



A NEW REALITY

The outlook for the oil and gas industry in 2016



ABOUT THE RESEARCH

The outlook for the oil and gas industry in 2016 is an industry benchmark study from DNV GL, the technical advisor to the industry. Now in its sixth year, the programme builds on the findings of five prior annual outlook reports, first launched in early 2011.

The report delivers an assessment of industry sentiment, confidence and priorities, in addition to expert analysis of the key pressures facing the industry in the year ahead and their likely impact. It is based on a global survey, incorporating the views of 921 senior industry professionals and executives, along with 12 in-depth interviews with a range of experts, business leaders and analysts. The research was carried out on behalf of DNV GL by Longitude Research. The findings and views expressed in the report do not necessarily reflect the views of DNV GL.

During October and November 2015 we surveyed 921 senior professionals and executives across the global oil and gas industry. More than a third (35%) of respondents are oil and gas operators, while 60% are suppliers and service companies across the industry.

The remaining respondents are made up of regulators and trade associations. The companies surveyed vary in size: 40% had annual revenue of USD500m or less, while 14% had annual revenue in excess of USD10bn.

Respondents were drawn from publicly-listed companies and privately-held firms. They also represent a range of functions within the industry, from board-level executives to senior engineers.



We would like to extend our thanks to all participants, and, in particular, to the following interviewees for sharing their time and insights with us (listed alphabetically, by surname):

Graham Bennett, Vice President, DNV GL

Kristin Færøvik, Managing Director, Lundin Norway

Jeng Zen Fang, CEO of LNG, CPC

Christoph Frei, Secretary General, World Energy Council

Thore Kristiansen, COO E&P and Executive Director, Galp Energia

Koheila Molazemi, Service Area Leader, Risk Management Advisory, DNV GL

Pål Rasmussen, Secretary General, International Gas Union

Brian Sullivan, Executive Director, IPIECA

Michael Utsler, COO, Woodside Energy

Martha Viteri, Head of Subsea and Well Systems, North America, DNV GL

Eirik Wærness, Chief Economist, Statoil

Dato' Wee Yiau Hin, Executive Vice President and CEO, Upstream, Petronas



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01

INDUSTRY CONFIDENCE IS VOLATILE

Ongoing high supply in 2015 has suppressed oil prices, forcing the industry into a year of reflection and restructuring. From Shell abandoning its Arctic development plans, to BP cutting USD6bn in operating costs – and planning to sell USD3-5bn of assets over the next two years – difficult decisions are being made across the board. Cost pressure on operators is being pushed down the supply chain, affecting everything from headcounts to infrastructure projects.

Some believe that the year ahead may well bring a balancing of supply and demand in 2016. Additionally, a confident minority of companies said they are managing the market downturn better than others, are optimistic about their prospects for the coming year, and plan to ramp up spending as a result.

The future remains in the balance, however. 2016 began with the lowest oil price in 12 years, increased tension in the Middle East and continued uncertainty over the state of the Chinese economy.

Supply and demand

Opinions were clearly divided on whether oil and gas supply would continue to outpace demand in 2016 – just over half of our survey respondents (55%) said it would. “The supply side of the oil sector is giving indications that a change is on the way,” says Eirik Wærness, Statoil’s Chief Economist.

“First, in the US, shale-oil production growth has dropped from some 1.5m barrels per day (b/d) to a decline of around 800,000 b/d, and it is still on the way down,” he said. Additionally, preliminary reports suggest that OPEC’s (Organization of the Petroleum Exporting Countries) current levels of production are having a greater impact than first predicted on the national budgets of members such as Saudi Arabia.¹ Although the latest meeting of OPEC did not result in a change in strategy, many members are struggling under current levels of production.² On top of this,



“Collectively, we all are subscribing to the ‘lower-for-longer’ view on commodity pricing for oil, gas, and LNG products.”

Michael Utsler, COO,
Woodside Energy



1 <https://next.ft.com/content/954a7d86-6c0f-11e5-aca9-d87542bf8673>

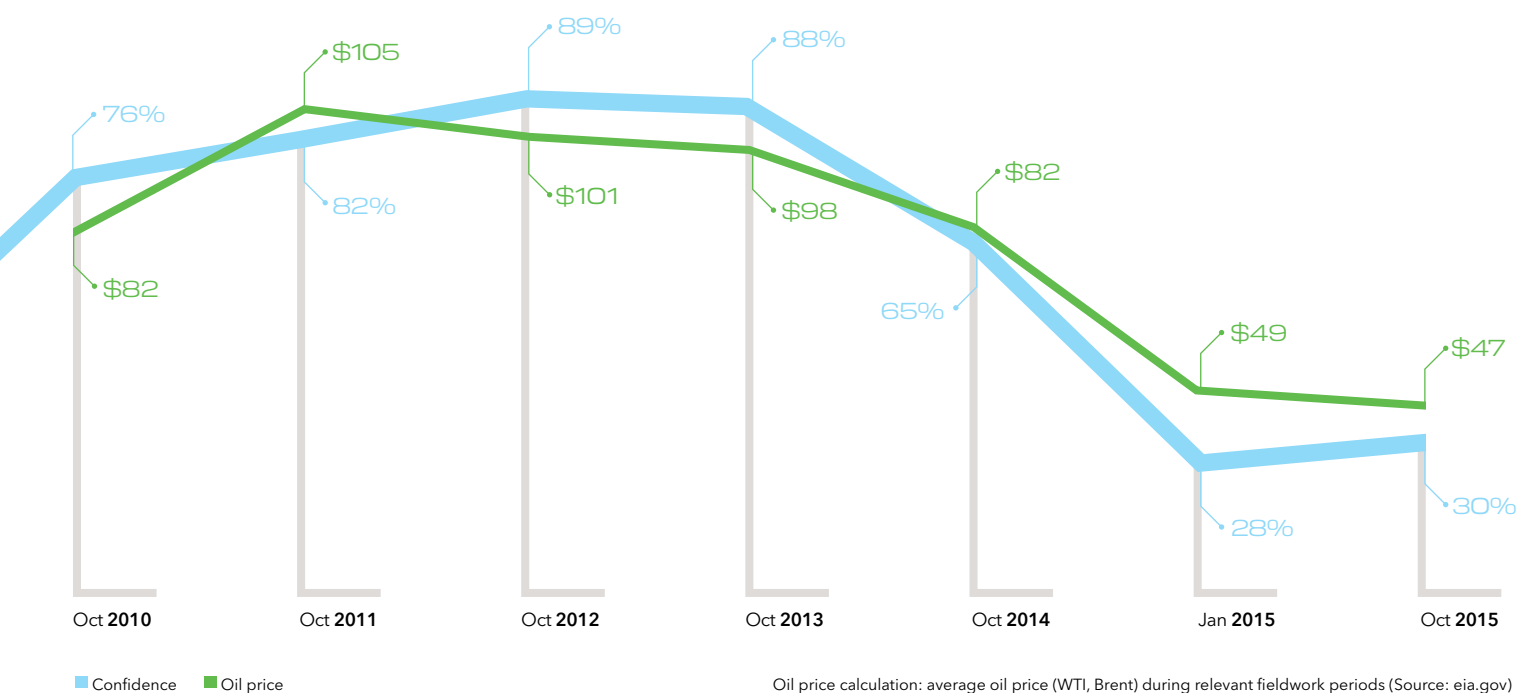
Wærness believed, "Demand growth is much higher than it was 12 months ago. However, it is still impossible to predict what will happen to prices once demand has caught up with supply."

Indeed, 73% of survey respondents said that they were preparing their company for a sustained period of low oil prices, and more than four in ten (42%) believed that oil prices would not increase in 2016.

Compared to the years when the oil price was around and above the USD100 per barrel mark, industry confidence in 2016 is down. However, when surveyed at a time when the oil price had reached an average of USD47 per barrel, 30% of respondents said they were highly or somewhat confident about the outlook, compared to 28% at the beginning of 2015.

"Against the backdrop of the oil-price situation in 2015, there is some optimism for a possible recovery in 2016," said Dato' Wee Yaw Hin, Executive Vice President and CEO for Upstream at Petronas. "But there are still uncertainties."

Oil price vs. overall industry confidence



"Collectively, we all are subscribing to the 'lower-for-longer' view on commodity pricing for oil, gas and LNG products," said Michael Utsler, COO of Woodside Energy. "Therefore, across the industry you are going to see operators and service providers working to drive efficiencies across the entire supply chain segment through 2016 and beyond."

Price versus confidence

Results from our previous annual surveys, combined with the results from this year's research, show a correlation of 0.975 between oil price and industry confidence. "Prices are obviously the source of a lack of industry confidence," said Christoph Frei, Secretary General of the World Energy Council. "We do not see a reason why they would return to previous levels in the short term."

However, in relative terms, more people in our survey were highly confident in their own company's performance this year (14%) than in the industry as a whole (7%) - the results from last year's survey showed that respondents were more confident in the industry than in their own businesses.

Confidence over financial performance was also slightly up from last year. About a third (34%) were confident about achieving their profit targets in 2016, compared to 30% in 2015. Indeed, in the third quarter of 2015, Total beat analyst estimates for adjusted net income by USD0.26 per share, posting USD2.76bn for the quarter,³ and BP bettered analyst forecasts for replacement cost profit by USD600m, posting USD1.8bn.⁴

Regional view

Industry confidence was highest in the Asia Pacific region, where 34% of respondents were highly or somewhat confident about the outlook for the industry, up from 27% last year. Europe and North America have both had a slight drop in industry confidence since last year.

