domestic production returns to 1.8 million bpd, OPEC will call on us to play our part in the cuts," predicted Minister Kachikwu himself, during a recent visit to Rome. If Nigeria collaborates, the goal of recovering production levels of a year ago will remain an illusion. President Muhammadu Buhari will also be forced, once again, to revise the economic growth estimates downwards.

The country's future, therefore, will be played out on a delicate balance: on the one hand, its obligations towards international partners and, on the other hand, the need to meet the expectations of the people.

Even from here, the future judgement will pass on to a leader, Buhari, who so far has not been able to give Nigeria the turnaround that voters and international observers have been expecting.

GIANMARCO VOLPE
A journalist and expert in international politics, Gianmarco Volpe covers Africa and international cooperation. He managed the Middle East and North Africa desk at the Rome Center for International Studies, and is a consultant for NATO.

Iraq/The OPEC agreement and the world's second largest oil producer

Baghdad bears the impact



Iraq, OPEC's second largest oil producer, has promised to cut its output by 210,000 bpd according to the agreement signed on November 30, 2016 in Vienna.

During negotiations with the exporting countries, the government in Baghdad asked to be exempted from the cuts due to the high costs of its war against the Islamic State (IS) and its difficult internal situation. However, Iraq failed to obtain its desired result and had to accept a ceiling of 4.35mb, compared with October's production level of 4.7mb. Nevertheless, for now this obligation should not have negative repercussions on the Iraqi oil industry or on revenues

derived from crude oil exports. With an average Brent crude price at \$55 per barrel, which, according to some estimates could increase to \$60, Baghdad can rely on the high liquidity needed to cover war and reconstruction costs. It is also likely that in coming months, Iraq will continue to be required to reduce its oil production due to contingent factors.

The maintenance of oil fields and the Kurdistan issue

Iraqi crude oil exports in March of this year are expected to fall to their lowest level in the last seven months, due both to planned maintenance work in some of the largest oil fields →

in the country and to the seasonal physiological decline in production during that period. In the “super giant” oil field of Rumaila, operated by BP, Petrochina and Iraq's South Oil Company (SOC), maintenance work started as early as January and should be completed in June. Works on the super-giant oil field of Majnoon, licensed to the Anglo-Dutch company Royal Dutch Shell in partnership with Malaysia's Petronas and Iraq's Missan Oil, should start in February and end in April. At full capacity, the two oil fields combined produce an average of approximately 1.5 million bpd, an amount that will decrease during this maintenance work.

According to expert forecasts, in March, Iraqi crude oil exports from the terminals of Bassora, in the south of the country, are expected to fall to 3 million bpd from the current level of 3.28 million given this decline in production. Added to this total are the exports from the fields under the control of the autonomous region of Iraqi

Kurdistan, regarding which there is still no agreement between the two countries. The agreement reached in December 2014 between Erbil and Baghdad on oil exports has in fact been blocked.

Under the agreement, Iraqi Kurdistan is expected to export 550,000 barrels of oil per day via Baghdad oil marketing company Somo, in exchange for 17 percent of the federal budget. Currently, however, exports from the Kurdish region and from the oil fields of Kirkuk, which are largely controlled by the authorities in Erbil, flow via the connecting pipeline with Turkey, the Kirkuk-Ceyhan oil pipeline. This change is partly attributable to the closure of a pipeline that travelled to Mosul, a city in northern Iraq still under the partial control of IS, and because of this instability due to war the pipeline has been closed since at least 2014. The government in Baghdad therefore continues to block the allocation of 17 percent of the state budget destined



Energy in Iraq

OIL

Production: 4,078 thousand barrels/day
Consumption: 766 thousand barrels/day
Reserves: 142,503 million barrels

GAS

Production: 7.30 billion cubic meters
Consumption: 7.30 billion cubic meters
Reserves: 3,158 billion cubic meters

Source: Eni World Oil & Gas Review 2016

for the Kurdish region under the Constitution.

Although the lack of an agreement between the federal government and the Kurdish regional government may have consequences for the country's internal political stability, it is unlikely that this factor will have repercussions on compliance with the agreement signed by OPEC. Also playing in Iraq's favor is the fact that to date OPEC has reduced its oil production more than expected, thanks to the contribution of Saudi Arabia which, on November 30, 2016, committed to reducing its output by approximately 500,000 bpd.

According to the International Energy Agency (IEA), in January, Riyadh cut its output more than necessary and data show 90 percent compliance with the OPEC agreement, the aim of which is to cut average production, in the first six months of 2017 by approximately 1.2 million bpd. To that can be added an output cut of 558,000 bpd by non-OPEC countries, a group

that includes Russia. Therefore, Iraq, at least for now, has been able to avoid completely fulfilling its commitment made under the agreement, remaining at 53 percent of its target (-0.11 percent production versus the -0.21 percent required).

The geopolitical challenges

In terms of geopolitics, despite recent military successes in the war against the Islamic State achieved with the support of the international coalition led by the U.S., Iraq is experiencing challenging times.

The offensive for the liberation of Mosul, the final stronghold of the jihadist group in the north, is almost at an end with the partial liberation of the city center. But once control is regained over the entire province, Baghdad must start a difficult “political reconstruction” task that takes into account the requests and demands of various religious and ethnic groups. It will be necessary to grant an important role to the Sunnite community,

including allotting top institutional offices, to avoid once and for all rekindling violence between the country's various religious groups.

With the Kurds, it will be necessary to find a new balance, since in the war against the Islamic State the autonomous region of Iraqi Kurdistan has taken on a stronger role, both in terms of diplomatic relations, with Turkey and the United States, and from a strictly military point of view. It is reasonable to hope that once the militias of the “Caliphate” have been defeated a period of growth and stability may open up for the country, one that cannot fail to promote its reconstruction.

GIORGIA LAMARO

Since 2003, Giorgia Lamaro has worked as a journalist focusing on the Middle East and the Balkans. She is a specialist in energy issues in countries such as Iraq, Turkey and Syria.

Venezuela/The economic prospects for an oil economy

The missed opportunity

For Venezuela, the golden age for accumulating resources from oil revenue would have been the past decade, when the price per barrel was as high as one hundred dollars or more. The agreement reached at the end of 2016 between OPEC countries and several large producers not belonging to the organization will not be enough by itself to get the domestic economy back on track, even if prices manage to remain above \$65 per barrel. Comparing OPEC figures with those of the International Monetary Fund (I.M.F.), it appears that in order to keep the national budget balanced, the Caracas government needs a price per barrel of \$117.50.

The economic situation

Venezuela, whose main economic asset is oil, is floundering in a recession—the I.M.F. estimates that the growth of

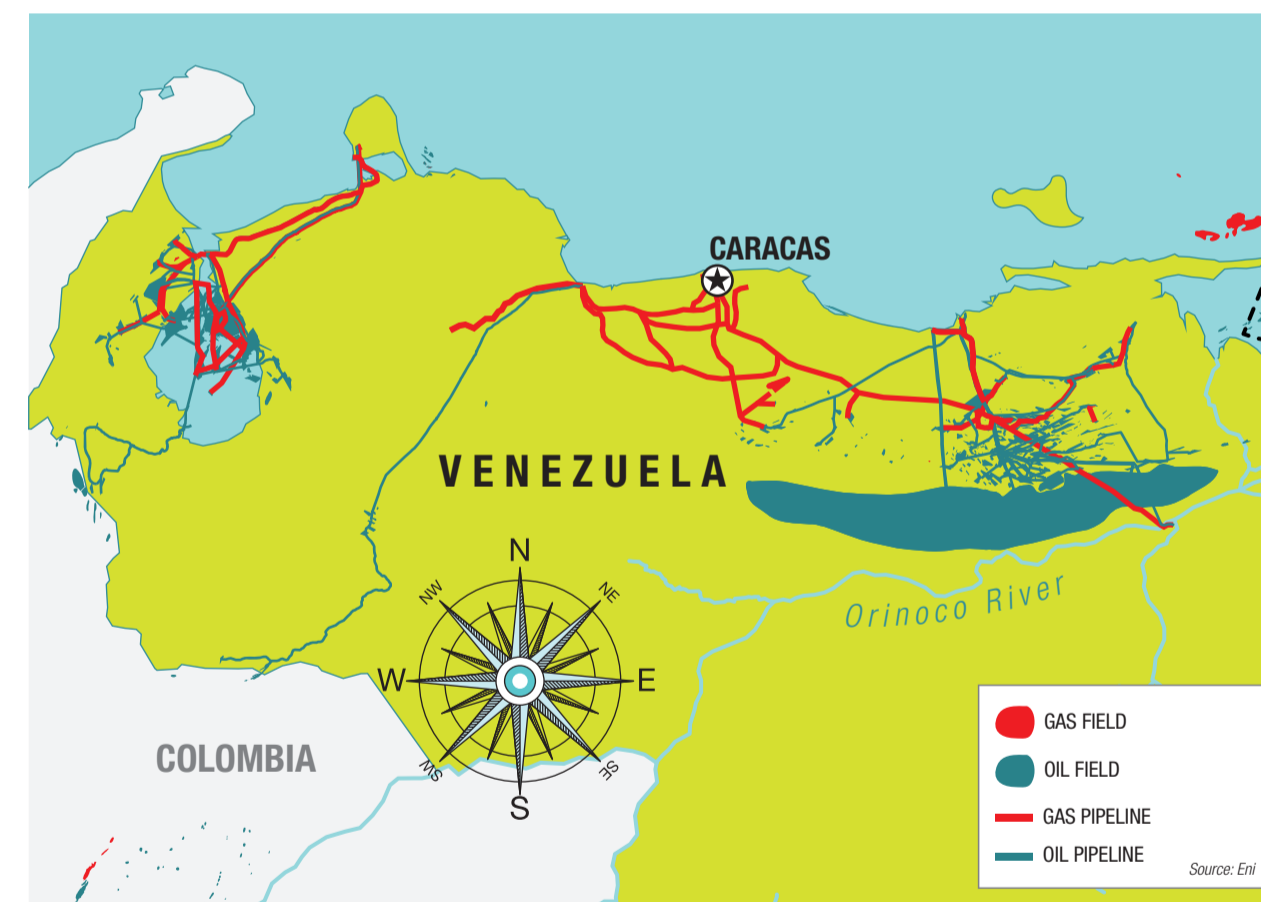
GDP for 2016 stands at negative 12 percent, aggravated by consumer price increases running at 3-digit levels. Numbers that seem to worry Caracas more than the short-term action on the price of oil: in January, Venezuela was one of the few countries that did not comply with the cuts in oil production. A modest overrun, however, with daily production of 2.01 million barrels, compared with the figure of 1.98 envisaged in the agreement (data from S&P Global Platts), offset until now by the undertakings of Saudi Arabia and Angola. The government of Nicolas Maduro is working to snatch added value by exploiting its position with Russia, the country that is the real linchpin of the agreement because of its ability to open up a channel of communication between OPEC and non-OPEC countries. Caracas has joined the diplomatic efforts put in place with Moscow in the weeks leading up to the

agreement, and it is one of the five countries of the Joint OPEC non-OPEC Ministerial Monitoring Committee (JMMC), the group that will review progress on a monthly basis. On the other side, the support that Russia provides for the country is vital to at least partly protect Caracas from the elements. If it is true, as the Fitch ratings agency suggests, that the state-owned oil company PDVSA is on the brink of defaulting, such a collapse would be shattering, given that Venezuela has the largest proved oil resources in the world. The era of the fat cats is over. When Hugo Chavez came to power in 1999, the price of Venezuelan oil was \$16 per barrel, between 2011 and 2014, the value soared to an average of between \$84 and \$103. From 1999 to 2014 the country was collecting, on average, \$56 billion per year. In 2015, with the price already falling, but not at 2016 levels, the

amount fell to approximately \$12 billion. The Venezuelan government spent tons of money whether for combating poverty, with results recognized by the World Bank, or for bolstering the popularity of senior political figures as elections approached. Lastly, as detractors would note, money was used to oil the wheels of an increasingly circular system of power. But very little ended up in the safe and now that the flow from the oil tap has slowed down, the public coffers are crying.

A country short of resources

First, the resources for modernization are lacking, or even just for keeping the oil machine running, to the extent that on the eve of the agreement, several analysts claimed that Venezuela would not have a problem cutting production still further. This is truly a national problem, given that



Energy in Venezuela

OIL

Production: 2,608 thousand barrels/day
Consumption: 698 thousand barrels/day
Reserves: 300,878 million barrels

GAS

Production: 25.75 billion cubic meters
Consumption: 26.17 billion cubic meters
Reserves: 5,702 billion cubic meters

Source: Eni World Oil & Gas Review 2016

black gold represents over 90 percent of total exports. Reuters, citing internal PDVSA documents, claims that because of a lack of funds, many tankers are delaying journeys to Moscow and Beijing by months, with total shipments valued at \$750 million. These are shipments, which Venezuela guarantees to satisfy loans granted by the two partners, following arrangements that could tighten the screws of the coffers of the Lat-

in American country even further. The liquidity crisis has alarmed creditors, even, if truth be told, Caracas has honored its debts until now. In the golden years, while enjoying large profits, the State and PDVSA issued large amounts of securities, creating a debt which, according to the consulting firm Ecoanalitica, could reach \$93 billion in 2027. This year bonds worth approximately \$9 million should reach ma-

turity, concentrated in the months of April and October. International reserves have fallen by more than \$40 billion since 2008, to almost 11 billion now, greatly limiting the power to purchase basic necessities intended for the domestic market. This problem is a cause of inflation, against which minting coins with increasing nominal value or repeated increases in salaries offer little help. President Maduro, however, is re-

launching, and in January promised to let the leaders adhering to the agreement have a new proposal, one capable of guaranteeing stable oil prices in international markets. However, it is difficult to imagine that the country can in this way redeem itself from the hardships constraining it.

MARISOL DIAZ DE MEDRANO

Russia/Exciting prospects, according to the former Energy Minister

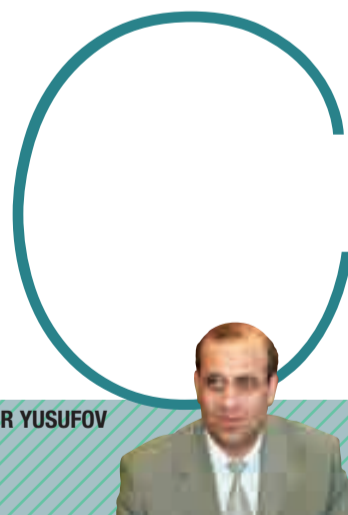
Towards stabilization

With crude oil prices at a sustainable level between \$50 and \$60, and the possibility for a new energy dialogue with the Trump administration, Russia looks forward with optimism

The adhesion of Moscow



Russia became the first non-OPEC country to collaborate with OPEC on cuts in oil production at the historic summit of November 30, 2016. Moscow, in fact, led the non-OPEC agreement of December 10, 2016, pledging to reduce the production between 200,000 and the 300,000 bpd. This commitment was taken to heart by Russian Energy Minister Alexander Novak: "We are doing all we can to participate in the implementation of the agreement."



IGOR YUSUFOV

He has more than 30 years' experience in the oil and gas industries. From 2001 to 2004, Mr. Yusufov was Minister of Energy of the Russian Federation. From 2003 to 2013, Mr. Yusufov was a member of Gazprom's Board of Directors.

bi bene incomincia è a metà dell'opera, an Italian proverb says. The start of the year evokes certain global hopes concerning energy development I would like to share with you.