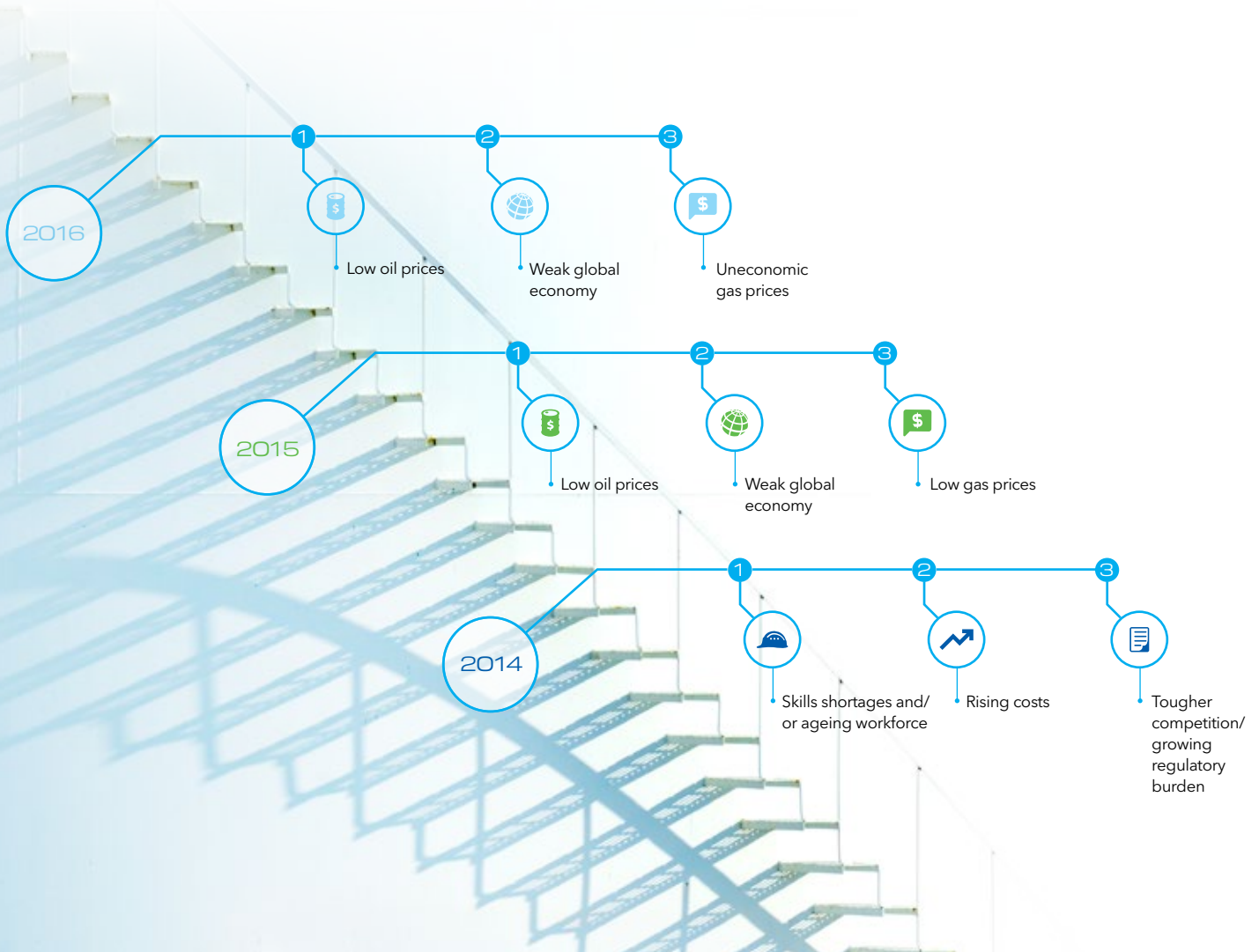
Confidence was lowest in Latin America, where only 17% of respondents were positive about the industry outlook for 2016, down from 29% last year. Large Latin American producing countries, such as Brazil and Venezuela, are struggling to deal with the sustained slump in oil prices, which may explain this pessimistic outlook. Concerns over serious corruption within Petrobras, Brazil's national operator, have also hit the industry hard. When the ratings agency Standard & Poor's reduced Brazil's investment rating to junk status, it also highlighted the fact that



"China's economic downturn will continue. Meanwhile, Japan is restarting some nuclear-power stations, so will be buying less gas. Also, a number of big gas projects are coming online at the same time as sanctions against Iran are coming to an end. These will raise supply as demand continues to fall."

Jeng Zen Fang, CEO of LNG, CPC

Top three barriers to growth, by year



four other countries were vulnerable to “adverse global trends”: Peru, Colombia, Argentina and Venezuela.⁵

There is a big disconnect between confidence levels among midstream and downstream operators: 21% of upstream and 28% of vertically integrated companies reported confidence in the industry for 2016, compared to 50% of midstream and 55% of downstream companies.

It is downstream activity that helped many integrated companies perform better than expected in 2015. For example, a doubled year-on-year refining profit of USD2bn helped ExxonMobil beat analyst forecasts for the third quarter of 2015.⁶

Barriers to growth remain largely the same

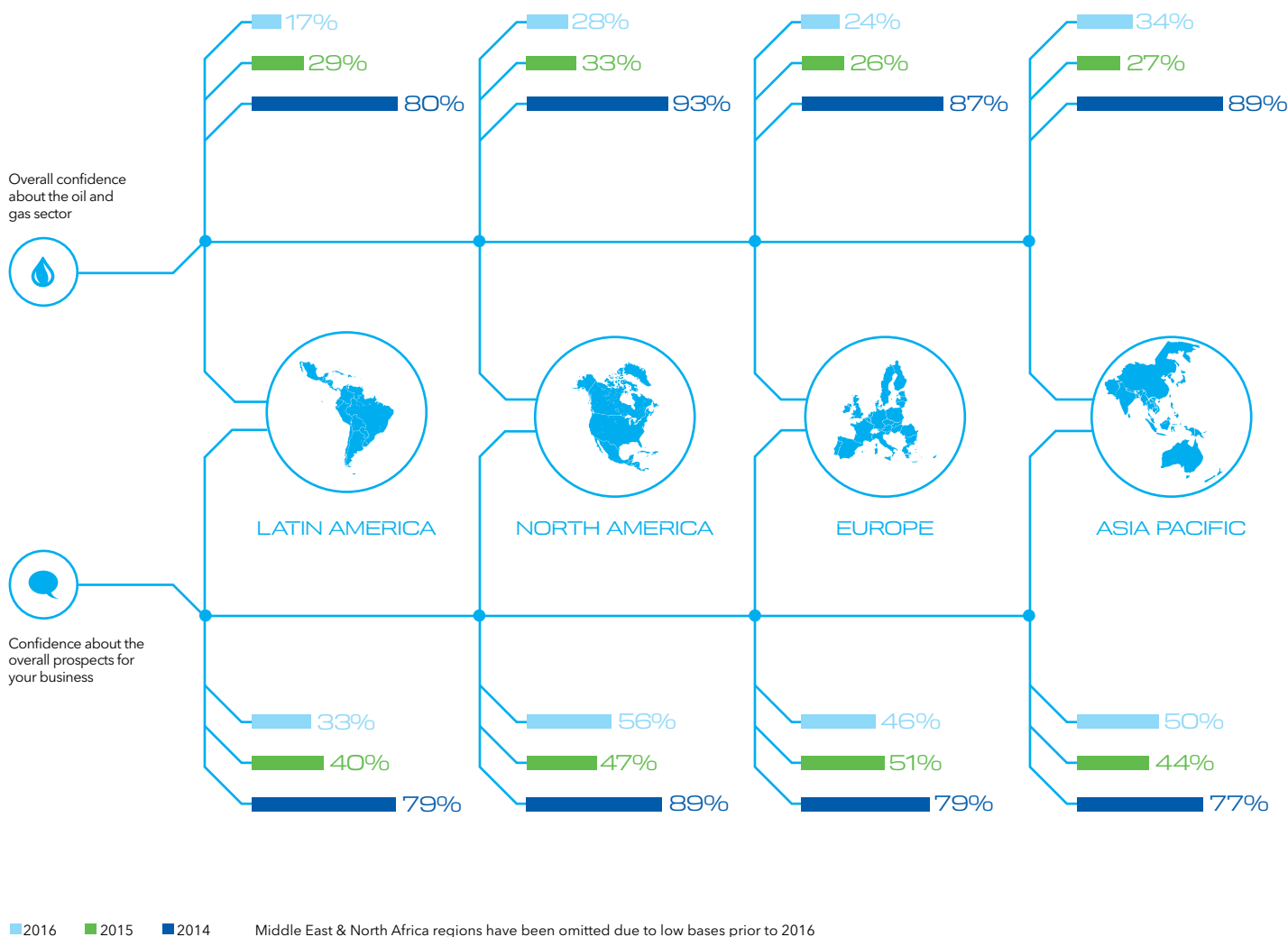
Unsurprisingly, our survey respondents reported exactly the same top three barriers to growth as last year. The number of respondents

citing ‘low oil prices’ dropped from 68% in 2015 to 63% this year - but it remains the leading factor. The second greatest obstacle was once again ‘a weak global economy’: the number of respondents citing this rose from 35% to 42%.

‘Uneconomic gas prices’ was the third largest barrier. Japan is the world’s largest importer of natural gas, and Asia has been a key export market for gas producers in recent years.

However, shifts in demand mean that gas prices globally will continue to fall in 2016, predicted Jeng Zen Fang, CEO of the LNG division of CPC, Taiwan’s integrated operator. “China’s economic downturn will continue. Meanwhile, Japan is restarting some nuclear-power stations, so will be buying less gas. Also, a number of big gas projects are coming online at the same time as sanctions against Iran are coming to an end. These will raise supply as demand continues to fall.”

Industry confidence by region



5 www.reuters.com/article/2015/10/15/us-economy-poll-latam-idUSKCN0S91KY20151015#CX3R7WVEebQ87JhV.97
 6 www.reuters.com/article/2015/10/30/us-exxonmobil-results-idUSKCN0SO11420151030#01tVr834rGtawwOX.99

02

FOR A LIMITED FEW, MORE CAPEX IN 2016

The drop in oil prices has clearly led to dramatic spending cuts in 2015 – analysts put the year-on-year fall in capital expenditure (capex) for the last 12 months at somewhere between USD180bn and USD250bn.⁷ However, when surveyed at a time when the oil price had reached an average of USD47 per barrel, a number of companies were optimistic that the worst was behind them. In 2015, 12% of respondents said that they were planning to increase capex in the year ahead, whereas, this year, 17% said their capex would increase.

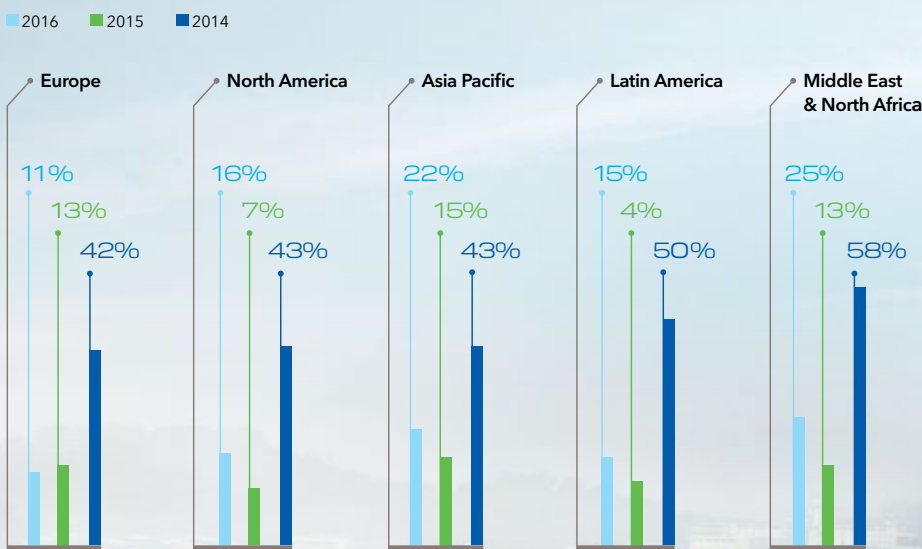
But these companies are an exception to the rule. It is expected that capital spending will decrease across the sector as a whole: 51% said that their company's capital investment will decline in 2016.

"Those companies with better access to financing are much more flexible in this current situation," said Statoil's Wærness. "In the past, some companies have managed to act in a counter-cyclical fashion, but companies with weaker market positions will struggle to do so."

Capex cuts are most likely to be felt upstream, with 62% of respondents saying capex would decrease – and just 10% saying it would increase. Cuts to capital spending were estimated at 30% for 2015, looking likely to drop a further 20% in 2016.⁸

Just under half of the integrated oil companies surveyed said they were planning capex decreases (45%). About a sixth (16%) said capex spending would increase in 2016. "In a low-oil-price scenario, the first thing we do is drop or defer the projects that don't pass our budgetary criteria at that price," explained Dato' Wee

Respondents who expected to increase capex in the year ahead, by region



7 www.rystadenergy.com/AboutUs/NewsCenter/PressReleases/capex-reductions
www.forbes.com/sites/gauravsharma/2015/08/24/oil-price-slump-nearly-250b-of-industry-cost-cuts-on-cards/
 8 www.rigzone.com/news/oil_gas/a/141808/Could_Cuts_in_CAPEX_Be_the_Catalyst_For_Growth_in_Oil_Prices#sthash.kDWAQLHP.dpuf

of Petronas. "Then, we further re-prioritize or re-phase our budget in line with affordability, taking into account revenue, operational expenditure (opex), capex of ongoing production and projects, and other expenditures and cash-related requirements for the period."

Larger companies will continue to cut for longer, according to our survey. Whereas 21% of smaller companies across the value chain (USD500m or less) said capex would increase this year, 16% of mid-sized companies (USD500m to USD5bn) said this and just 6% of large companies (USD5bn+). Looking at planned capex cuts, the same trend is clear: 36% of smaller companies, 52% of mid-sized companies and 74% of large companies said their capex would decrease this year.

High opex-pectations

Any industry under cost pressure is expected to cut back capital-expenditure projects drastically and reallocate spending to improving operational efficiencies. The same is true of the oil and gas sector.

"In this current environment, we will definitely see a drop in exploration as capex costs are cut," said Pål Rasmussen, Secretary General of the International Gas Union (IGU). "But we are also seeing an increased focus on cost reduction in operations. These two facts are likely to mean that we will see a scaling back of industry activity over the coming 12 months. This is unfortunate, as these periods also provide opportunities for creativity, but, in the longer term, this focus on cost reduction in operations will turn out to be something positive for the sector."

In the short term, even opex seems to be coming under pressure. This year, 55% of respondents said their opex would decrease, compared to 50% last year.

This is particularly true in the upstream: 65% of upstream respondents said operational spending would decrease in 2016, with just 10% saying it would increase.

Downstream opex spending will not see such dramatic changes. Only 35% of downstream companies said opex would decrease this year, and 25% said that it would increase. "While the oil price is low, this is the time for downstream companies to make hay while the sun shines, so I would be very surprised to see opex spending drop," explained Graham Bennett, Vice President of DNV GL. "Key for 2016 for downstream companies will be avoiding shutdowns, minimizing heavier maintenance activities, and continuing to produce as much as possible. When the margin spread increases from USD2-3 a barrel to a level of USD10-15 a barrel, these companies are going to produce as much as they can for as long as they can."

"In the past, some companies have managed to act in a counter-cyclical fashion, but companies with weaker market positions will struggle to do so."

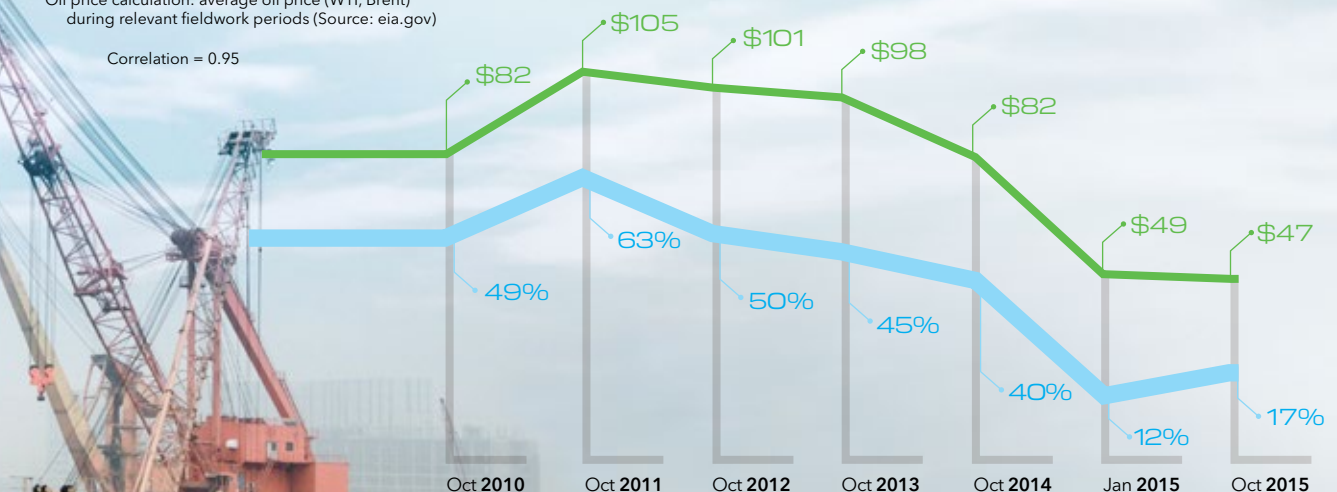
Eirik Wærness, Chief Economist, Statoil

Oil price vs. intentions to increase capex in the year ahead

■ Increased capital expenditure ■ Oil price

Oil price calculation: average oil price (WTI, Brent) during relevant fieldwork periods (Source: eia.gov)

Correlation = 0.95



03

COST REDUCTION: SUCCESSFUL SO FAR, AND MORE TO COME

Cost cutting was the industry priority in 2015, and the focus appears to have paid off. Nearly three quarters (74%) of survey respondents said that they were either highly successful or somewhat successful in reducing costs in their businesses last year.