One is a hope that international crude prices could be stabilized in a sustainable way through the framework of a marketing procedure adopted at the end of 2016: both OPEC and non-OPEC producers decided to reduce their oil production. Russia pledged a 200,000 to 300,000 barrels per day (bpd) cut and already in the first days of 2017 has lowered production to 100,000 bpd. Although a special OPEC body will determine whether all participants of the significant international move obeyed this self-imposed production discipline, one thing is certain: the crude price finished 2016 at \$55 per barrel, and in the mid term should oscillate in the \$50-\$60 range. This means that the profitability of energy corporations throughout the globe will remain stable, allowing a commensurate stability in project implementation and employment.

For me, the oil reduction decision nicknamed OPEC+ has a special meaning: in 2001, as Russian Energy Minister and head of the Russian delegation to the 117th OPEC conference in Vienna, I led around-the-clock talks with oil ministers of the cartel which resulted in the first ever participation of my country in the solidarity oil output cut. The Russian reduction share was 140,000 bpd, and despite some skeptical voices from the press, it helped to maintain the price of oil in the essential just corridor, at that time between 20 and 25 dollars. Different times give different prices, but let me provide an answer for those who do not understand how Russia will manage economically with lower oil production: raising the price of oil by \$10 means that when our budget is calculated on the basis of a \$40 per barrel price, \$29 billion will be added to net income.

A new America: What this means for Russia

Anno nuovo, vita nuova: the new political year started with inaugura-

tion festivities in Washington which deeply impressed me as a guest, but at the same time I felt that this fanfare could announce a new beginning of the Russian-American energy dialogue that I have had the honor to contribute to for some 15 years.

My term as Russia's energy minister coincided with a very interesting and laborious period that included an intensive search for new rationales and incentives for Russia's energy policy. In the early 2000s, we developed our country's energy strategy and established close ties to Italian companies and the European Union as partners in global energy relations. In 2001, the Presidents of Russia and the United States, Vladimir Putin and George W. Bush, proclaimed the bilateral energy dialogue based on the understanding that Russia as the most important oil producer and the U.S. as the major oil consumer needed each other.

It is a particular joy for me to mention that one of the most active participants in the establishment of this qualitatively new international rela-

The weight
in the world

World
91,863
thousand bpd

Russia
11,057
thousand bpd

Russia has a key role on the global energy chessboard. In fact, it is the third largest oil producer in the world, after the United States and Saudi Arabia.

tionship format was ExxonMobil's Senior Vice-president, Rex Tillerson. We first met on April 10, 2002 and right from the start it was clear that a conversation with such a strong and knowing personality would lead to a positive result. Mr. Tillerson seemed to know and to understand Russia exactly in the same way I did as minister, and not only in energy matters. He knew personally every person both from government and the private sector whom we discussed, and he seemed to have grasped even the smallest details of Russian legislation and of contracts that foreign companies had concluded in Moscow.

In my opinion, Russia and Italy have many things in common as personal contacts and relationships play a significant role for us, even in the most formal contacts. Mr. Tillerson also showed his substantial skills in this regard. It is not a coincidence that President Putin appreciates him and chose him as one of the few people to be decorated with the Russian Friendship Order. Together with the brilliant Russian diplomat Sergey Lavrov, our

foreign minister, the new secretary of state can really change the world. Of this I am certain! The business-like approach central to the Trump administration represents a very solid basis on which the skyscraper, maybe a metaphoric Tower named after its architects, of the new Russian-American energy dialogue can be created. Russia has many very interesting energy projects to offer, and the American contribution could consist of investment and managerial and technological input.

My sincere hope is that President Trump and his team will demonstrate a reasonable and positive approach to global challenges and to a strategic partnership with President Putin, not least in the area of energy cooperation. This would open the door for massive investment into Russian oil and gas exploration and production and for the attraction of cutting-edge technologies and excellent American management practices into this sector. This would give Russian companies new opportunities to have the courage to enter into projects with

15 years ago

"I met Tillerson for the first time on April 10, 2002. From the very beginning," explains Yusufov "it was clear that a conversation with such a strong and wise personality would lead to results. Tillerson seemed to know and understand Russia just like me, who, at the time, was wearing the Minister's shoes. It is no coincidence that President Putin praised the current secretary of state. Along with the brilliant Russian diplomat, Sergey Lavrov, our foreign minister, the new secretary of state can really change the world. I'm sure of that." (Pictured, the first meeting in Moscow between Igor Yusufov and then senior VP of ExxonMobil, Rex Tillerson.)



heavy-to-extract hydrocarbons such as the Achimov deposits in the Urengoi district in Siberia.

This is exactly the technology and management challenge the investment Fund Energy I founded six years ago is facing while working on our Yamal project which comprises two deposits, Karasyovskoye and Yuzhno-Tanlovskoye, plus eight licenses for geological exploration of other fields. We managed to attract Halliburton to the exploration drilling as supervisor and continue talks with the Export-Import Bank of the United States on financing these operations in order to continue this spring with three more exploration drillings. So, we are optimistic about the future of both our projects and the Russian-American cooperation in the energy field in general.

This is no wonder. In the beginning of 2000, I had the privilege to attend the birth of this interstate dialogue having been actively involved in the organization of the two Russian-American Commercial Energy Summits in Houston (2002) and Saint-Petersburg (2003). By the way, it was in Houston in 2002 that I first met James Richard Perry, the present Energy Secretary of the United States.

I had the privilege to witness his excellent knowledge of the energy issues discussed by both government and private business representatives at this historic event.

It's my opinion that now is the best time to return to the praxis of such summits. In interviews for *Bloomberg Businessweek* and *The Guardian* pub-

lished in January, I have already proposed a return to the practice of bilateral energy summits. We are ready to work hard to provide a qualitatively new impulse to the new Russian-American energy cooperation. Being organized under the aegis of presidents of the two countries and with active involvement of both the governments and private oil and gas business, they seem an effective format not only for extensive diplomatic discourse but also for the formulation of common goals in energy development.

As the U.S. expresses its intention to come to the international energy market with considerable amounts of oil and gas, it should be noted that one of the sections of the Russian-American Commercial Energy Summits was dedicated to international hydrocarbons markets.

This is exactly the place where a common pricing policy could be formulated, and Russia would be able to implement this decision using our experience of effective dialogue with OPEC and other crude producers. At the next stage, European and Asian energy powers could join this new dialogue which has to result in the elaboration of certain regulatory mechanisms, and market stability could be established for a period adequate for the effectiveness of the measures introduced.

All experts from the Fund Energy, which can function as a kind of small think-tank, and I would be glad to contribute to this part of the global energy dialogue and apply our experience to make it succeed.

The "opposing" effect of U.S. sanctions

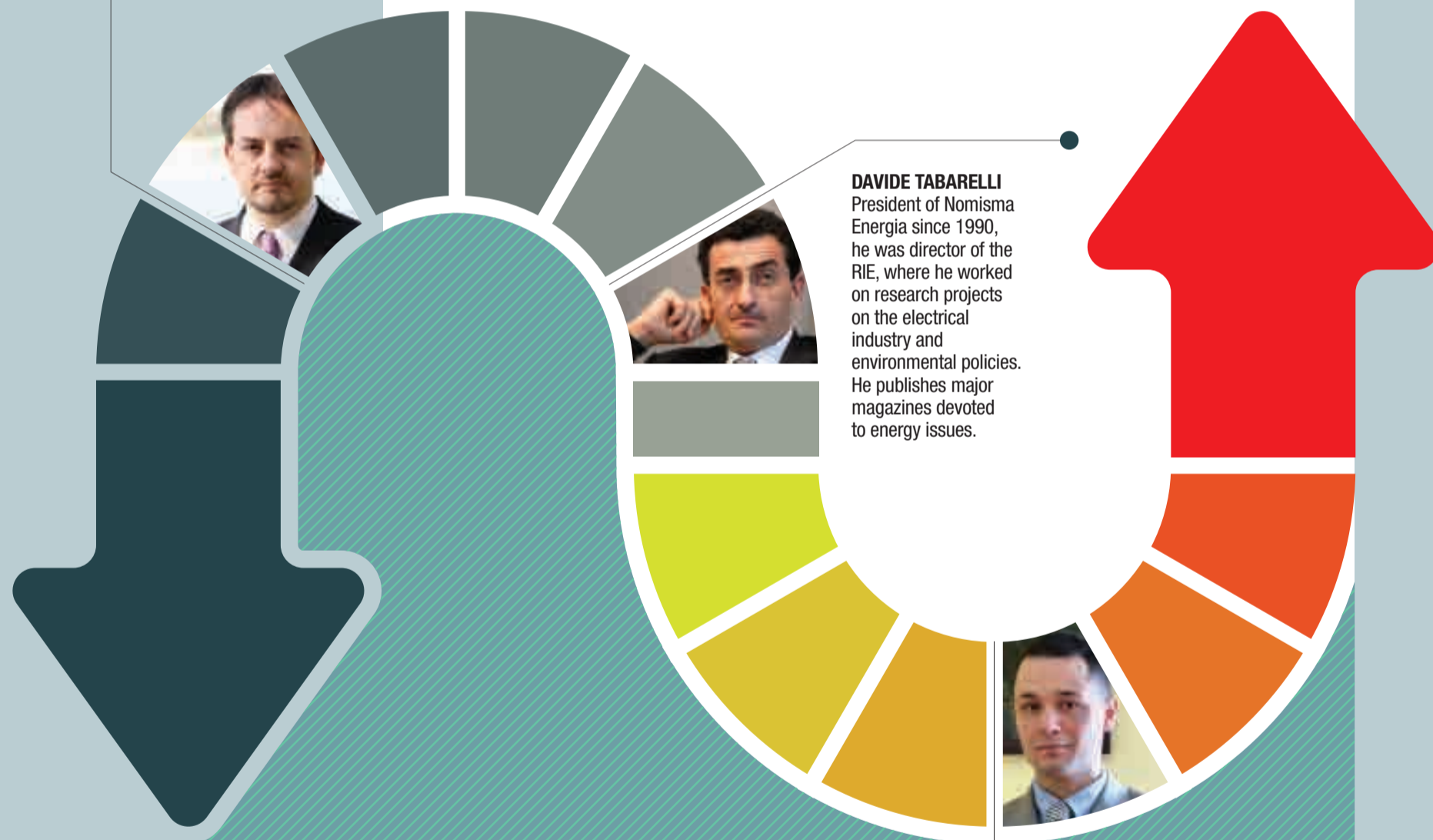
As for politically motivated sanctions, this invention from past times, they seldom lead to the expected result. Having been first introduced in 423 B.C. by ancient Athens against certain producers from the Megara district, they resulted in the bloodshed of the Peloponnesian Wars. The clever Lysistrata from the Aristophanes comedy, who lived in the same historical period, was a trifle more successful with sanctions, but that is a completely different story. Returning to the sanctions issue, the Russian oil and gas sector emerged quite successfully from this harsh stress-test. As for the sanction details and their future, I would like to quote Mr. Anthony Scaramucci, President Trump's senior advisor for communications with business. In January in Davos he stressed "an enormous respect for President Trump (then President-elect) for the Russian people and the legacy of the relationship that the U.S. has with Russia, which dates back to the Second World War."

Mr. Scaramucci said American sanctions against Russia have had an "opposite effect" which has brought Russians closer to their President. In addition, 2016 was a record year for foreign investments into our energy branch. Chinese Beijing Gas invested \$1.1 billion into the Rosneft project Verkhnechonskneftegas, and the Indian ONGC Videsh Limited invested \$5 billion into East-Siberian Rosneft projects. Further, the privatization of 19.5 percent of the shares

of Rosneft through the participation of the Swiss Glencore and the Qatar Investment Authority brought \$10.2 billion to the Russian budget. What strikes the eye? Of course, the absence in this impressive list of American and Italian companies. This must be changed!

Among the Russian-American projects I expect to succeed in the near future, I would mention the Exxon-Mobil-Rosneft project in the Kara Sea. ExxonMobil invested \$640 million, including the financing of exploration drilling. The drill core is now being analyzed in the Exxon laboratories in Houston. My hope is that shortly we will get news of the discovery of a new important deposit. This means that even under present conditions, leading American and Russian companies successfully search for secure ways to extract oil in Arctic off-shores. It is the first step to the future cooperation of giants such as Exxon and Rosneft in hydrocarbons production in the Arctic regions. In the future, we expect new projects in these areas with Italian participation.

ROBIN M. MILLS
C.E.O. of Qamar Energy,
and author of "The Myth
of the Oil Crisis."



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he was director of the
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DEMOSTENES FLOROS
A geopolitical analyst, he
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program in International
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as being the head and professor
of the third course in
Geopolitics, established
at the Open University of Imola
(Bologna). He collaborates with
the Energy International Risk
Assessment (EIRA) and the
geopolitical magazine *Limes*.

Focus/The consequences of the OPEC deal

Markets and prices: What to expect?

Three experts from the energy world analyze the trend of crude oil prices in the short, medium and long term, and their impact on other energy sources



A slippery path for gas and renewable energy?

The oil market will adjust rather quickly to the increase in crude oil prices. Green and nuclear energies will receive a boost from the cut in oil production, as will the sale of electric and hybrid vehicles

ROBIN M. MILLS

Many barrels of ink have been spilled over the OPEC deal on oil production cuts reached last November. Less attention has been paid to the deal's impact on gas and renewable energy worldwide. But the effect will be significant: partly for the boost it gives to other energy sources, but even more for what it says about the long-term strategies of the big oil producers. The agreement requires most OPEC members to cut production from October levels by 4.4-4.5 percent, a total of about 1.4 million barrels per day (bpd). Libya and Nigeria, troubled by political unrest, are exempt. And Iran, returning from sanctions, is capped at a higher level. This accord was followed on the tenth of December by an unprecedented arrangement for Russia to reduce output by 300,000 bpd while another set of non-OPEC countries, including Oman, Kazakhstan and Mexico, cut a further 300,000 bpd.

So far OPEC compliance appears to be good (almost 90 percent), though mostly led by Saudi Arabia, while Russia's output is largely flat. Brent oil prices, which had

climbed up from the mid-\$40s per barrel as the deal was being debated, jumped to around \$56 per barrel and have remained around that level since.

OPEC's stated aim in taking this action has been to reverse the heavy over-supply that triggered the price crash in mid-2014 and that had persisted since, and to drain off excess inventories. And various forecasts, such as that of the International Energy Agency, do show the market shifting into deficit this year. But the price rebound is expected to be relatively modest, at least in the short term, due to the increase in U.S. shale oil output. From a low of 8.45 million bpd in early October, U.S. crude production had already rebounded to 8.978 million bpd in early February, on figures from the U.S. Energy Information Administration.

A BOON FOR OTHER ENERGY SOURCES?

The increase in price gives some temporary relief to stressed oil producers and companies. But it also improves the situation for competitors to oil. Such competitors should be considered under three headings: natural gas; coal, renewable and nuclear power; and alternative fuel vehicles.

The reduction in OPEC oil production also reduces their output of associated gas. In Saudi Arabia, associated gas amounts to about 2.4 billion cubic feet per day. Any decrease has to be met by increased oil burning. Conversely, though, higher prices for oil and by-products of gas extraction such as condensates and natural gas liquids mean more drilling in areas such as the U.S.