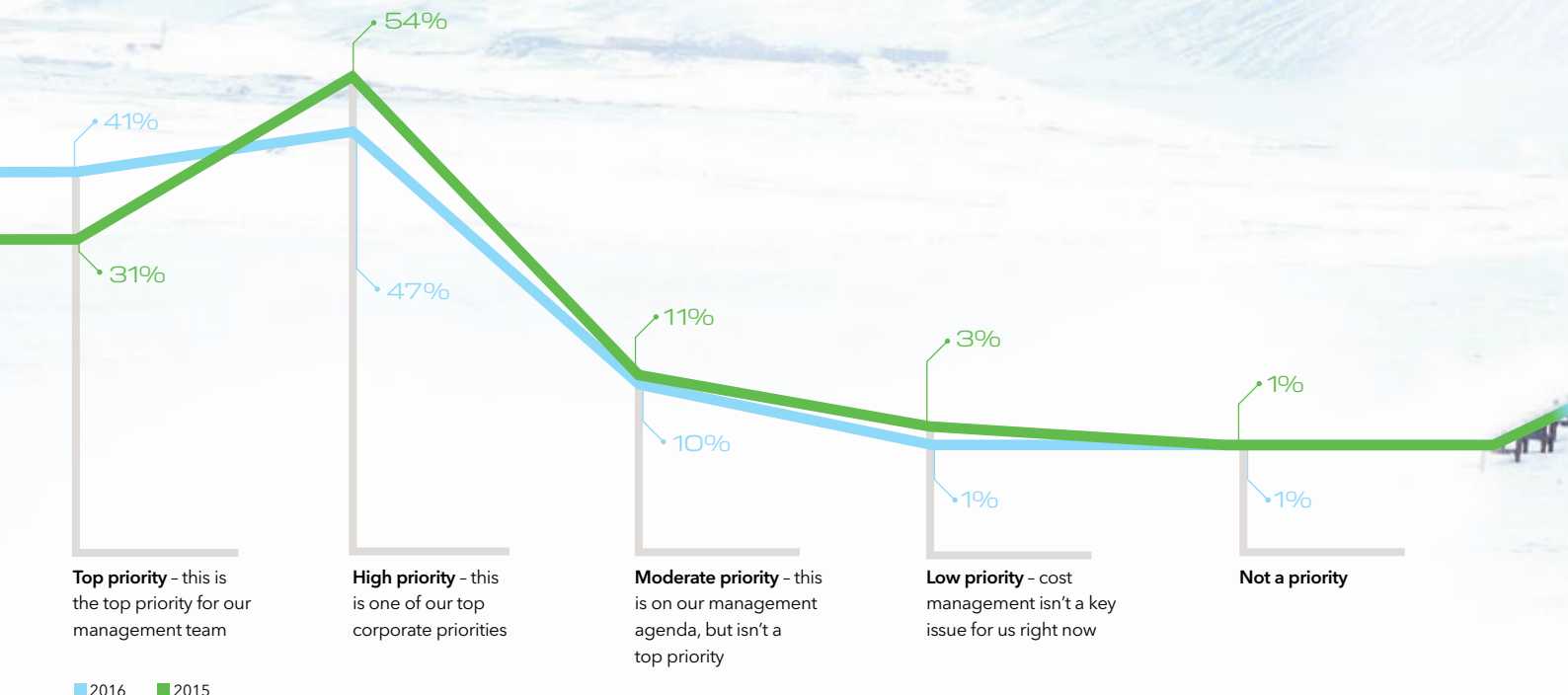
But the shape and extent of cost cuts varies greatly from business to business, depending on their place in the value chain, operator projects and supplier order books, the scale and depth of current investments, and geographical location.

“Companies at the end of large investment cycles, for example, will find it harder to cut costs than those with more of a free rein on where they can spend,” said Statoil’s Wærness.

Our survey shows that cost-efficiency initiatives will continue well into 2016. Nearly nine out of ten respondents (88%) said that cost reduction would be top, or a high priority, for them in 2016. This is up from 85% last year. Shareholder pressure is increasing the urgency of cuts: 93% of publicly-listed companies said that reducing costs would be top or high priority for them this year, compared to 85% of privately-held companies and 77% of state-owned companies.

The way in which cost cuts will be implemented seems set to change in 2016. One area of increasing pressure is in the supply chain, where costs of equipment, services and supplies

Priorities for managing cost in the year ahead



have dropped significantly in recent years. Of the 20-30% average cost reductions that operators are looking for on projects in the current environment, it is estimated that an average of 10-15% of this will come from supply-chain savings.⁹

“Like everyone else, we’ve taken a very close look at our cost base,” explained Kristin Færøvik, Managing Director of Lundin Norway. “For us, a large part of this has been about getting the best deal from our contractors.” Færøvik explained that Lundin Norway spent 2015 going through its entire database of service providers and renegotiating prices, which has set the company up well for 2016. “It’s taken a bit longer for some of the larger companies to get to where we needed them to be – it took time for them to come around to the reality of the situation, and also took them longer to move because of their size, but I think now everyone is on the same page, and realizes that this is about relationship building.”



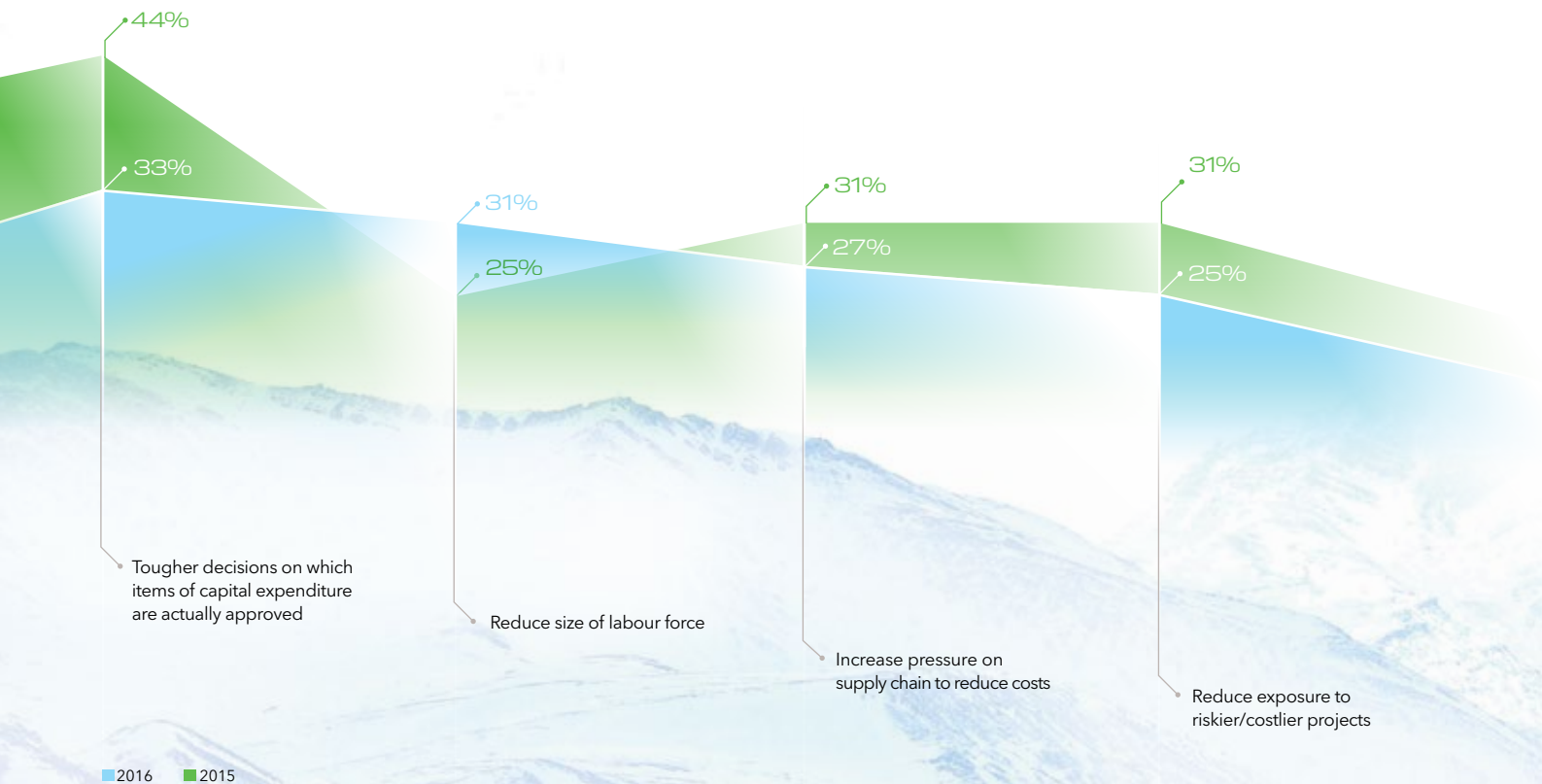
This pressure will continue into 2016. Over a quarter (27%) of respondents said that they would apply pressure on the supply chain to reduce costs this year. This strategy was the third-most popular cost-cutting strategy in this year's survey, but the total number of respondents applying this approach has dropped, down from 31% in 2015.

This is not just an approach that operators are taking with service companies, but also one that service companies are taking further down the chain. Almost a third of operators in this year's survey (32%) said they would be applying pressure on their supply chains, and, in response, 25% of service companies and 29% of other businesses in the supply chain said they would also be putting pressure on theirs.

Extent to which respondents agreed that the industry will be successful in further reducing costs in 2016



Top priorities for imposing stricter cost controls in the year ahead



"Drilling costs are clearly coming down already, which is good. It will be interesting to see if construction and development costs come down accordingly."

Thore Kristiansen, COO E&P and Executive Director, Galp Energia

But some operators are still unsure that this pressure on the supply and service sector has been applied in the right areas. "The question is, are costs coming down in a way that is positive?" asked Thore Kristiansen, COO E&P and Executive Director at Galp Energia, Portugal's integrated oil and gas operator. "Drilling costs are clearly coming down already, which is good. It will be interesting to see if construction and development costs come down accordingly - we will know for sure when our latest project in Mozambique reaches the final investment decision, which will be a great indicator of whether the necessary market adjustments have been made."

Tougher decisions

When asked which strategies their companies will be prioritizing in 2016 in order to impose stricter cost controls, the most popular answer was: 'tougher decisions on which items of capex are actually approved', cited by 33% of respondents. This number is down from last year (44%).

Reducing the size of the labour force as a cost-control strategy has grown in prominence - it appears second on this year's list, up from fifth in 2015.