Natural gas competes directly with oil in a few applications, such as home heating, but customers here are generally locked in to one or the other fuel. Only a few coun-



tries, notably Saudi Arabia, still use substantial amounts of oil for power generation, and here government-regulated prices mean that market fluctuations do not translate immediately into making gas more competitive.

In the market for temporary and off-grid power, primarily diesel generators, higher oil prices do intensify a trend that is already underway. This is to switch to renewable energy, either with battery storage or in combination with oil-powered backup. Alternatively some locations, such as drilling rigs, are using gas where it is available.

Higher oil prices have an immediate impact on gas by raising the price of oil-linked sales contracts. An oil-indexed formula is still the leading method of pricing liquefied natural gas (LNG) in Asia. Increased oil prices make gas relatively more expensive, lowering its attractiveness against

gas priced on another basis (for example, U.S. LNG priced against the Henry Hub benchmark), coal, renewable energy or nuclear power. Gas is already too expensive to displace coal in many markets, such as India.

So indirectly, more expensive oil will raise the share of both coal and renewables. The impact on coal is immediate, as generators switch away from gas-fired power plants. The effect on renewable energy is slower, since it takes time to build new capacity.

However, in the longer-term, there is no reason for oil and gas to trade at some fixed parity level. Even oil-linked gas sales agreements will be adjusted to reflect new market realities. Gas prices are driven by their own dynamics. Indeed, a growing disconnect of gas from oil prices encourages the trend towards gas-on-gas competition, and the use of pricing points

such as the U.S.'s Henry Hub, the north-west European nodes, and the new "Singapore Sling" LNG benchmark.

U.S. shale gas output continues to rise strongly, the global LNG market is glutted with Australian and now U.S. supplies, and new projects from East Africa and Canada can arrive at the right price. But except perhaps in North America and for some remote stranded gas fields, the price disparity is not wide enough to encourage more gas-to-liquids projects like Shell's giant Pearl facility in Qatar.

Some major oil exporters are, of course, also big gas players: notably Qatar, the world's largest LNG exporter, Russia, the biggest gas exporter overall, Algeria and Norway. Iran has ambitions to join them. They can be somewhat more relaxed about oil prices as long as their gas remains competitive.

Finally, more expensive oil improves the attractiveness of alternative-fuelled vehicles: running on natural gas, biofuels, hybrids or electricity, or perhaps one day hydrogen. Conventional vehicles that are smaller or more fuel-efficient also gain. And there is already a trend to switch some shipping to LNG, to comply with marine pollution controls.

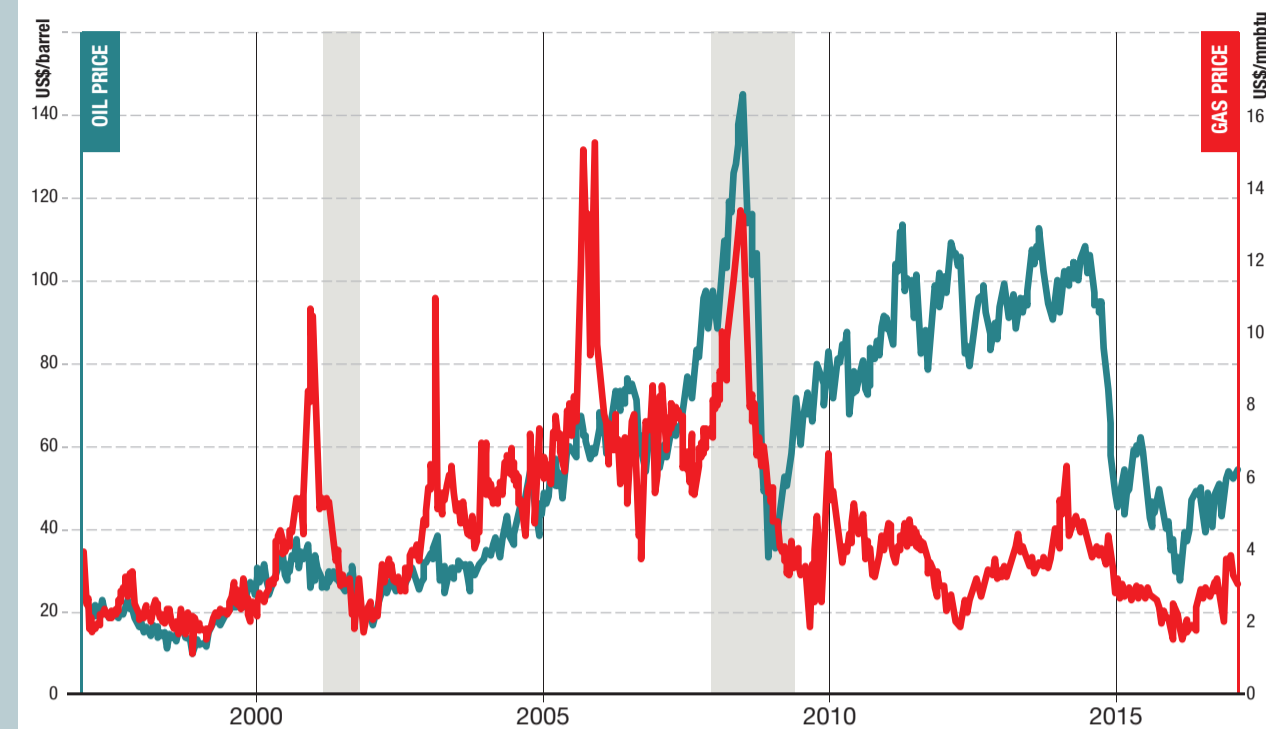
Battery vehicles can, of course, run on electricity from any source. Rising electricity demand would be good news for coal (if not constrained by tighter climate policies), gas, renewable and nuclear energy. Potentially all would gain market share at the expense of oil. But electric vehicles could be introduced synergistically with renewable energy. Their batteries, otherwise unused for 95 percent of the day while the driver is elsewhere, could be used to store variable solar or wind power, or indeed cheap off-peak nuclear electricity.

The increase seen so far in oil prices, from around \$45 to \$55, will in the short-term have a relatively modest but positive impact on all of these alternatives.

Whether over the next few years oil prices remain around current levels (as futures curves imply), increase further or slump again depends on the interplay of five main factors: OPEC's discipline in adhering to current cuts and extending the deal beyond its initial six months; the strength of rebound in U.S. shale output; the pace of decline in non-OPEC output over the next few years due to the cumulative impact of underinvestment; the state of the world economy in the face of protectionist moves; and the threat of instability or conflict interrupting supplies from one or more major oil-producing countries.

Oil prices at current levels will probably not greatly alter the global energy trajectory: steady gains in the share of renewable energy and electric vehicles, and improving efficiency. If OPEC continues to hold back production and non-OPEC cannot keep up with demand, a new price spike, to levels of \$80, \$100 or even more per barrel, would accelerate progress in converting transport to electricity and gas. It would combine with continuing climate poli-

PRICES IN COMPARISON: CRUDE OIL VS NATURAL GAS



This chart compares the price performance of West Texas Intermediate (WTI) or Nymex Crude Oil to that of the Henry Hub Natural Gas spot price over the last 20 years.

cies to encourage government intervention favouring renewable energy and batteries.

In the third case, a renewed slump in oil prices, the prospects dim for a swift transition to more efficient and hybrid or electric vehicles. Already the last two years of low oil prices have seen U.S. gasoline demand and vehicle miles travelled, which had seemed to be in terminal decline, turn upwards again. And low oil prices can also be important in guiding the trajectory of the future transport systems of the emerging Asian giants, most importantly China and India: away from small, mostly electric vehicles and public transport, and closer to an aspirational American model of large, petrol or diesel-driven cars. Almost 40% of new Chinese car sales from September to November were S.U.V.'s.

ALTERNATIVE ENERGY BEGINS AT HOME

At the same time as they grapple with the challenges posed to their core business by alternative energies, OPEC countries are also seeing the opportunities at home. In many of them, the legacy of years of lavish energy subsidies is high and wasteful consumption. Fiscal pressures have made subsidy reform and attempts to improve energy efficiency and productivity essential.

Falls in the cost of solar and wind power have made them highly competitive in the right localities. The UAE has taken the lead by commissioning some of the world's cheapest solar photovoltaic plants; Saudi Arabia has recently unveiled some large-scale solar and wind plans as part of its National Transformation Plan. Solar bid prices of 2.45-2.99 US\$ per kilowatt-

hour in Abu Dhabi and Dubai imply parity with gas prices around \$3-3.60 per MMBtu, well below current LNG prices or the cost of developing new higher-cost domestic resources.

Some other OPEC counties are dabbling in renewable energy on a smaller scale. The UAE is also expected to start generation this year from the first reactor of its 5.6 GW civil nuclear power program. And some steps are being taken to establish electric charging networks for cars, with Tesla set to open in Dubai, its first Middle East location, shortly. Alternative energy technologies are also helping to support oil output. Oman's Mirraah solar thermal plant is due online before the end of this year, set to generate 1000 megawatts equivalent of steam for heavy oil recovery. And last November, Abu Dhabi's Al Reyadah joint venture started delivering carbon dioxide captured from a steel plant's exhaust for enhanced oil recovery.

The OPEC countries' motivation is almost entirely economic rather than environmental. Renewable energy displaces more expensive oil and gas—Saudi Arabia and Kuwait being two of the few countries worldwide that still use substantial amounts of oil for power generation. Saudi Arabia's direct burning of crude oil in the summer air-conditioning season has at times exceeded 1 million barrels per day. But, though cost-effective, it will take vast amounts of renewable energy to make a dent in consumption: one million barrels per day of crude can produce in excess of 22 gigawatts of power, more than half the installed solar capacity of Germany, and do so through night, cloud and dull winter days.

Alternative energy also holds out the hope of diversifying the economy and

building a future beyond oil and gas. This was the hope of Abu Dhabi's Masdar initiative, launched in 2006, which has built solar, wind and carbon capture plants at home and abroad, constructed a low-carbon city, and invested in renewable energy research. But beyond making use of their excellent solar potential, the major Middle East oil producers are still searching for ways to be inventors and developers of new energy technologies, rather than simply purchasers.

OPEC'S LONG-TERM STRATEGY

OPEC's debate over its long-term strategy has largely been framed in terms of three issues: the elasticity of shale production; the threat of alternative energies, particularly electric vehicles; and the pressure to phase out fossil fuels to tackle climate change. The rise of shale offers sustained growth in production at moderate oil prices, at least by recent historical standards, and weakens OPEC's role as the arbiter of global markets. Breaking oil's monopoly on the transport sector would rob the major oil producers of the premium value their product commands. And, while the future of climate policy is uncertain for now under the Trump administration, stricter curbs on carbon dioxide emissions are ultimately inevitable. Shale is both a short-term and long-term problem for the major oil exporters. Electric vehicles are, so far, a longer-term threat. But together, they do pose a strategic puzzle for OPEC. The organisation could do what it did in the 1970s and early 1980s, and repeatedly cut production to defend a price target in the face of shrinking demand and rising non-OPEC competition. This might be easier today given cooperation from some non-OPEC players, →

and the legacy of three years of brutal upstream spending cuts.

Alternatively, those OPEC countries with the resources and political stability to do so—essentially, Saudi Arabia, Kuwait, the UAE, and perhaps Iraq and Iran—could make a dash for growth. Expanding their production would keep prices relatively low, but they would make up some of the losses by gaining market share. This approach would also stave off competition from alternatives to oil. And the low-cost producers would sell their oil while they can, possibly leaving high-cost, high-carbon resources such as Canada's oil sands stranded, environmentally unrecoverable within a few decades.

For a while starting in late 2014, the second strategy seemed to be the one the Saudis, at least, were adopting. Former oil minister Ali Al Naimi made it clear that his country would not again resume the burdensome role of swing producer that cost it so heavily in the 1980s.

But 2016's return to a short-term approach of production cuts has marked the abandonment of these plans, if indeed they were ever contemplated. The short-term pain of low prices proved to be unbearable, despite the avowed scepticism of some OPEC oil ministers that the production cut strategy can succeed. Of course, the cuts so far are modest. There is still time for OPEC to change course by the time of its next scheduled meeting in May—whether the market appears to be rebalancing, or the cuts are clearly not having the desired effect. But Saudi Arabia, still the key OPEC arbiter, has made no clear moves to expanding its production capacity. Unless it does so, its ultimate weapon—the ability to overwhelm competitors with a surge of production—will remain capped at an absolute maximum of 12.5 million barrels per day, just 2 million bpd above recent output records.

WHAT'S NEXT?

The OPEC agreement and the organization's shift of tack make oil somewhat more expensive for a while. The gas market will adjust quite soon to the relative shift of pricing. And in the limited areas where they compete directly with oil, renewable and nuclear power will get a boost, as will sales of hybrid and electric vehicles.

In a world in which oil output remains the key source of revenues and exports, but is no longer the driver of growth, the major petroleum producers will gradually develop a bigger role for renewable energy. But even as some of the supermajors, notably Total, grapple with biofuels, wind, solar and battery technology, none of the big national oil companies have articulated a future beyond oil. And both they and their host countries need soon to devise a strategy for output that balances short-term revenues, long-term market share and carbon constraints. That crucial step, much-debated, remains elusive.



Tiles that fit together

The unprecedented commitment of Saudi Arabia and Russia and the unexpected American U-turn toward hydrocarbons led to a “sealing” of the recent oil agreements

DAVIDE TABARELLI

After more than two years of out-of-control supply, a large group of countries decided to reduce their oil production. They amounted to 24: 13 from OPEC, and 11 non-OPEC. The countries involved accounted for 55 percent of global production, with 52 million barrels per day (bpd), 34 from OPEC and 18 from non-OPEC countries. Never before had we seen such an extensive effort, not to mention excess supply at this level, with prices

falling from \$110 per barrel at the beginning of 2014 to less than \$30 per barrel in January of 2016. At the beginning of 2017, prices returned to \$55 per barrel, partly due to a high degree of compliance with the commitments made on production cuts. The OPEC agreement, signed on November 30, 2016, provides for a ceiling of 32.5 million bpd, approximately 1.2 million bpd lower than the record peaks of 33.7 in November of 2016. The agreement relating to the non-OPEC side, announced on December 10, 2016, provides for a further reduction of another 0.6 million bpd, bringing the total reduction to 1.8 million bpd. A similar reduction in supply, if confirmed throughout the entire first quarter of 2017, had only been observed back in 1999, when began the long bullish cycle, which lasted until 2014, with only a temporary interruption in 2009. Since then, a series of events, combined with the clash between Saudi Arabia and Iran, triggered a sharp increase in supply well beyond that which the demand, despite slowing down, was able to absorb. What can be seen in the increasingly complex situation of the oil market is a short supply in the coming years that prepares the ground for the future bullish cycle, which aims at the \$100 per barrel threshold. In the last 50 years, demand has never stopped grow-

ing, with an average rate of 1.2-1.5 million bpd per year. In the last 30 years, consumption has increased by a third, totaling an extra 36 million bpd. The greater slowdown or speed with which supply follows the consumption trend determines the underlying performance of prices. With the rapid rise in production, stocks rise and prices fall; the opposite occurs with demand, which rises, supported by supply. Cyclically, these periods alternate and result in substantial price fluctuations. At the beginning of 2017, with a sharp fall in production and with a demand that continues to grow steadily, the start of a new cycle is expected. However, certain elements combine to provide greater balance: on the one hand, U.S. production and, on the other hand, technological innovations, especially the electric car.

AN AGREEMENT WITH FEW HISTORICAL PRECEDENTS

Such an extended agreement, involving all major players in the Middle East, has not been recorded since 1998. Fundamental, as usual, was the rapprochement between Saudi Arabia and Iran, following a year of grueling negotiations. In the context of the uncertainty that characterizes oil, a dominant rule is that when relations between two countries improve, prices rise, while if they get worse, as occurred be-

tween 2014 and 2016, prices fall. The threat of Iran's full return to the market prompted the Saudis to flood the market with surplus production. Riyadh did not like the fact that America and Iran had restored good relations, as this represented a threat to its ambitions to lead the entire Middle East. Obama's disengagement from Iraq in 2011 had left an empty space, which was then filled with internal instability and ISIS. To try to solve the problem, Washington enlisted the help of Tehran, whose intervention, as a counterpart, led to the request to lift sanctions on nuclear power. Threatened and even slightly disappointed by the Americans, Saudi Arabia suddenly decided to boost its production to defend its market share, ahead of the potential return of Iranian production to the market, which could have increased the current 2.5 to 4 million bpd, a share reached prior to the sanctions. Such an action was justified as a way to stop the costlier American production from fracking, which, beyond politics, threatens the Saudi market share. The price collapse that followed was unexpectedly large, even to the Saudis themselves, who hoped to exert pressure on the Iranians and to cause a sharp decline in U.S. production. After two years, however, they had to accept what now seems obvious, that the Iranians, after the lifting of sanctions,

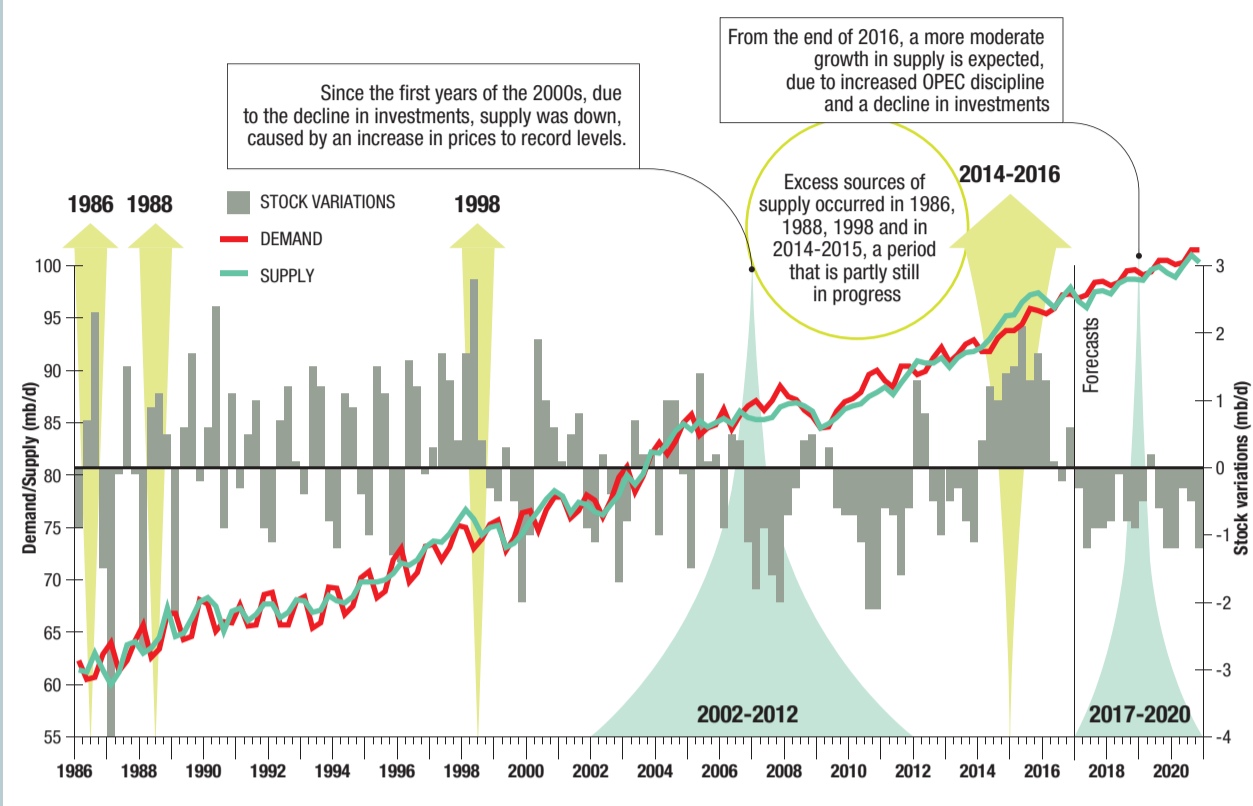
could return to producing 4 million bpd, the threshold on which its production has been substantially stable for 20 years. All the other OPEC members, those “external” to Middle Eastern discord, expressed a desperate need for an agreement. Venezuela and Algeria, countries traditionally exposed to crude oil price fluctuations, have seen their economies dramatically worsen and, inevitably, their internal political instability grow. For months, to no avail, they pressured Iran and Saudi Arabia to reach an agreement. The degree of compliance with OPEC shares was very high at the beginning of 2017. This was a discipline rarely observed in the past, a discipline that suggested that many members of the cartel had suffered from the previous situation. Two major countries, Nigeria and Libya, were exempted from the terms of the agreement because their production was much lower than normal levels due to internal political conditions. These two countries are expected to increase their production this year, in the best-case scenario, by 0.5 million bpd, an increase that will not create a significant problem for the market. Starting in 1985, when the first of a long series of crude oil price collapses occurred, many attempts were made by non-OPEC countries to define common initiatives to control production without achieving signif-

icant results. But in this case, the support given to the agreement by a large group of non-OPEC countries led by Russia, was the element that reinforced recent dynamics and seems to offer a more stable outcome. The 11 non-OPEC countries are committed to reducing production by another 0.55 million bpd, of which 0.3 has been promised by Moscow. In a previous failed attempt in 2001, Russia promised a cut of 30,000 bpd, ten times less than that proposed under the latest agreement and with which despite the lower commitment, it did not intend to comply. Moscow has now established its leadership. Interestingly this larger promised cut appears to be easier than the earlier promise, since it coincides with a decline already underway in many oil fields due to the lack of new investment that should have been made over the past two years but was delayed due to financial difficulties. Unlike OPEC, the degree of compliance with the non-OPEC agreement promises to be lower, since Russia needs time to reduce its production, as the technology in its oil fields does not provide for the possibility of immediate re-adjustments that would slow down extraction levels.

WIND OF CHANGE IN MOSCOW AND WASHINGTON

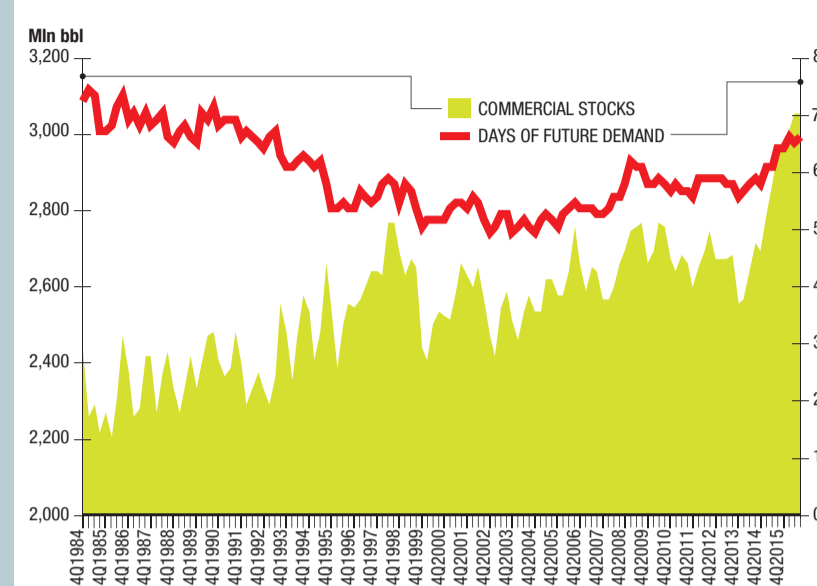
Political and military activism in Moscow and the Middle East have also affected oil diplomacy, given that Moscow's economy, already heavily tested by the sanctions of 2014, depends like no other on the price of the barrel. Russia is the world's second largest oil exporter, with 5 million bpd, a total only bettered by Saudi Arabia, but Moscow has long been the top gas exporter, with a total of approximately 200 billion cubic meters per year, equal to over 3 million barrels of oil equivalent per day. Gas prices targeted at Europe and Asia, towards which Russian exports are intended, are still set according to the trend in oil prices. Throughout 2016, Moscow had encouraged Saudi Arabia to accept that Iran could go back to producing its pre-sanction levels, while Russia received invitations from Venezuela and Algeria to effect better coordination. Since February 2016, Russia has attended three meetings to coordinate a reduction in output and finally a strong rapprochement came at the summit of the end of September 2016 on the sidelines of the World Energy Forum in Algiers. That agreement paved the way to the end-of-year agreements. For thirty years, as soon as Moscow raised the issue of oil prices, fear rose among many parties of a possible expansion of OPEC; currently, however, Russia's new direction is being underestimated. The element that will most contribute to braking the bullish rise of the barrel will be U.S. production, which was expected to collapse with the fall in prices in 2014, but which, instead, declined less, by approximately 0.9 million bpd, to 12.3 million bpd. At the beginning of 2017 production itself showed signs of →

GLOBAL OIL DEMAND AND SUPPLY AND STOCK VARIATIONS PER QUARTER



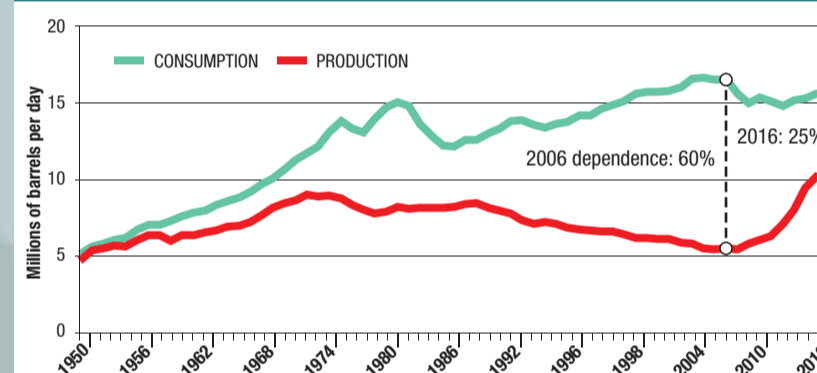
In the last 50 years, the demand for crude oil has never stopped growing, with an average rate of 1.2-1.5 million bbl/d per year. In the same period, consumption increased by a third, totalling an extra 36 million bbl/d. What we see today is a short period that is preparing the ground for a future bullish cycle aiming for the \$100 per barrel threshold.

TREND IN COMMERCIAL STOCKS FOR OECD COUNTRIES



The OECD countries hold most of the world's oil reserves. As the graph shows, at the end of 2015, the record level of over 3 billion barrels was reached, corresponding, in terms of future consumption, to approximately 66 days. In the same period, reserves exceeded demand, which is still in a phase of recovery.

U.S. OIL CONSUMPTION AND PRODUCTION



Thanks to greater production and combined with a slight decrease in domestic consumption, U.S. dependence on oil imports decreased from a maximum of 60 percent in 2005 to a minimum of 24 percent in 2015, a figure not seen since the start of the '80s and which also represents a success for the Obama administration.

a slight recovery. If prices go back in a stable manner to above \$60, production will grow again in a more sustained manner. The cost-reduction process launched in 2014 has never stopped; in 2012 in Texas, prices between \$70 and \$90 were recorded, while at the end of 2016 in the best areas they stood between \$40 and \$60. In the Permian Basin, from Dallas to Odessa in Texas, production continued to grow, and reserves were revised upwards. At the same time, the search for new solutions to save on water, on pipes, on the rental of drills, on chemical compounds, and on geoseismic analyses never ceased. New methods are constantly being applied in the search for better geological stratification for fracking. There are thousands of companies working in this sector in the Odessa and Midland area alone, and another hundred thousand in the rest of the United States, and there is abundant potential for cost improvement. The sector grew, almost out of nowhere, between 2006 and 2014, and now it would be difficult to find alternative employment for the contingent of geologists, chemists, truck drivers, and metal workers experienced in valves and pipes. The U.S. banking system has always helped with very low interest rates and with a certain ease of access to fund this activity, but it had never witnessed such a re-entry of resources. Optimism, even in difficult times, is in the best tradition of the American frontier and has never abandoned these pioneers of the global oil industry. Had the former president been a Republican, the strong support of the oil industry in the last 50 years could have been attributed to him but, paradoxically, he was a Democrat who tried to impose stricter environmental rules. Thanks to increased production and a

slight decrease in domestic consumption, the U.S.'s dependence on oil imports decreased from a high of 60 percent in 2005 to a low of 24 percent in 2015, a figure not seen since the '80s and a success story for President Obama. While the former occupant of the White House had not done much to support the boom in domestic production, new Republican President Trump will actively encourage it. To lead the Environmental Protection Agency (E.P.A.), he appointed Scott Pruitt, Attorney General of Oklahoma, the oil state par excellence, a man famous for having led lawsuits against environmental regulation imposed by faraway Washington. Gone are the fears that the E.P.A. could restrict fracking activities which, objectively, have a heavy impact on the environment. Had Clinton been elected, there would certainly have been tightening of environmental constraints that would have increased production costs. Trump has so much confidence in oil that he chose, as Secretary of State, Texan Rex Tillerson, C.E.O. of ExxonMobil, the largest oil company in the world, based in Irvin, Texas, but also a man with solid roots in the Middle East. Tillerson has a deep understanding of the complexities related to energy policy and at the same time has also been a skilled negotiator with Putin's Russia. Despite strong criticism from the opposition, his presence on the one hand reassures Saudi Arabia as regards relations with Iran and on the other hand ensures a frank dialogue with Putin, skills that should tend to limit political instability.

HOPES RESTING ON DEMAND

In 2017, Global oil demand will reach a new record high of 97.8 bbl/g, confirming an underlying trend that sees an increase

by 1.2-1.5 million bpd every year, more or less the equivalent of Algeria's production or Germany's demand. In this way, the 100-million-bpd threshold is approaching, a total deemed difficult to achieve 15 years ago due to lack of reserves. Compared with the crisis scenarios of the 70s, demand has increased by 35 million bpd and, despite attempts to reduce it, shows no signs of decreasing.

Oil remains the top source for covering global energy demand, with 35% of the total, a figure that gives way only slightly to gas and renewable sources. In recent years, the debate regarding the oil peak has shifted from that of production, which would have been caused by the exhaustion of reserves, to that of demand, which will be reached in a few years, thanks to alternative sources and electric cars. If we were to focus on the whirlwind of information on the Internet, which creates a kind of virtual science, a future climate cataclysm caused by fossil fuels, including oil, seems certain, while oil's abandonment, thanks to the existence of the electric car, is just a few years away. In reality, while we wait for more concrete evidence on climate change, oil demand will continue to rise due to population growth, globalization and improved living conditions for billions of peoples. This will be achieved mainly through internal combustion vehicles that use large amounts of energy that only oil derivatives such as gasoline and diesel can guarantee. Oil consumption to 2040 will continue to rise towards 115 million bpd, a figure that in 2016 seems very far off, just as in the '80s it seemed excessive to speak of the 100 million bpd, a figure that will be reached in a couple of years. Meanwhile, however, it will take time for the huge stocks accumulated in the last two years to be reabsorbed. The

commercial stocks of the OECD countries, i.e., those that have the greatest impact on price dynamics, have reached a record level of over three billion barrels, a quantity that in terms of consumption would last 66 days. With the production cuts made at the beginning of the year by OPEC and non-OPEC countries, these levels will immediately begin to decline, with resultant impacts for prices.