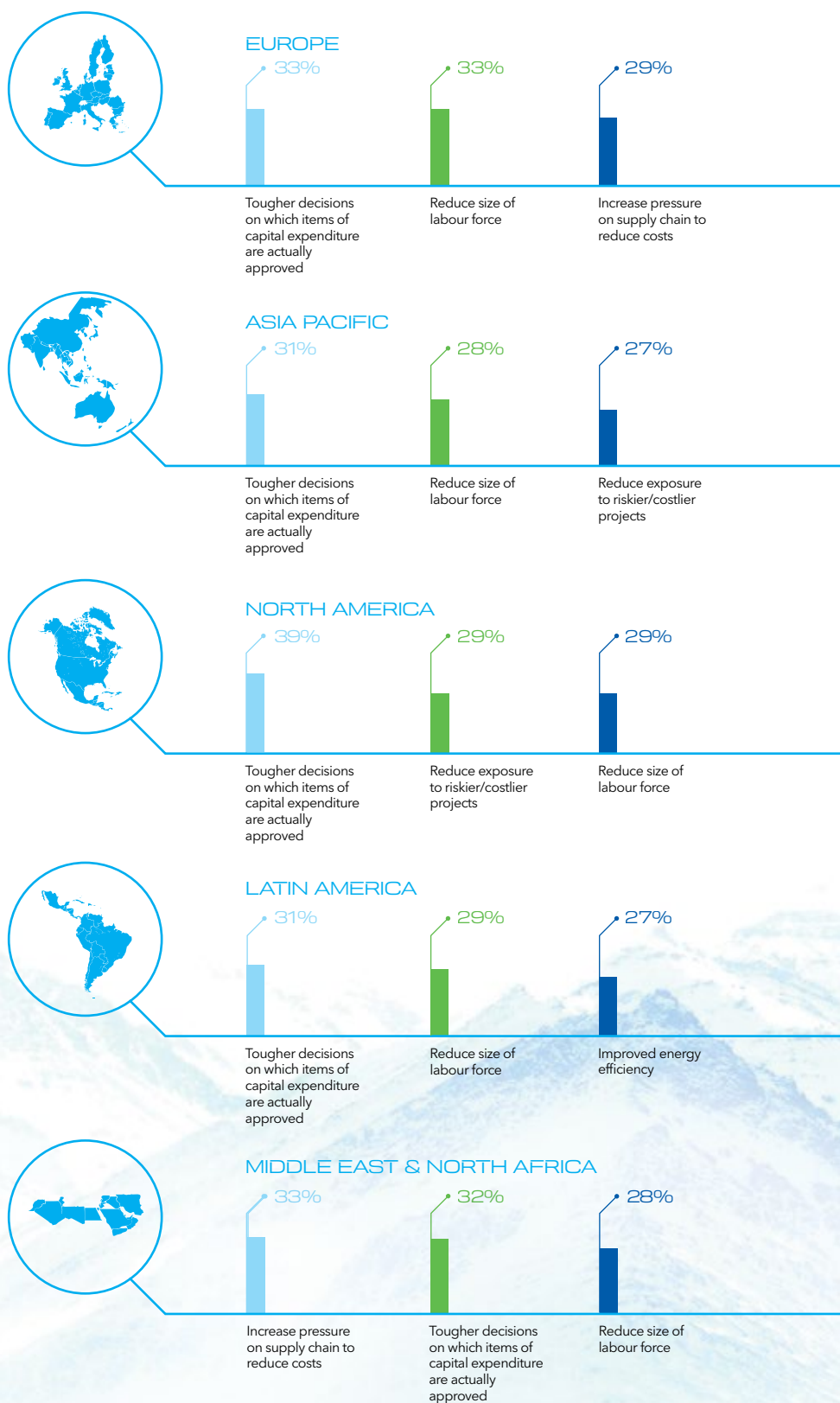
According to Statoil's Wærness, labour-force cuts will be spared in areas where projects are still going ahead. "Companies will continue to hire the specialists they don't have in-house and need for their projects, but, given that overall activity levels will decline, net hiring will probably be negative for a while."

Confidence in cuts

Cost cuts were successful to a large extent last year; indeed, 74% of the industry said that they were successful to some degree in reaching their cost-efficiency targets for the period.

There is cautious optimism about how successful cost-cutting exercises will be this year. Nearly nine in ten (88%) said that cost cuts would be a top or high priority for their companies in the coming year. Two thirds (66%) said that the industry as a whole would be successful in further reducing costs during the same time period.

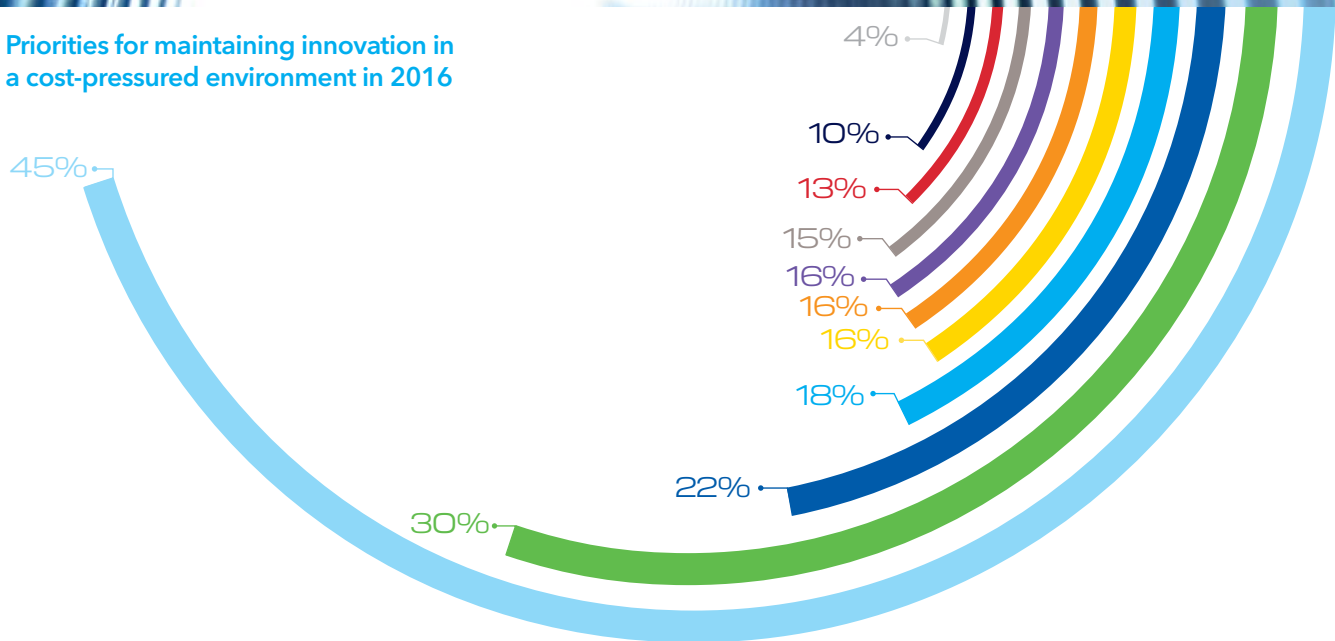
Top priorities for imposing stricter cost controls in 2016, by region



04

COST PRESSURES WILL FORCE GREATER COLLABORATION TO MAINTAIN INNOVATION

Priorities for maintaining innovation in a cost-pressured environment in 2016



- Increase collaboration with other industry players
- Greater involvement in joint industry projects
- Create a specific joint venture with an external partner/partners
- We do not have a strategy in place to help us maintain innovation
- Greater partnering with academic institutions
- Greater partnering with innovative start-up companies

- Try to hire new talent
- Increase or ring-fence our in-house R&D budget from cuts
- Set up an in-house incubator/accelerator scheme
- Spin off discrete technology units to see if they can thrive in the marketplace
- Other

Almost half of survey respondents (49%) said their companies were taking a long-term approach to innovation and R&D in the current price environment.

One key strategy for maintaining innovation while lowering budgets is to look for shared innovation priorities with other industry players. "There are a number of areas where our members are embarking on joint initiatives," said Brian Sullivan of IPIECA, the global oil and gas industry association for environmental and social issues. "Overall, the industry definitely wants to increase the depth and extent to which they collaborate, particularly in areas where there are no competition issues."

When asked which strategies respondents would be employing in 2016 to maintain innovation, the most common answer was to increase collaboration with other industry players, cited by 45%. However, finding ways to collaborate in a highly competitive industry is challenging.

A number of companies are looking to partner outside of the industry, in order to find new skills and solutions: 16% said they would partner with innovative start-ups in order to maintain innovation efforts this year. For example, "None of

"Overall, the industry definitely wants to increase the depth and extent to which they collaborate, particularly in areas where there are no competition issues."

Brian Sullivan, Executive Director, IPIECA

Perseverance pays off on both sides, however: Woodside gets access to new cutting-edge analytics tools, and its partner gains a foothold in a brand new sector, with the potential of much more work to come.

But, wherever there are leaders, there are also laggards. Nearly one in five (18%) of our survey respondents said their companies had no strategy in place in order to maintain innovation in the current environment. This is much more common upstream, where companies are feeling the pressure to cut deeper and faster: 25% of upstream companies reported this, compared to 15% of midstream companies and 10% of downstream companies.



49%

of survey respondents said their company is taking a long-term approach to innovation and R&D in the current price environment



18%

said their company has no strategy in place in order to maintain innovation in the current environment



25%

of upstream companies reported feeling the pressure to cut deeper and faster in order to maintain innovation in the current environment



10%

of downstream companies reported feeling the pressure to cut deeper and faster in order to maintain innovation in the current environment

our partners in the area of data analytics and cognitive computing are oil and gas-related entities at this point in time," revealed Woodside's Utsler.