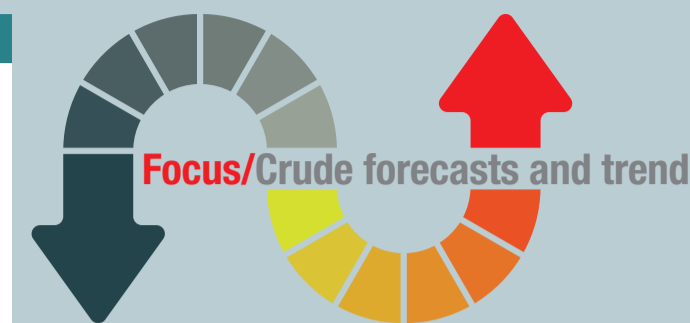
THE NEW SAUDI PARADIGM

Saudi Arabia remains the main influencer in the global oil market, as it is the top country in terms of reserves, production, exports and unused production capacity. In January 2017, its production recorded a drop of over 0.5 million bpd, a cut not seen for over a decade and one that reveals the Saudi determination to lead the price recovery.

The director is the new oil minister, Khalid Al-Falih, the former president of Saudi Aramco, a company that has always produced the best state officials. His appointment in April 2016 slightly lessened the ambitions of the young prince, Mohammed bin Salman, the 32-year-old son of King Salman, who ascended the throne in January 2015, when the oil collapse had just started. The young prince, a kind of economy minister, during some recent statements in January 2016 explained his "Vision 2030," based on which the country's economy will gradually be liberated from its dependence on oil exports. He is well aware of the problems of a parasitic system made up of millions of people who pretend to work on state salaries that are derived from Aramco's oil exports. Moreover, as someone who is always connected to the network, he is convinced that its oil will soon become nothing other than black rock with no value, once that, in a

few years, the electric car will have replaced internal combustion engines. The oil minister, being older and more experienced, knows very well that this will take a long time and that oil will still be in demand for much longer. The OPEC agreement of November 30, 2016, that of December 10, 2016 of the non-OPEC group led by Russia, the high degree of compliance with the agreements at the start of 2017 and Saudi Arabia's commitment, all suggest that the market is heading towards a new cycle, one characterized by demand that is growing more than supply. A decade ago, the strong growth in Chinese demand was followed by a growth in supply and this caused prices to rise to \$140 per barrel in July 2008. We have almost forgotten the ease with which those values were reached, values which are now unthinkable. It is true that strong support comes from the degeneration of finance which,

even now, has not completely gone, and that some new help will come from Trump. Currently, things are a little different. Demand is rising less, the Chinese economy has slowed down, India is unable to maintain the same growth rate, internal combustion engines, which run on gasoline or diesel, are showing continuous improvements in efficiency, despite the progress of electric traction; but still in a context of hybrid cars. In terms of supply, the U.S., with rising prices, is increasing production, but still by limited volumes that are unavailable on the international market. The production cuts at the beginning of 2017 suggest that a price increase is highly likely, but what is important is that this does not occur with shock increases, the ancient evil of this market, and that OPEC knows, this time, how to better govern the change.



The end to price declines

For now, bullish factors resulting from the OPEC agreement seem to be prevailing—macroeconomic factors and geopolitical trends suggest that oil prices will finally stabilize, though challenges remain, U.S. tight oil not least among them

DEMOSTENES FLOROS

With the agreement reached on November 30, 2016 by OPEC countries on production cuts, the downward phase for crude oil prices seems to be over. The agreement, which came after eight years of misunderstandings, as well as wider-scale conflicts that have gone beyond the perimeter of the organization itself, is undoubtedly of historic importance.

WHAT HAPPENED ON NOVEMBER 30

On November 30, 2016, in Vienna, the Organization of Petroleum Exporting Countries decided to cut production—as of January 1, 2017—by 1.2 million barrels per day (bpd) compared with October 2016 levels. The organization's new production ceiling—from which Libya and Nigeria must be excluded (due to sanctions and consequences of the war), in addition to Indonesia, which is temporarily suspended from the group—will be around 32.5 million bpd. Meanwhile, 11 non-OPEC producers have promised to reduce their extractions to a total of 558,000 bpd. More precisely, the Russian Federation by 300,000 bpd, followed by Mexico (100,000 bpd), Oman (40,000 bpd), Azerbaijan (35,000 bpd), Kazakhstan (20,000 bpd) and others (Bahrein, Brunei, Equatorial Guinea,

Malaysia, Sudan and South Sudan). In the event that these cuts were to be implemented, in mid 2017 a gradual rebalancing between demand and supply would occur, with prices consistently above \$50/b. On January 31, 2017, North Sea Brent Crude and West Texas Intermediate crude oils were priced at \$55.48/b and \$53.32/b respectively, gaining approximately 15 percent since OPEC and non-OPEC producers committed to reducing extractions.

LATEST DATA AND ESTIMATES ON OIL

According to data provided by the Oil Market Report on January 19, 2017, in December 2016, global oil supply fell by 0.6 million bpd from the record level of 98.2 million bpd reached the previous month. This decrease involved both OPEC and non-OPEC countries. The Cartel's crude oil production fell by 320,000 bpd, amounting to 33.09 million bpd.

According to data provided by the OPEC Monthly Oil Market Report, on January 18, 2017, in 2016, the Organization of Petroleum Exporting Countries produced, on average, 32.418 million bpd of crude oil, a sharp increase from the 31.470 million bpd produced in 2015.

The IEA estimates that in 2016 the global oil supply increased by 0.3 million bpd from the previous year, to the extent that OPEC's record extractions have more than offset the 0.9 million bpd decline in non-OPEC output, despite the fact that the Russian Federation's production has increased by 230,000 bpd, reaching 11.2 million bpd several times, a record for the post-Soviet era. Forecasts for 2017, however, suggest a reversal of the non-OPEC trend, whose supply is expected to increase by 385,000 bpd, of which as much as 320,000 bpd from the U.S.

In accordance with data published by the Oil Market Report of December 13, 2016, total stocks in OECD countries declined in November 2016 for the fourth month in a row. Preliminary estimates at the beginning of December reveal a drop, in absolute terms, of 82 million barrels from the record reached in July. Nevertheless, the

overall amount of stocks still remains greater than 3 billion barrels.

Global oil demand is expected to grow by 1.5 million bpd in 2016 and by 1.3 million bpd in 2017. Despite the slight slowdown, this value is still higher than the annual average of 1.2 million bpd recorded at the start of the 21st century.

Specifically, China will once again drive consumption, driven by its 6.7 percent economic growth recorded in 2016. The main state-owned company—CNPC—has estimated for 2017 a record of 11.88 million bpd of crude oil (+3.4 percent), with net imports up by 5.3 percent to 7.95 million bpd. In all likelihood, these import increases will continue beyond 2017, given that the Chinese government expects that in 2020 its output—amounting to approximately 4 million bpd—will decrease by seven percent from 2015. Analysts at Wood Mackenzie estimate an even steeper decline, to 3.53 million bpd in 2020. Although from 2005 to the beginning of 2015, much of the incremental crude oil production worldwide came from the U.S., the oversupply that has characterized the oil market in the last two years has been almost entirely due to OPEC's non-compliance with the production ceiling.

THE ROLE OF MONETARY POLICY

On December 14, the Federal Reserve raised interest rates by 25 basis points, bringing them to a range of 0.50-0.75 percent. The Chair of the U.S. Central Bank, Janet Yellen, justified this move—which investors have been waiting for several months and which the market had already started to expect, given the appreciation of the dollar since October 2016—claiming that “the labor market seems to be going the same way it did before the recession.” What were the first consequences?

1 | Increase in yields. For the first time, U.S. 10-year Treasury Debt yields reached an annual record of 2.3809 percent, precisely at the time of the OPEC agreement. After that, they continued to grow, reached a maximum of 2.5967 percent on December 15, to then close the year at 2.4443% (2.4531 on January 31, 2017).

2 | Strengthening of the dollar. In November, the dollar opened at €1.1025/\$, steadily appreciating for the entire month to close at €1.0635/\$ at the time of the OPEC agreement. This trend continued, with the dollar reaching its highest level since 2002 on December 20, at €1.0364/\$. During the first month of 2017, the dollar clearly reversed its trend, depreciating to €1.0755/\$ on January 31, 2017, in the wake of Donald Trump inauguration speech, which seemed to suggest the U.S. would turn toward protectionism.

From November 8, 2016, the date of the U.S. presidential elections, to January 6, 2017, the dollar gained eight percent over the euro. The new U.S. President's promises in favor of deficit spending poli-

cies and, above all, reduced rates to companies that had repatriated funds held abroad, supported a bullish trend. After that, the impression is that, in the market, fears have prevailed due to protectionism, in parallel to the criticism that the White House directed at Germany, guilty of favoring their exports due to an underestimated euro.

ECONOMIC CONSIDERATIONS

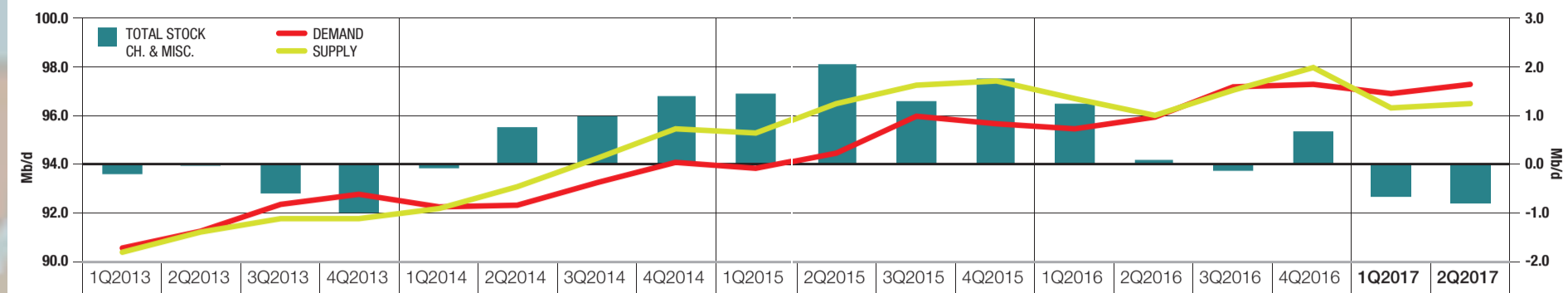
The increase in interest rates by the Federal Reserve decided on December 14 may not lead to the opening of a new markedly bullish course, as shown by the subsequent decision made by the Central Institute which, on February 1, kept rates unchanged. Despite Yellen's statements, the U.S. labor market has a significant grey area, starting with the fact that 95 percent of the jobs created in the Obama era are part-time.

The Trump administration, in addition to inheriting 43.2 million Americans who use food stamps (government subsidies for food) and public debt of almost \$20 trillion, following the \$9 trillion increase during the previous presidency (+86 percent), will have to carefully assess the consequences of a significant strengthening of its own currency. According to economist Guido Salerno Aletta, “America is changing economic strategy [...] because it can no longer maintain its role as a global locomotive growing on foreign debt. During the Obama presidency, net debt worsened exponentially, growing from -\$2,627 billion in 2009 to -\$7,281 billion in 2015.” The impression, therefore, is that an appreciation of the dollar would be “disastrous.”

WINNERS AND LOSERS WITHIN OPEC

The OPEC agreement represents a serious political defeat for Saudi Arabia and its allies in the Gulf, starting with Qatar and the United Arab Emirates, the effects of which will have repercussions that go far beyond the balances with the organization. The Saudi strategy, implemented since September 2014 and aimed at flooding the oil market in order to cause prices to decline, had, as its primary goal, to further weaken Iran which, at the time, was still grappling with the sanctions on nuclear power. This option, in addition to causing problems for the States with a high tax break-even point within the organization (starting with Iran itself, but also Venezuela, Algeria, Nigeria and Ecuador), would have led to the expulsion of high-cost producers from the market. This plan was not implemented—if not partially and, above all, not in the times that Riyadh had initially planned—for a number of reasons, starting with the military defeat in the war in Syria.

In addition, the previously reported data reveal that several unconventional producers have since been expelled from the market, while others have had the ability to resist, by significantly reducing extraction costs. Moreover, the petro-dictator succeeded in the attempt to stop the recov-



Source: I.E.A.



ery of Iran's output after the end of the embargo decreed on July 14, 2015 and, at the same time, saw its own public deficit flare up due to the collapse in income from oil exports. Despite having lost \$100 million in revenue due to sanctions and the collapse of crude oil exports, Iran came out top from the Syrian military conflict and, therefore, from the clash with Saudi Arabia, as evidenced by the production ceiling of just under 4 million bpd established by the agreement (close to that of the pre-sanction period). That said, despite Iranian exports having reached 2.44 million bpd again in October 2016, Trump's doubts regarding the nuclear deal and pro-Israel statements would suggest to Tehran not to declare victory, even taking into account that its oil & gas industry needs hundreds of millions of dollars in order to be modernized. Iraq also came out victorious from the clash with the Saudis: proof of this is in the replacement of supplies from Riyadh with those from Baghdad to Cairo's supply, previously suspended by the Saudis due to General al-Sisi's political and military support to al-Assad.

THE RUSSIAN FEDERATION

As one of the commodity producing states, the Russian Federation has been the

main winner since the agreement reached by OPEC & non-OPEC countries is the direct result of its success in Syria. After years of economic crises due to the sanctions imposed by the West, which “were much more effective due to low international oil prices,” according to Ambassador Dan Fried, coordinator for the Sanctions Policy at the U.S. Department of State, Moscow can look to the future with cautious optimism thanks to the recovery of the barrel, the consequent strengthening of the ruble—at an 18-month high, after having reached 59.22 rubles/\$ on January 24—and the constant purchases of gold by the Central Bank of Russia which, in October, reached a record high since 1998.

THE OIL PAX, THE PRICE OF THE BARREL AND ITALY

According to economist Giuseppe Masala, “with Trump's announcement of the appointment of Rex Tillerson, C.E.O. of Exxon Mobil, as secretary of state, it should be made clear that an era has truly ended... This should restore relations between the two states on a path of mutual trust that could ensure a great deal in both the Middle East and Ukraine.

This deal will most likely be remem-

bered by historians—should it go ahead—as the Oil Pax.”

Given that a new reset in international relations between the U.S. and the Russian Federation will not be at all easy, what major geopolitical events occurred in December 2016 leading to the possibility of achieving the Oil Pax, in addition to Tillerson's appointment and the OPEC & non-OPEC agreement?

1 | Entry of the consortium comprising Swiss Glencore and the Qatar Investment Fund (QIF) into the shareholding of Rosneft—50 percent controlled by the Russian state—for a value amounting to €10.5 billion (19.5 percent of the capital), with the guarantee of a pool of banks (including Russian) headed by Italy's Intesa Sanpaolo. Through this transaction, Russia benefits from Qatar going from military enemy to business partner, by bringing together the interests of the two largest natural gas producers in the world.

2 | Rosneft purchased 30 percent of the capital of the Shorouk Concession, offshore Egypt, where the major Zohr gas field is located, from Eni for \$1.57 billion. In doing so, the company headed by Igor Sechin entered into the gas market but without prejudice, for the

moment at least, to the interests of the other Russian energy giant, Gazprom, with which several tensions existed. The Russian Federation therefore managed its attempt to “place another foot in the Mediterranean” as stated by Gay Caruso, Energy and National Security Program Analyst, at the Center for Strategic and International Studies.

In the event that the Oil Pax is actually reached, it will promote a stabilization of current barrel prices and, at the same time, it would create the conditions for a possible, albeit moderate, increase. In parallel, for Italy, the doors would be thrown open for anything but a secondary scenario: Italy would, in fact, look towards the possibility of playing a pivotal role, not only in the Mediterranean, but also between the White House and the Kremlin.

POTENTIALLY BEARISH FACTORS

The main factors that could curb oil price increases, if not reverse their trend, are possible delays or the failure to implement the agreement, the rapid recovery of Nigerian and Libyan output excluded therefrom, and a significant increase in U.S. tight oil production.

1 | Implementation. Currently, members of the organization are complying with

BALANCE BETWEEN OPEC/ NON-OPEC DEMAND AND SUPPLY
In 2017 we still expect the rate of growth for global demand to fall back to 1.3 mb/d, slightly above the average rate seen in this century of 1.2 mb/d. The prospect of higher product prices – assuming that the cost of crude oil rises in 2017 – plus the possibility of a stronger U.S. dollar are factors behind our reduced demand growth outlook for this year.

the spheres of influence between the United States and Russia in the Mediterranean and Middle East. If so, for Italy, it would lead to a considerable problem, given the support provided to the current government of Tripoli and the presence of Eni terminals at Melitah, in Tripolitania.

3 | U.S. Tight Oil. Both the EIA and OPEC forecast that U.S. crude oil production will increase in 2017, to around nine million bpd. After reaching a record 9.7 million bpd in April 2015, it fell to a low of 8.4 million bpd in July 2016. After that, in the wake of the increase in barrel prices, U.S. crude oil output again reversed its trend, reaching 8.9 million bpd in the week of January 20, 2017. This was possible thanks to the recovery of unconventional oil—estimated at around 4.7 million bpd in February 2017—and the start-up of dozens of drills, reaching a total of 712—of which 566 (79.5 percent) oil, 145 gas (20.4 percent), plus 1 mixed—according to data provided by Baker Hughes. Two factors could hinder this trend.

First, the need to meet the increased demand means that frackers have to restart less productive wells, with a higher breakeven than those currently used. This will result in increased costs, which the Wall Street Journal has already estimated at 10-20 percent during this winter. The risk, therefore, is that frackers will need higher than existing per-barrel prices, in order to increase their output. Secondly, the current decline in the rates of energy junk bonds and the simultaneous increase in interest rates by the Fed is significantly reducing the gap between the respective yields—already below 4 percent—placing new clouds on the horizon for several American companies operating in the oil & gas sector. In 2016, the decreased output of U.S. crude oil coincided with increased imports. More precisely, in November, output exceeded 8 million bpd (8.054 million bpd) for the fifth time that year.

Excluding March, it is interesting to note that the other four months in which this situation occurred are subsequent to 2016, the month after which American crude oil extractions started to increase again. That said, the average for imports in the first 11 months of 2016 amounted to 7.879 million bpd, up from the 7.344 million bpd imported in 2014, and the 7.363 million bpd in 2015.

The main macroeconomic and geopolitical factors we analyzed in the text suggest a stabilization of black gold prices at just over \$50/b during the first months of 2017. For now, bullish factors seems to be prevailing. That said, should such conditions occur, the amount of that increase does not currently seem enough to determine a significant recovery of output by high-cost producers, starting with unconventional producers.

their obligations in terms of predetermined amounts and times. The Saudis—who had to cut 486,000 bpd, amounting to a total output of 10.058 million bpd—are already “slightly under 10 million,” according to the announcement of Minister Khalid al-Falih, in Abu Dhabi, during the Atlantic Council Global Energy Forum. Even the main non-OPEC producer, the Russian Federation, has already reduced its production by 130,000 bpd, versus the planned 100,000.

2 | Nigeria and Libya. Nigeria and Libya will unlikely be able to increase their output in the coming months by an amount that would significantly affect global supply. Specifically, the former Italian colony is far from the 1.6 million bpd extracted during the final period of the Muammar Gheddafi era. That said, the impression is that the country's stability—a precondition for an increased oil output—may come more easily from the consolidation of power by General Khalifa Haftar, supported by Moscow, than from the current government of Fayeze al Sarraj, officially recognized by the UN and strongly backed by Obama, but not necessarily from Trump, in the future division of



Reflections/OPEC made history in Vienna

An interesting year

In 2017, the most diplomatically savvy and economically flexible countries are not excluded from either the production cuts set by the cartel or the recently ratified guidelines dictated by COP21



ROBERTO
DI GIOVAN PAOLO

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PEC/non-OPEC is a disjunctive, if we consider the work done to reach an agreement in November with OPEC based in Vienna, followed by the December commitments from non-OPEC countries led by Russia; together these oil producers raised prices to levels never seen in the past decade. The agreement, which will be implemented during 2017, will show us whether there really is a revival of prestige and a real political presence for the Organization. In previous editions of *Oil*, we have considered the difficulties faced by an organization that had strong leadership in the '70s and '80s but has struggled to rebuild its image, especially since the start of the 21st century. There are many reasons for this difficulty, as we know; first and foremost, the changing role of oil itself and, as a result, that of the producing countries, which have lost power and prestige as they have confronted an almost completely changed culture of ener-

gy supply. And internal difficulties must not be forgotten, especially in the Arab countries in South American countries such as Venezuela and in some African countries. In any case, trumping everything is the confrontation with fundamentalists driven by radical Islam. While the establishments of the oil-producing Arab countries are fully immersed in this problem, sometimes even Western countries are hit by terrorism where dynasties and consolidated balances have been in play not just for decades but sometimes for centuries. The beginning of the 21st century has seen a constant decrease in oil prices, an increasingly pressing demand to move away from a system strictly centered on oil and, weighing on this, are the highs and lows of production, linked to prices.

Triumph reveals loss of influence

OPEC's loss of influence was evident

to everyone, a loss demonstrated by the "triumphalist" tone with which, in November, after months of negotiations, it announced an internal agreement, one that even included Iraq and Iran, to cut production by as much as 1.2 million barrels per day in order to raise prices through a stable and controlled system. It was no small deal, if we consider that this agreement had to sacrifice Indonesia's membership in OPEC. Indonesia had returned to OPEC after having been outside of the organization for a long time, but left again when it chose not to participate in an unexpected unanimous decision that it found counter to its self-interest. However, the triumphalist tone (that of the press and OPEC's official journal) makes sense when in the days after the November agreement the price of a barrel increased by almost 9 percent and reached a peak of \$51 in the case of Brent. The optimism for the judgement, as well as for

the immediate result, was based on the fact that the November agreement was foreseen in confidential talks that were already in progress. To that end, OPEC's effort was actually important for publicizing something that had not happened for more than a decade, the creation of production quotas for each country and also establishing a committee to monitor the implementation of production cuts. Immediately after the November agreement, public messages of appreciation and invitation to dialogue were sent to Russia and producing countries outside of OPEC. A good job by OPEC guides ensured that, a few weeks later with the December 2016 agreement, a goal sought for around 15 years has finally united the majority of producing countries to limit production for the common end of relaunching and stabilizing higher prices. This triumph was hailed by OPEC's official journal with a very significant title, "OPEC makes history in Vienna," which suggests a proud sense of regained global influence. The agreement unites 24 of the largest oil-producing countries to cut approximately 1.8 million barrels per day (bpd) from the beginning of 2017 for an initial period of six months, a time which may be extended for another six months. Although we are not yet at the end of the first quarter, the results seem to justify the decision. If we simply consider only the price issue, it has increased from a depressing \$31.79 per barrel in January 2016 to \$53 in January 2017, an increase among the highest in recent years and a growth of 45 percent in value, the largest growth since the beginning of the global crisis in 2009. Obviously, it is not all roses--we have briefly reported on a very difficult negotiation, especially within OPEC itself, for this is a story of a group that has always suffered from difficult relations, more within itself than with non-producing or non-member countries.

Old issues resolved

The will for a general agreement hinged on overcoming old, unresolved internal issues within OPEC. Saudi Arabia's willingness to engage Iran may prove difficult as, after the years of the embargo, Iran is racing to recover influence in all international political and diplomatic areas, and given that ambition it may not only refuse to adhere to the negotiated cuts but may even increase its production to approximately 3.9 million barrels per day. The purpose, according to Saudi Minister Khalid Al Falih, who was one of the main creators of this agreement, first within OPEC and then with non-OPEC countries, is mainly to build a long-

term collaboration with consultations and coordinated interventions on the market to avoid the bad results of the last two years, in which OPEC was kept on the sidelines of almost all energy decisions while the price of the barrel collapsed. Now, although certified by these agreements, OPEC only controls a part of the oil supply and, therefore, in some ways it cannot go back to being the key player it once was. But it no longer needs to assume 100 percent of the costs, having made a "transparent" agreement and a comparison before the world with the other producers that often avoided energy, environmental and social discussions of an international nature. This is certainly a good political result for OPEC. In terms of political forecasting, it is also a good result considering that, while the countries of the organization traditionally experience internal conflict, especially due to Islamic radicalization, their agreement now includes more stable non-OPEC countries. But political stability issues remain. Less optimistic economic analysts predict that soon, in the haze of the relations of non-OPEC countries, there may be a risk of recovering production, a surge which would produce a downward drive in oil prices. Then we need to consider the effect all this will have in conjunction with Donald Trump's presidency.

What will happen in the U.S. and Saudi Arabia?

For political affinities, Trump certainly represents all the major oil producers of his country, and he can only view positively a measure that may well do a favor to the U.S. According to economic analysts, the rise in oil prices can revive American shale producers. At the end of December, Bloomberg revealed that a rise in prices would have allowed producers to use the complicated American technology necessary to reappear with confidence in the market. The U.S. produces approximately 8.8 million barrels per day and has returned to the production levels of two years ago, even with only one-third of active wells compared with the maximum possible collection points. Again, according to Bloomberg, since May 2016, almost 200 extraction points have been relaunched in order to act in advance on both the presidential electoral challenge and because a possible agreement within OPEC was envisaged. Currently, shale production is at 4.5 million barrels, according to several analysts and, with a further jump of around ten dollars, a production of 5.5 million barrels a day could be reached, which would certainly not be a good result for OPEC. Donald Trump will certainly not discourage this situation.

Crossing interests



TOWARD A COLLABORATION
The agreement came out thanks to the resolution of long-held internal issues within OPEC. We only have to consider Saudi Arabia's willingness to work with Iran. The purpose of the agreement, according to Saudi Minister Khalid Al Falih, is mainly to build a long-term collaboration, with the possibility of consultations and coordinated interventions in the market.



IN FAVOR OF SHALE
Donald Trump can only see the OPEC agreement in a positive light, as it could well favor the U.S. According to economic analysts, the increase in oil prices may revive American shale producers.



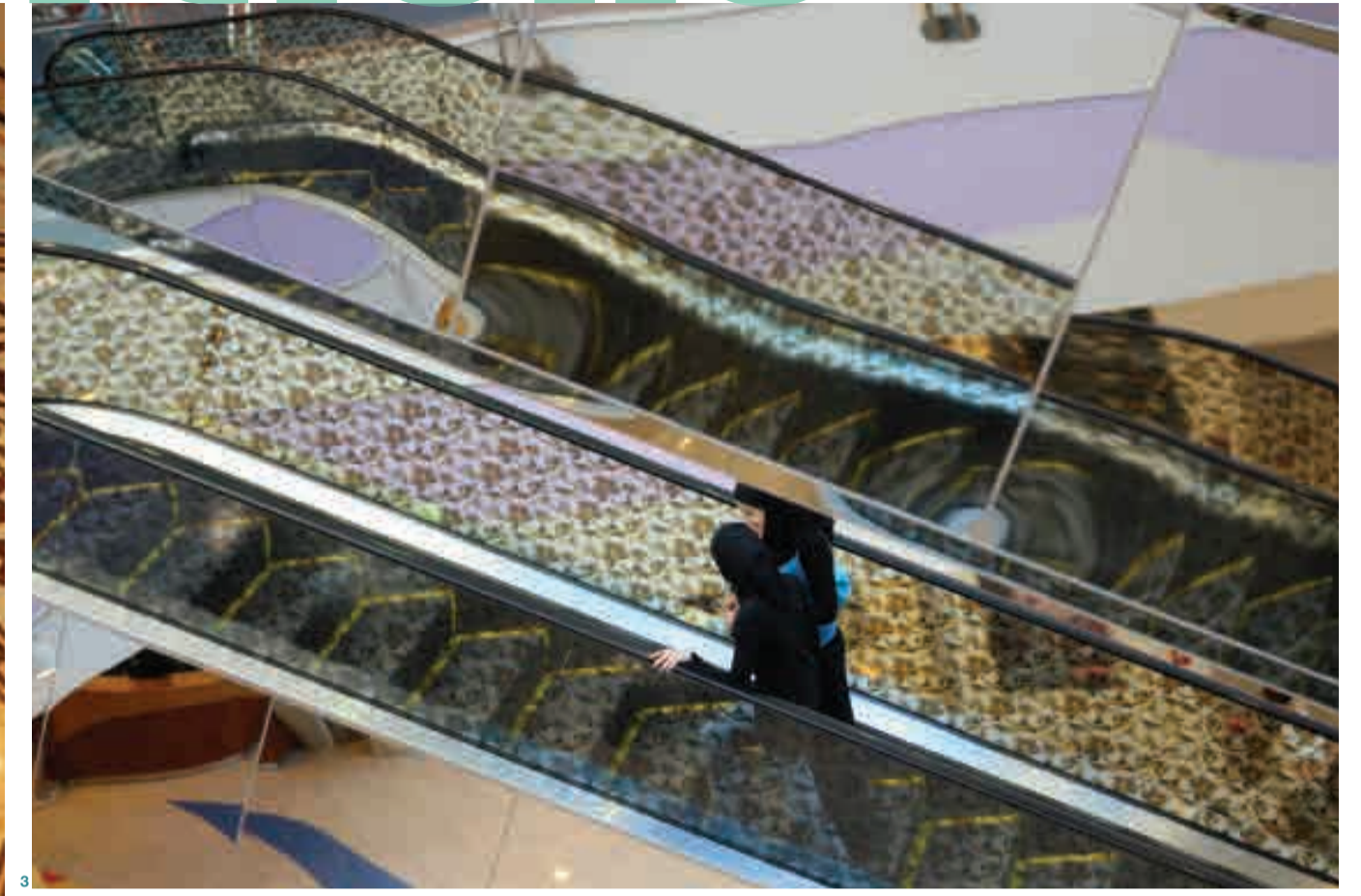
DIVERSIFICATION OF ENERGY
Europe must continue to diversify energy sources and maintain a certain political strength if it wishes to oppose a possible U.S.-Russia agreement, which could cut its influence on energy source prices.