This brings with it a particular set of challenges, not least learning each other's vocabulary. "These digital partners speak in a language rooted in mathematics, which is very different from the language the oil and gas industry is used to speaking. When putting two very different groups of people into the same room, the first thing they have to learn is how to communicate with each other," Utsler continued.

"One challenge of maintaining an innovation strategy is that you don't necessarily know what you will create in the end, or how the results could be commercialized," said Koheila Molazemi, Service Area Leader for Risk Management Advisory at DNV GL. "One way out of this is to take a lean approach to innovation, and tackle shorter-term projects with proof of concept agreed with industry. We also need a tolerance for failure, and to be prepared to kill failing projects."

05

STANDARDIZATION WILL DRIVE EFFICIENCY IMPROVEMENTS, WITH A FOCUS ON EQUIPMENT AND PROCESSES

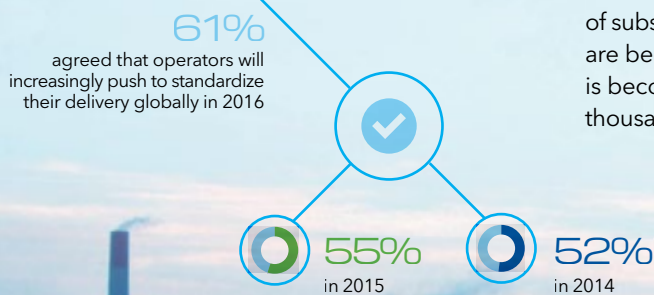
Greater standardization of projects and operations could bring new cost-saving opportunities to the oil and gas industry in 2016 and beyond. "As an industry, we have always tried to tailor everything to each individual opportunity. However, this comes with a high price tag, so we have identified the need to use more standardized solutions," said Galp Energia's Kristiansen. "For example, at Lula and Iracema in Brazil, we plan to deploy ten floating production storage and offloading vessels (FPSOs), which, for all practical purposes, are virtually identical. There is a huge opportunity for standardization, and bringing down costs significantly as a result."

Given today's price pressures, standardization is a popular tool for driving cost efficiency. Six in ten (61%) respondents agreed that operators will increasingly push to standardize their delivery globally, up from 55% in 2015 and 52% in 2014.

"There is a multitude of companies operating across the hydrocarbons value chain, so the approach to standardization will be different for each, based first on the role they play as upstream operator, producer, developer, midstream provider or downstream utilizer."

Michael Utsler, COO, Woodside Energy

Almost half of upstream companies (44%) said they would increase standardization in 2016, and there are already examples of standardization at work here. "Many examples are emerging across the industry to drive standardization including ongoing work on blowout preventers, which are critical to improving operating and cost efficiencies," said Woodside's Utsler. "The same is true for many components in the design and installation of subsea equipment. Above the water line, processing vessels are becoming increasingly standardized. Even valve design is becoming more standardized, despite the hundreds and thousands of different valves being used across the value chain."



Reducing complexity

Standardization, not only of equipment, but also process, is increasingly being seen by the industry as a way to reduce project creep and over-run. "Almost by definition, standardization will lead to cost efficiencies, as it is intended to reduce complexity, one of the biggest causes of cost creep," said Martha Viteri, Head of Subsea and Well Systems, North America, at DNV GL. "By implementing standard processes, operations can be streamlined and made more predictable. That way, trust is built both within individual companies and across the industry."

"It could, for example, take six to eight months between casting a subsea forging and delivering it to an equipment manufacturer," Viteri explained. "This should only take a few months if those forgings are available in inventory. But, time and complexity are added by customized requirements, pre-production meetings, and witness and hold points. Much of these could be eliminated with improved trust in the supply chain and a common set of standards."

Some parts of this are easier to achieve than others, however. "Standardization of processes is easier to achieve," Viteri continued, "because, at a company level, that can begin with streamlining and agreeing on what processes are needed at what stage." With the standardization of equipment, one of the biggest challenges is the need to agree and align each stakeholder in the supply chain. "Standardization of equipment, even within one company, is a challenge. Identification of what is not needed impacts how people think and work. Trying to

standardize across the industry is easy in meetings, but not as easy when it comes to implementation. Oil and gas companies have a way to go in terms of learning from each other, sharing best practices and employing non-standard practices that promise to yield cost results."

However, slowly but surely, companies are working out how to overcome these challenges. A fifth of this year's survey respondents (20%) said simpler processes and design would be a focus in the coming year, and 10% said that they would adopt industry standards to achieve this.

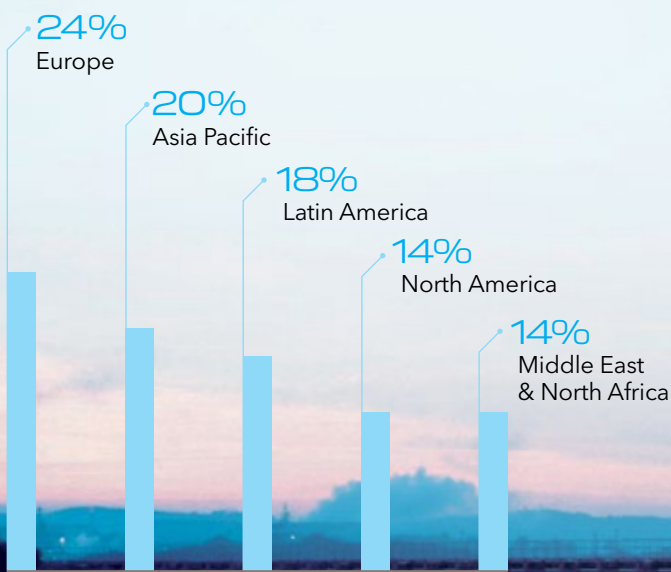
The opportunities for standardization across the value chain, and in both equipment and processes, are vast. When respondents were asked where their standardization efforts would be focused in 2016, the answers varied immensely, from data collection to design, and from drilling to IT.

"There is a multitude of companies operating across the hydrocarbons value chain, so the approach to standardization will be different for each, based first on the role they play as upstream operator, producer, developer, midstream provider or downstream utilizer," explained Utsler.

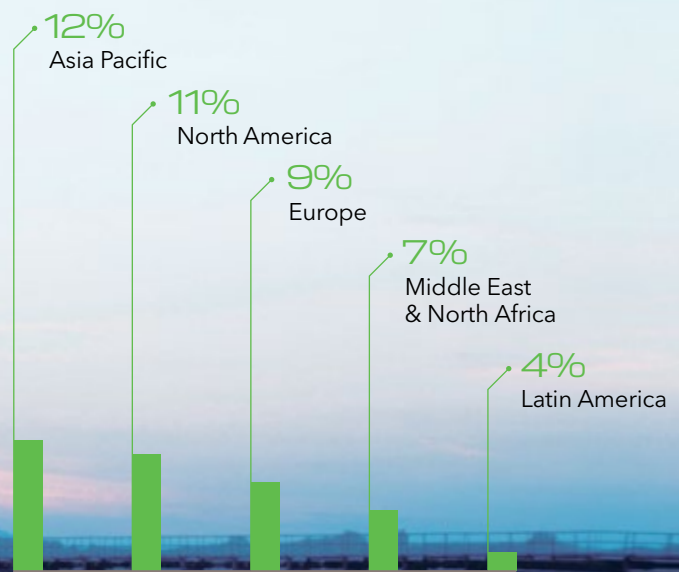
"There is a huge opportunity for standardization, and bringing down costs significantly as a result."

Thore Kristiansen, COO E&P and Executive Director, Galp Energia

Respondents who intend to implement simpler processes and design in 2016



Respondents who intend to adopt industry standards in processes and design in 2016



06

THE INDUSTRY'S PROFIT-CONFIDENT FIRMS ARE FORGING A DIFFERENT PATH

The sustained dip in oil prices has led to a period of reflection for many oil and gas businesses. "Some companies allowed themselves to grow too heavy in the USD100-per-barrel world. They now need to examine if their structure is fit-for-purpose," said Galp Energia's Kristiansen. "This is an opportunity for them to set things back on the right path."

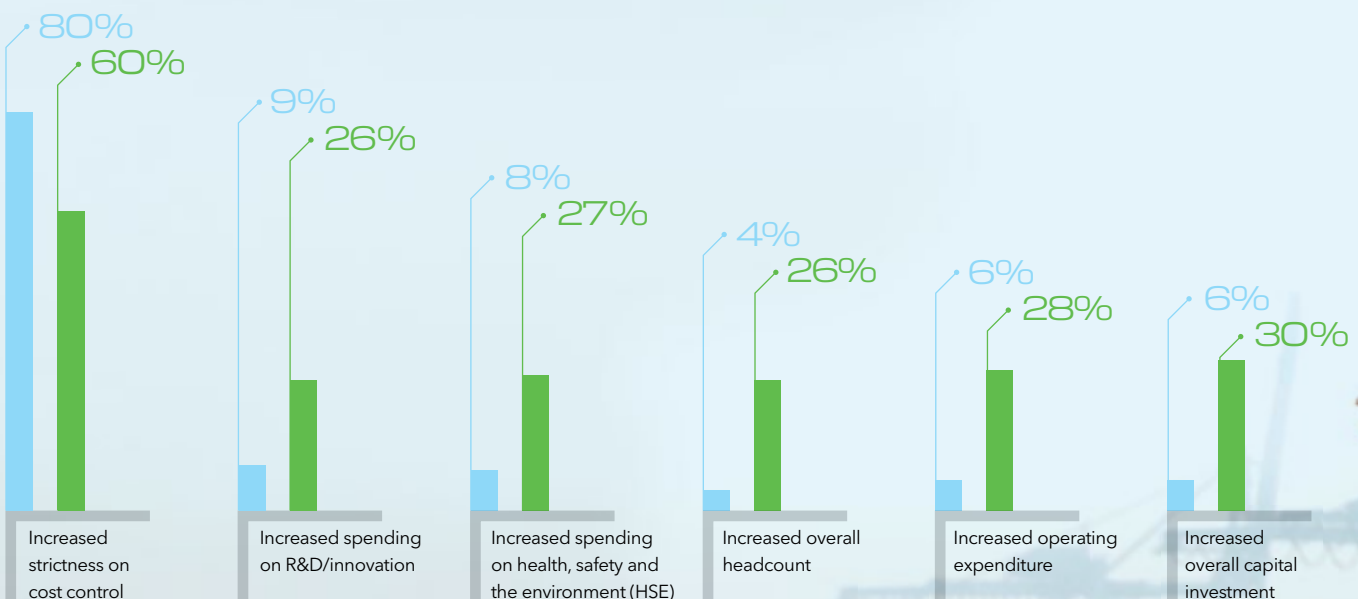
While some companies are confident in their profit outlook, owing to a successful period of efficiency gains, a longer-term focus on staying slim in the up cycle has also proved to be a major advantage. "We're lucky enough to have owners with the stomach for taking a long-term view," explained Kristin Færøvik of Lundin Norway. "2015 was our first year of operation, but it was also our

most critical year in terms of project execution. When we set our plan for 2015, we clearly didn't foresee the oil-price drop. We've done other things to adapt to the changing circumstances, but our project strategy sat firm." Lundin's investment in Norway in 2016 will be similar to that in 2015, and the company will continue to invest in capex on its ongoing projects and exploration over the course of the year, owing to its 'lean and mean' approach to operations.

There are striking differences in the characteristics and behaviours of the survey respondents who were highly or somewhat confident about their company hitting its profit goals (dubbed here as profit confident), compared to those who were highly or somewhat pessimistic towards this (dubbed here as profit pessimists).

Characteristics of profit confident and profit pessimists in 2016

- **Profit pessimists:** Respondents who were somewhat or highly pessimistic about reaching their profit targets in 2016
- **Profit confident:** Respondents who were somewhat or highly confident about reaching their profit targets in 2016



Different behaviours

A significant number of these 'profit-confident' companies expected to increase their overall opex in 2016, for example: 28% compared to 6% of the 'profit pessimist' group. Around three in ten (30%) of profit confidents reported that they would increase capex in 2016 as well, compared to 6% of profit pessimists. Just over a quarter (26%) planned to increase headcount in 2016, compared to 4% of pessimists. The same number planned to increase spending on R&D and innovation, compared to 9% of pessimists.

The profit confidents said they would be looking to take advantage of the downturn as an opportunity for consolidation. Executives from both Citigroup and UBS have said that, in the US at least, interest in mergers and acquisitions (M&A) is expected to increase, despite low oil prices.¹⁰ While 27% of profit pessimists said they would look to asset sales and divestments to increase in 2016, 28% of profit confidents reported that they would be looking at new M&A opportunities this year.

"A number of companies will face significant financial distress because they are so highly leveraged - handling their balance sheets will be a real challenge for them," says Kristiansen. "This will create opportunities for companies with strong balance sheets to add interesting business to their portfolios."

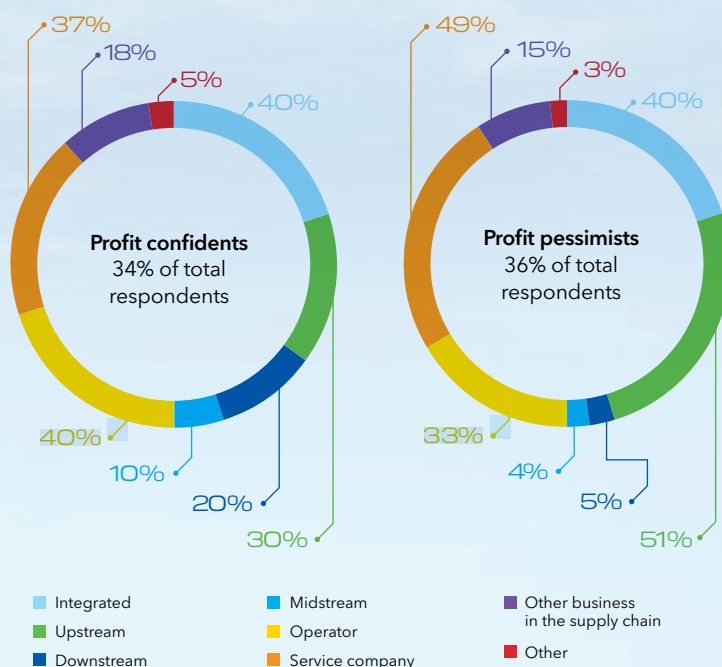
"We're lucky enough to have owners with the stomach for taking a long-term view."

Kristin Færøvik, Managing Director, Lundin Norway

The profile of a pessimist

What are the common behaviours of the members of the group that is pessimistic about their profits this year? They are much more likely to be planning to reduce the size of their labour force than profit confidents: 42% of profit pessimists reported this, compared to 17% of profit confidents. The pessimists also plan to reduce the size and scope of their asset portfolios (16% vs. 6%), increase pressure on the supply chain to reduce costs (32% vs. 23%), and take tougher decisions around capital expenditure (37% vs. 32%).

Who are the profit confidents and pessimists for 2016?



IN-DEPTH

01

COMPANIES THAT SUCCESSFULLY REDUCED COSTS IN 2015 TAKE A LONG-TERM APPROACH

The size and scale of cuts required for each company to reach cost-efficiency targets varies greatly across the oil and gas value chain, the markets in which the company operates, and the extent to which it has kept costs in check during the up cycle. Our survey looked at those companies that believe they were successful in reaching their cost-efficiency targets in 2015, no matter what they were, in order to see what implications successful cost cutting has for the long-term success of these businesses.

We have compared two groups of respondents taken from this survey: the first, which we call 'high cost-successful' companies, are those that say they were 'highly successful' at reducing costs in 2015, which is 18% of the total sample. The second group, which we call 'low cost-successful' companies, is composed of those that say they have been either 'somewhat unsuccessful' or 'highly unsuccessful' at reaching their cost-efficiency targets over the past year. This is a group that accounts for 17% of the total sample.

Long-term thinking

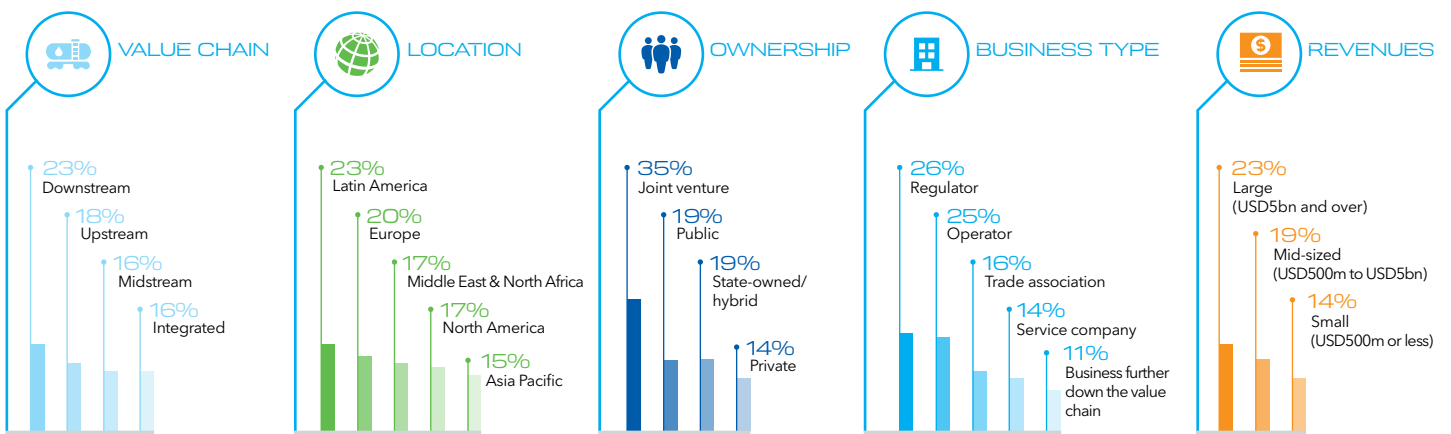
Some companies are confident that their strategy in the current climate is sufficiently focused on the long term. "This is the ninth downturn that I have weathered in the industry," said Michael Utsler, Woodside's COO. "Over the course of these downturns, hopefully the industry, and certainly we here at Woodside, recognize the importance of rigorous financial discipline, and

not being seduced by short-termism or opportunism. We know that the investments we make are robust against the down cycle and leave us well positioned for the up cycle."

Graham Bennett of DNV GL, however, believes that this is far from being a common industry approach. "Many companies are handling this downturn in exactly the same way as they did the previous one: they are laying off lots of people, stopping projects, and significantly cutting back on research and development (R&D). The operators can weather the low oil price storm for some time, but the supply chain will suffer far more, and there is a risk of a permanent loss of capacity in the supply chain if low prices persist."