We wonder, therefore, if we are faced with a "win-win" scenario or whether the agreement will simply place OPEC in the limelight over the coming months. Which refers, again, to a political game involving several countries. The OPEC agreement has, for the first time in years, united Saudi Arabia, Iran and Iraq, and has also enabled countries in difficulty to ease domestic tension in the marketplace. Russia, knowing that this new situation will benefit the U.S., will use new talks to reach a stabilization agreement. The truth is that the country taking the biggest political gamble is Saudi Arabia, which has agreed to be responsible for almost half of the cuts. The Kingdom has ended the trade war with Iran that started at the end of 2014, perhaps even resulting in a partnership in the field of nuclear power. Venezuela is getting back into the game, having suffered, more than others, severe economic damage from the fall in crude oil prices. Putin's Russia sees a possible additional political/economic opportunity, one that it will duly exploit. Europe must continue to diversify sources of energy and maintain political strength if it wishes to oppose a possible U.S.-Russia rapprochement related to energy source prices. However, we must not be fooled by appearances. The fact that Saudi Arabia has focused so much on the agreement is due to the fact that its establishment has made room for a strong drive to diversify economic sources and to have a future with less, or even no, oil. In 2017, both the OPEC agreement and the decisions of COP 21, confirmed in COP22, are now both operational. These paths will not necessarily be different and divergent. In fact, it is conceivable that they will be long, interdependent and that the most diplomatically savvy and most economically flexible countries will take advantage of both opportunities. Thus this will be an interesting year.



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Before the discovery of the oil in 1970, Abu Dhabi was a modest fishing village, surrounded by dunes and desert. In little more than 40 years, it has become one of the most modern cities on the Arabian Peninsula, with the highest percentage of green public space, thanks to the desalination of incredible amounts of seawater and the low labor cost of thousands of immigrants. Sheikh Zayed, the visionary emir who launched the city, has not succumbed to the temptation to build the usual cathedral in the desert. In the coming 20 years, a billion-dollar project will see construction of large hotels, skyscrapers and the inevitable amusement park, but also of a cultural district with four important museums, including the new Louvre, and especially a model of cities to house the first zero-carbon-emission community in the world.



Abu Dhabi: Arab miracle

Sergio Ramazzotti



Born in Milan in 1965, he has written and photographed hundreds of stories for most of the leading magazines of the world. His photographs have been exhibited in several personal exhibitions in Italy and abroad. He was one of the eight Italian photographers featured in the 8-documentaries series "Fotografi" on photojournalists, produced and broadcast in 2012-2013 by TV channel Sky Arte. He won the International Photography Award (Los Angeles) in the 'Editorial' category in 2005, twice (in 2005 and 2010) the Enzo Baldoni Prize for Journalism of the Province of Milano, and in 2015 the Magna Graecia Awards for Literature under the patronage of Italy's Ministry of Culture and Education.



- 1 | The hotel hall of Emirates Palace.
- 2 | The fabulous courtyard of the huge mosque dedicated to Sheikh Zayed.
- 3 | Two women go shopping inside the Marina Mall.
- 4 | Floral decorations that characterize the interior of the Sheikh Zayed Mosque.
- 5 | Pakistani workers busy repairing the huge mosque dedicated to Sheikh Zayed.
- 6 | The lowering of the flag in the breakwater district, in the Corniche.
- 7 | Inside the Marina Mall, the city's biggest shopping center.
- 8 | A boy practicing parkour in the Corniche.

NICOLÒ
SARTORI

New balances in an era of uncertainty

Following the agreement of November 30, OPEC appears finally to have found a lost unity. Since 2008 the Cartel, divided between the hawks led by Iran and Venezuela and the doves aligned with the Saudi government, has not reached a common approach on production cuts. In confirmation of the effectiveness of the agreement, on January 22 a committee comprising OPEC members and non-OPEC countries met with the aim of defining the mechanisms for monitoring the agreement. Despite the extraordinary nature of recent events and the strong messages sent out to the markets, crude oil prices have not reacted as hoped for in Vienna. The fluid political situation in the global arena, it seems, is likely to neutralize, at least to some extent, the progress recorded to date by the Cartel.

Is Saudi leadership enough?

Saudi Arabia, the top producer both within OPEC and globally, has clearly veered away from the strategy adopted in the previous two years. In fact, as its production cuts demonstrate, Riyadh now seems geared to take on most of the costs of the compromise; its cuts have seen Saudi production decline to below 10 million barrels per day (bpd), a level even lower than that envisaged by the November agreement. Despite Saudi efforts, elements of uncertainty remain on the commitment of some countries to proceed with the cuts. The situation appears complex in Iraq, where the bulk of production is concentrated in the hands of the international majors. Despite this and Riyadh's

willingness to cooperate with the government in Baghdad, as demonstrated by the reduction in exports in January after the peak in December, the willingness of Iraqi authorities to compensate the majors for losses caused by the cuts needs to be verified. The situations of Libya and Nigeria also endanger the stability of the agreement between producers. However, an important match in the game will be played between the walls of the Kremlin. Russia, brought to its knees by the collapse in prices and the pressure of international sanctions, has proved to be a key player in reaching the November agreement, and seems poised to continue its cooperative efforts, as demonstrated by its own cuts in the first days of January. Despite this, certain changes taking place at the international level could make the collaborative dynamics less urgent for Moscow, compared with a few months ago.

Trump reshuffles the cards

Donald Trump's election as President of the United States is certainly one of the factors that will affect Russia's decisions. If internally the new administration seeks to facilitate a rapid recovery of the oil industry, the unpredictability of its foreign policy choices could have destabilizing effects on the oil market, which is still in weak recovery. In terms of energy, the Trumpian motto *America*

First translates into the goal—utopian, at first glance—to make the United States independent from foreign supplies. As unrealistic as the message seems, it appears to have come across strong and clear to national producers, who in recent weeks have accelerated activities in unconventional energy fields. In January, American production recorded growth of over 170,000 bpd, the highest figure since May 2015. Also, the proposed tax reforms assumed by the White House, which quickly boosted WTI prices, could create strong imbalances on the market. In the international arena, Trump's actions may have mixed effects. While frontal attacks towards Iran and the possible escalation of tensions in the Persian Gulf could drive up crude oil prices, his friendliness with Putin and a possible slackening in the international sanctioning regime could drive Moscow to reconsider its alignment (costly and forcible) with its historic OPEC rivals. Not to mention the potential effects of the protectionist policies of the White House, especially against China: a possible slowdown in global economic growth with clear repercussions on the performance of oil.

China and the fight against climate change

It is China itself that, in the medium-long term, is the source of the main threats to the stability of the cartel. In light of the revisionist approach adopted by the Trump administration, Beijing is strongly proposing itself as a new global leader (alongside an increasingly green Europe) of decarbonization policies. Due to pollution having reached unsustainable levels, which risks damaging an increasingly demanding and

central urban middle class in Chinese power dynamics, the government has taken ambitious steps to speed up the energy transition. In 2016, Beijing not only doubled its solar energy generation capacity to limit the impact of coal power stations on the environment: but, even more impressive are the transport industry data, where the number of electric cars has more than doubled compared with the previous year. This market has currently already exceeded the size of that in America and Europe combined, and the introduction of government subsidies in the industry will only accelerate this trend. In this context, a rapid transition from the traditional model based on coal and oil to one focused on the renewables plus gas and electric combination, respectively, in the generation and transport industries, could have significant effects on future global demand for crude oil and, consequently, on the fate of producing countries.



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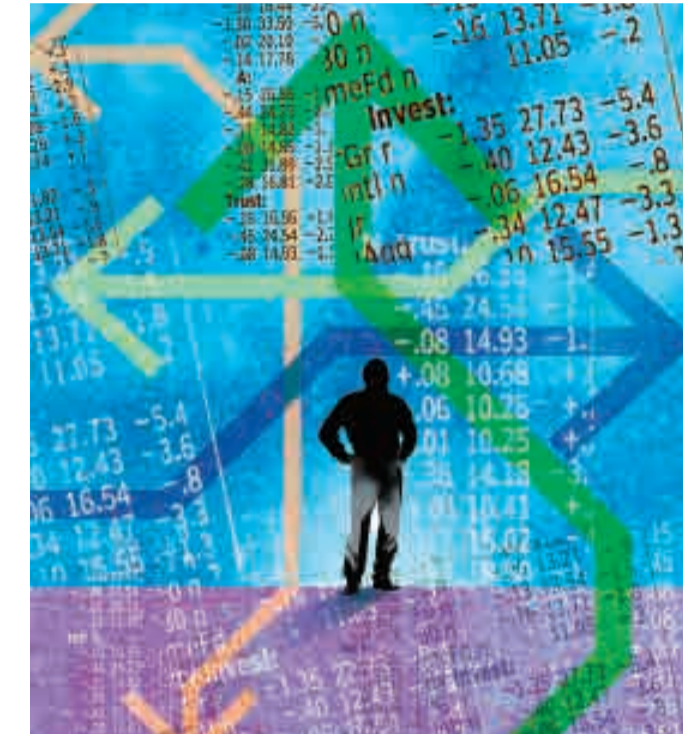
GEMINELLO
ALVI

A friendship founded on oil?

It is unlikely that Donald Trump's approval of Russian Federation President Vladimir Putin prescinds from a clear advantage for the United States. Rarely are the niceties of a rich man independent of his calculation that some economic advantage is possible—in this case that could be represented by oil itself. NATO and Ukraine, ISIS threats and aversion to political correctness are all serious issues of understanding between the two, but they have no single solution and are therefore crippled by excess complication. Oil could therefore provide the crux of an agreement. Rex Tillerson's appointment as Secretary of State leads to this suspicion, as he has more experience in the Russian oil industry than anyone else. After all, he negotiated a joint venture worth \$500 billion with the Kremlin for Rosneft in 2011. It has been clear since the beginning of his presidency that Trump is not supported solely by internet multinationals; rather, all industry, including the oil industry, supports him. Therefore, to give substance to his desire for friendship with Putin, what better gift could Trump give than price stabilization. A price between USD 60 and 80 per barrel could help the Kremlin heal its public balance sheet and reverse its failure to grow. This would also enable frackers in the United States to invest in new projects, all this without American motorists feeling too much damage.

It all started from the oil industry

Even George W. Bush, in the early 2000s, when he decided that relations with Russia should become



closer, believed that the best ground for starting this was the oil industry. However, in 2004, Russia's nationalization of the energy sector and the development of fracking techniques by the Americans changed this picture. The United States became more suspicious and lost its interest in sharing its technology and investment with Russia. In the next decade, the United States was to become a net exporter, and gave a boost to an oil market which had long been deflated. However, for now, better prices are needed by both the Russians and the Americans and this is a situation that could prevent a repetition of the failure that followed the Energy Summit in Houston in 2002. We should also note that both powers are balanced in that most crucial area for oil, the Middle East, by supporting a local ally, Saudi Arabia, one that had for decades been strategic for the interests of the United States and Iran and one that had evolved to a fully tactical alliance with Putin's Russia. However, if

Russian-American relations were really to use oil as a central point of reference, this Middle Eastern dialectic could change a lot. If the role played by the two allies were to weaken, it could, better than any OPEC and non-OPEC agreement, hinder Saudi Arabia's downward price control policy and, to keep the balance in play, could isolate and complicate life for Iran.

A complicated game

During his visit to the CIA at the end of January, Trump regretted that America did not take Iraq's oil in 2003, adding that perhaps there would be another chance, though his foreign policy team would walk this comment back mere weeks later. Trump has also blamed Iran's influence in Iraq since his electoral campaign. In early February, the since deposed General Flynn condemned the Iranian ballistic missile test and an attack by Houthi rebels, supported by Iran, on a Saudi vessel. This earned Trump appreciation from his party. In short, the question of a rise

in oil prices writes in a geopolitical game between Russia and the United States that is more than a little complicated. It includes the possible partition of Syria and destabilization of Iran. It is hard to think who will win Saudi Arabia in the end.

In the end, a historic agreement can be spoken of

In conclusion, the Vienna agreement must be judged as a sign of the widespread, perhaps unanimous perception that prices that are too low for public budgets and political stability in the producing countries. With Trump's administration, the likelihood of a subverted scenario in the entire area, with a recombining of Russian and American interests, will benefit Israel. However, the same cannot be said for Saudi Arabia and other Sunni States in the Gulf. Iran's difficulties and higher oil prices would make Saudi Arabia superfluous and less strategic. So much is this the case in our brief scenario that we overlooked the fact that the game will not only be played by Trump, but also, and with just as much skill, by Putin.

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MARKET DEVELOPMENTS

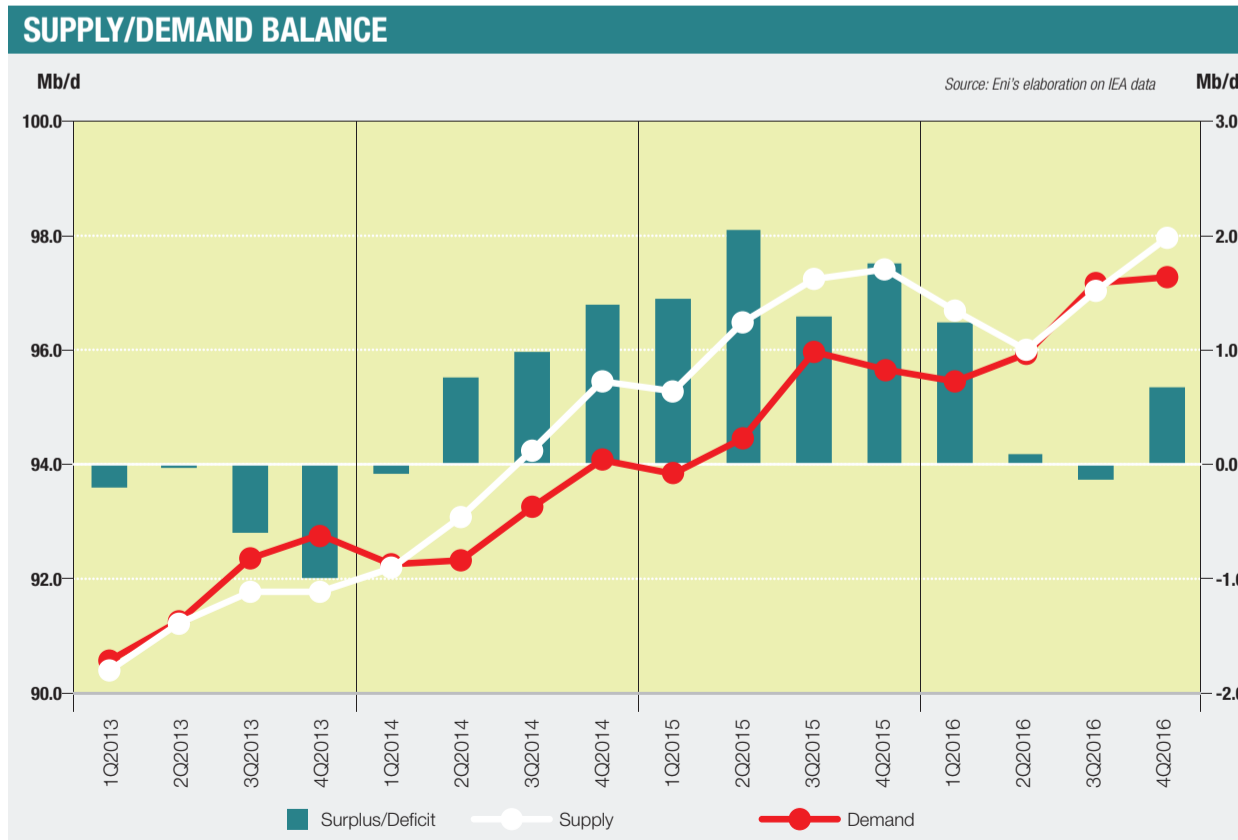
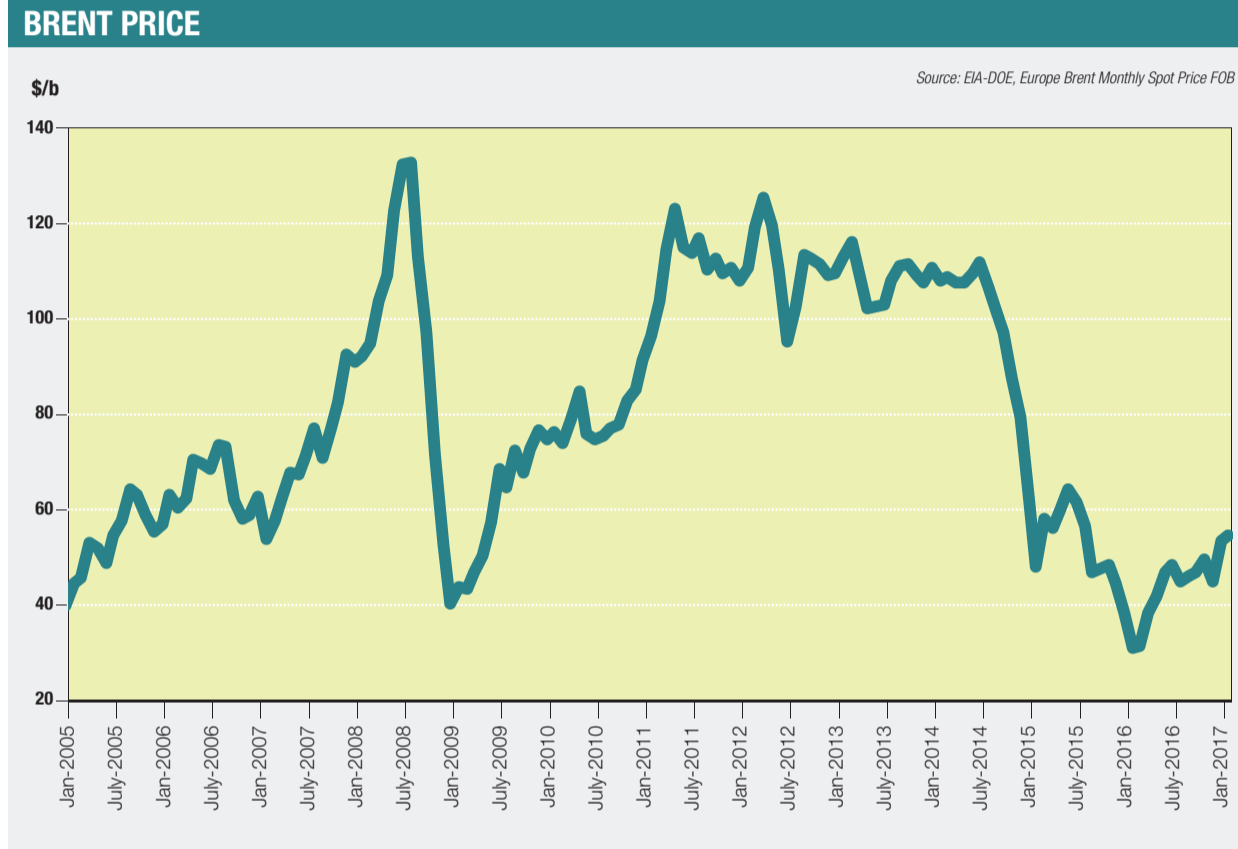
Happy new swing (producer)

Prepared by Market Scenarios and Long-Term Strategic Options – Oil (SMOS/OIL) – Eni

OIL PRICES

The OPEC agreement is welcomed by analysts and investors, but it has yet to restore balance to the market

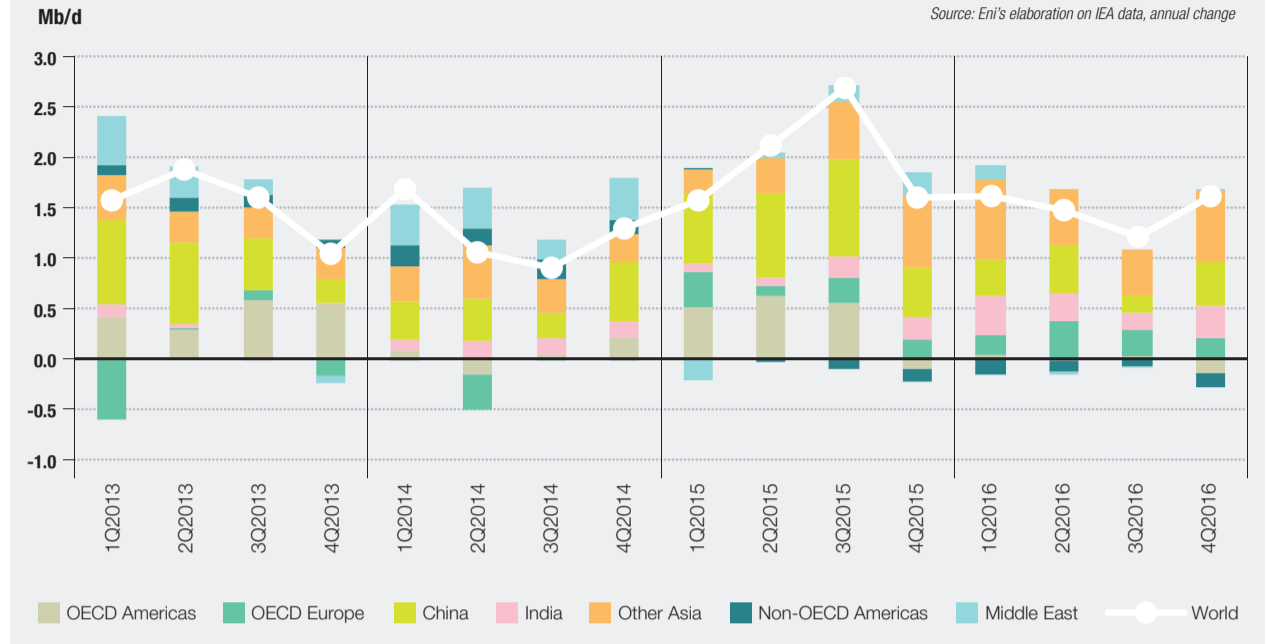
2016 was the second *annus horribilis* for Brent, which went below \$44/b for the first time in 13 years. January saw it hit bottom at 30.70/b; it recovered over the year, supported by expectations of a return of OPEC. The February meeting in Doha was the first stage of a long obstacle course that led, at the end of the year, to a wide-ranging agreement, the first since 2001, on OPEC and non-OPEC joint cuts. While the April meeting failed, OPEC continued to grow, with Saudi Arabia and Iraq at new highs and with the re-entry of Iran being faster than planned. In the meantime, the disruptions supported prices and, in May, approximately 2 Mb/d of supply was subtracted. In Algiers, at the end of September, the announcement of a possible cut saw prices reach \$50/b for the first time since July 2015. An agreement was finally hammered out at the meeting of November 30: starting in January of 2017, for a period of six months, the member states would cut 1.2 Mb/d (of which Saudi Arabia's share was 0.5 Mb/d). Non-OPEC states also participated, promising a further reduction of 0.6 Mb/d (of which Russia's share was 0.3 Mb/d). 2016 ended with a much lower surplus than that of 2015 (0.5 Mb/d vs 1.6 Mb/d), showing the first signs that the market was rebalancing. OECD industry stocks, albeit still high, began to fall at the end of the year. The exposure of financial operators on the futures markets grew higher than ever, reflecting a marked optimism towards a rise in prices. At the beginning of 2017, the focus was on the effectiveness of the cuts. The initial data are positive: OPEC compliance was at 82% and, above all, Saudi Arabia returned as a swing producer and cut over 100% of its target. The Saudi Minister, however, confident in the rebalancing of the fundamentals and in a poor U.S. recovery, believes an extension of the agreement in the second half of the year to be unlikely. Limiting prices, the fear of Libya's recovery and a rapid resumption of production in the U.S., where the increase in rigs as of the second half of 2016 reversed the declining trend and suggested a recovery.



OIL DEMAND

In the fourth quarter of 2016, global oil demand grew by 1.6 Mb/d, bringing the total increase for the year to 1.5 Mb/d. Despite the slow demand compared with 2015, the year with the highest growth since 2010 (+2 Mb/d vs 2014), rates remained well above the average for the last decade. Colder weather in northern Europe and a recovery in industrial consumption in the emerging economies in Asia supported the acceleration in consumption in the final quarter. In terms of products, while in the first three quarters gasoline had been the driving force for growth, in the final quarter products more closely linked to economic activity (gasoline/diesel, LPG and fuel oil) started to take on a leading role. In the OECD area, Europe increased for the second consecutive year, after nine months of structural decline. At the base, we see an improvement of the current economic outlook, as revealed by the PMI index and the Economic Sentiment Index, which in November reached its high for the year. The U.S., however, remained largely stable, despite gasoline consumption surpassing its historical peak of

ANNUAL DEMAND CHANGE BY SELECTED AREAS

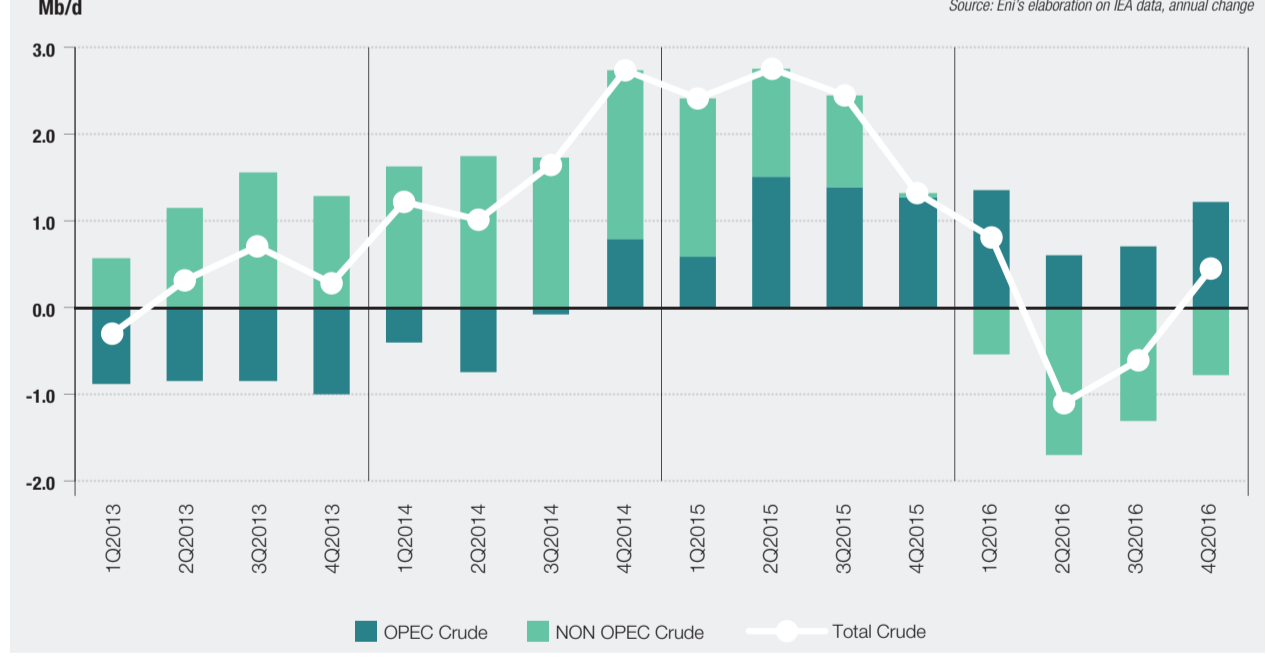


2007. 2016 is, in fact, confirmed as a record year for the circulation and registration of gas-thirsty SUVs (over 60% of total new cars). Low gas prices, it seems, were a decisive factor in the kinds of cars American consumers chose to buy. In the non-OECD area, consumption accelerated in the fourth quarter compared with the third (+1.4 Mb/d vs +0.9 Mb/d), especially LPG consumption which, due to the support of the petrochemical industry in China and of the civil sector in India, accounted for almost half of the area's total increase (+0.6 Mb/d). In China, November saw seven of the largest propane dehydrogenation record increases in utilization rates and, between October and November, new plants became operational (Oriental Energy; Hebei Haiwei). In India, the government is expanding the LPG distribution network for civil use, in order to ensure access to energy for over 15 million homes during 2016-2017. Overall in 2016, China continued to grow, albeit at a slower pace than in 2015 (+0.4 Mb/d vs +0.7 Mb/d), while India almost doubled its growth rate (+0.29 Mb/d vs +0.15 Mb/d).

OIL SUPPLY

The global oil supply closed 2016 up by just 0.3 Mb/d vs 2015 (96.9 Mb/d): non-OPEC was down, mainly due to the capex cuts of the last two years, against OPEC, which counterbalanced its decline, recording a historic peak. In the final months of 2016, the decline in the production of U.S. crude oil stopped, returning to 8.8 Mb/d (-0.5 Mb/d vs 2015). China, however, continued to decline, down 0.3 Mb/d compared with 2015, as a result of spending cuts in older, costlier, fields. Russian crude oil production continued to increase and, in Q4, was confirmed above 11.2 Mb/d (+0.4 Mb/d vs Q4 2015): in 2016, Russia was the top crude oil producer with 11 Mb/d (+0.3 Mb/d vs 2015), due to the acceleration in drilling activity (especially by Gazprom Neft, Bashneft and Novatek) to stop the decline. Brazil was still growing, due to Lula's production and the start-up in the offshore oilfield of Lapa (Santos Basin). In 2016, OPEC crude oil production grew for the second consecutive year by approximately one Mb/d, as a result of the increased output by major

ANNUAL CRUDE SUPPLY CHANGE



producers in the Gulf in Q4 (+1.8 Mb/d): in November, the cartel reached a record value of 33.4 Mb/d. At the top was Saudi Arabia which, in order to recover its market share, reached a historic high of 10.6 Mb/d. Iraq's growth was unstoppable, closing the year at 4.6 Mb/d, and Iran's recovery was surprising, returning in recent months to pre-sanction levels. Libya recovered, following the reopening of certain strategic terminals, exceeding 0.6 Mb/d in December, the highest level of the last two years. Further short-term growth in Libyan output was linked to political stability and the unfreezing of several funds by the Central Bank. The situation in Nigeria, however, remained critical, closing the year at the lowest level since 1988. The structural crisis in Venezuela in 2016 led to the country's lowest output since 1990. 2017 opened with the great unknown regarding compliance with the joint cut agreed at the end of the year (-1.8 Mb/d, of which OPEC -1.2 Mb/d).

Oil



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