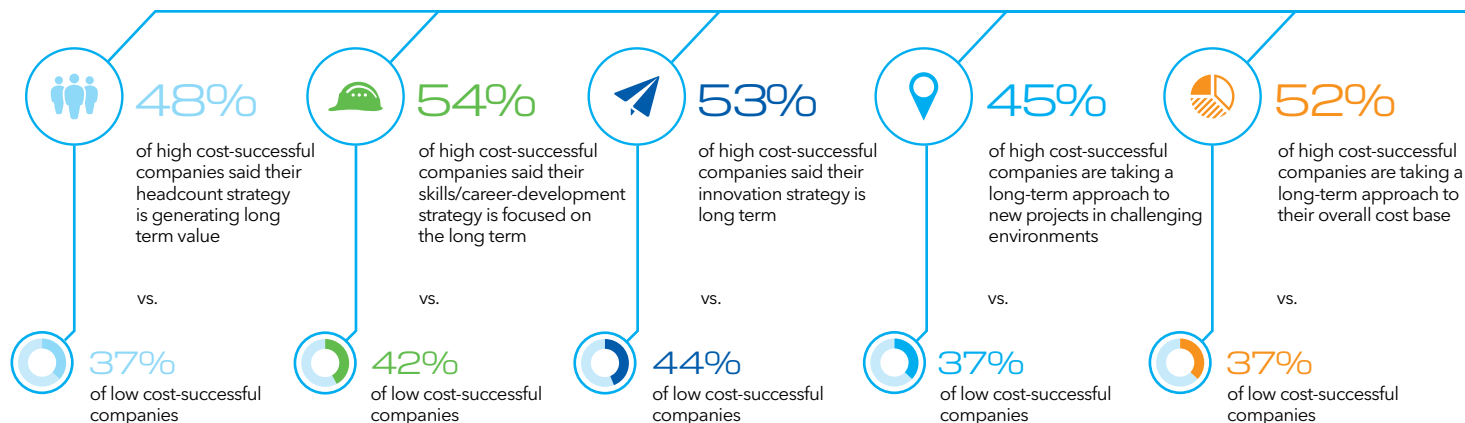
Cutting headcount is one key response to cost pressure. Just under a third of respondents (31%) said that their company would prioritize reducing the labour force as a way to impose stricter cost controls in 2016. However, as with all cost-reduction strategies, the challenge is putting in place a headcount strategy to reduce costs that simultaneously drives long-term value. Cost-successful companies seem to be better at achieving this than their cost-unsuccessful counterparts: 48% of cost-successful companies reported that their headcount strategy was generating long-term value for the company, compared to 37% of cost-unsuccessful companies.

Who considers themselves to have been highly cost-effective in 2015?



*These do not total 100% because they are the percentage of each segment that reported themselves to be cost-successful, rather than a breakdown of the cost-successful group according to each sub-category

Long-term approaches



What does a long-term approach to headcount mean? It could mean a smart approach to cuts. OPITO, the skills organization for oil and gas, reports that interest in its competence management system increased 250% in the first half of 2015, as North Sea energy firms looked for ways to assess and develop their workforces.¹¹

However, some companies are also using the downturn to invest actively in hiring new people, acting against the cycle. "We have taken the downturn as an opportunity for growth on the headcount and competence front," revealed Thore Kristiansen of Galp Energia. "We have found that there are a lot of interesting people available in the marketplace right now. We will continue to grow our staff in 2016," he said. Indeed, 43% of low cost-successful companies said that they will prioritize reducing the size of their labour force in 2016 to control costs, compared to just 25% of high cost-successful companies.

As well as taking a longer-term approach to headcount, skills and career development, our high cost-successful survey respondents reported that they were leading low cost-successful companies on longer-term approaches to new projects in challenging environments, and in terms of their overall cost base.

The coming year: actions and perspectives

In terms of concrete actions that both groups would be taking in 2016, it seems that, across the board, more of those that were successful at achieving cost cuts would be channelling savings back into spending this year.

Those that were highly successful at reducing costs in 2015 would be more likely to increase capex in 2016 than those that were not: 25% of high cost-successful respondents said they would be increasing capex, compared to 14% of low cost-successful companies. Eighteen per cent of those that were highly cost-successful said they would increase operating expenditures, compared to 15% of those that were low cost-successful in 2015. Twenty per cent of the high cost-successful

group said they would be increasing spending on R&D and innovation in 2016, compared to 15% of the rest of respondents.

In times of budget pressure, sustainability goals are frequently the first to be readjusted or scrapped completely. However, those that have been successful in reaching cost-efficiency goals seem to view sustainability as a key factor in competitiveness. Fifty per cent of high cost-successful companies said that sustainability is a key factor in their long-term competitiveness, compared to 27% of low cost-successful companies. This could be a matter of motivation. Low cost-successful companies are more likely to see sustainability in terms of cost reduction (37% compared to 27%), whereas high cost-successful companies are more likely to want to 'do the right thing' (55% compared to 34%).

For Brian Sullivan of IPIECA, the approach of his members varies greatly on this issue. "There is a range of responses in terms of strategies and attitudes, and different elements of sustainability, which is a broad area. However, one commonality is that there is no change in the level of resourcing when it comes to sustainability issues like climate change and corporate social responsibility. If these companies were already heavily invested in these areas, they have continued to be in the downturn."



"We have found that there are a lot of interesting people available in the marketplace right now. We will continue to grow our staff in 2016."

Thore Kristiansen, COO E&P and Executive Director, Galp Energia

IN-DEPTH

02

THE INDUSTRY IS SPLIT OVER THE IMPACT OF DIGITALIZATION IN 2016

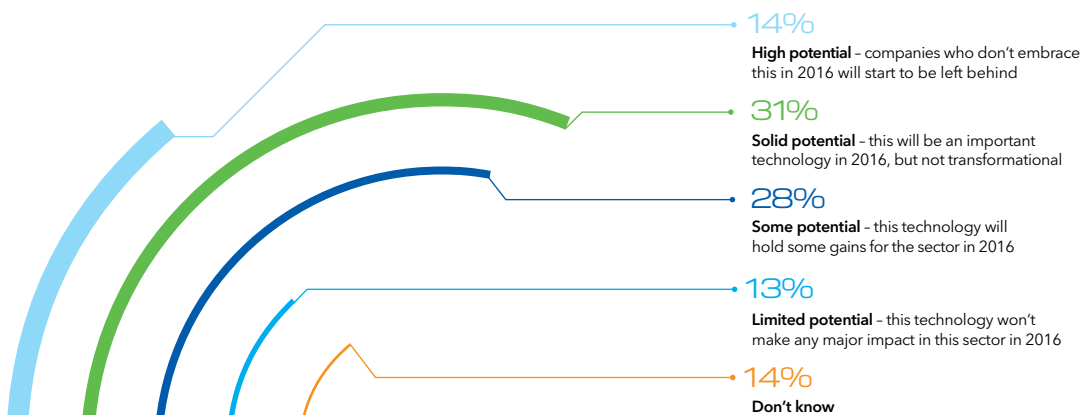
Digitalization undoubtedly has the potential to reshape the oil and gas industry. DNV GL believes that, if the oil and gas industry could analyse and understand all the data it is currently producing in a more coordinated manner, operational efficiency could be boosted by as much as 20%.

Many companies are already adopting digital processes in order to boost productivity and efficiency. Total, for instance, built digital controls into its Martin Linge offshore platform, and was able to reduce its offshore workforce from the 70 people usually required to just 22. This was not just about reducing the number of workers on the platform for Total, however, but about operational efficiency. "Platforms are no longer autonomous

islands. If you have all the data onshore, you can use onshore competence to process the data. This both reduces costs and shifts more tasks back on land," Martin Tiffen, speaking as MD of Total E&P Norge, explained in a recent issue of DNV GL's PERSPECTIVES magazine.¹²

"The first winner with the implementation of digital technology is operational effectiveness, but, with it, comes improved efficiency, including energy efficiency," said Christoph Frei of the World Energy Council. "Shale is a great proof. Without embracing digitalization, we wouldn't have shale today, as we wouldn't have the sophisticated, directed and monitored technologies that made shale extraction possible." Quicker

The potential for big data and analytics to transform operating efficiency in 2016



12 <https://www.dnvgl.com/oilgas/perspectives/a-total-approach-to-smarter-ep.html>

drilling and well-completion times have protected profit margins. In the Eagle Ford region, rig efficiency is 18 times greater than in 2008, and 65% more than in 2013.¹³

Another factor making digitalization even more attractive in the current environment is its relatively low implementation cost. "Digitalization is not as cost-intensive as some other, hardware-focused, efficiency drivers, and is, therefore, viable even in this environment of capital scarcity," Frei explained.

However, the question remains to what extent digitalization has the potential to change the industry in 2016. The industry seems split on this: 45% of our survey respondents said that digitalization had high or solid potential to transform operating efficiency in 2016; 41% said it holds some or limited potential to do this.

"Although the oil and gas industry has not been very fast in deploying data-smart technology in the past, it is moving faster now, and there'll be more changes in the coming two or three years," said Molazemi of DNV GL. "In 2016, implementation will probably be on a smaller scale, with companies looking at how they can deploy data-smart technology to gain efficiencies and better performance in terms of operations and safety. This would lead to cost savings. It is the beginning of a longer-term shift."

Regulators seem to be more optimistic about the impact of digitalization in the coming year. Twenty-nine per cent of regulators and government authorities believed it had high potential to change operating efficiencies in 2016, compared to just 10% of operators and 15% of service companies.

One of the big opportunities for companies looking to digitalize their operations and services lies in looking at sectors that are more advanced in their adoption of digital technologies.

"At Galp, we're very interested in what we can learn from other sectors," said Thore Kristiansen. "We're currently looking at the way the health sector has been able to use massive amounts of data in an efficient manner. We hope it could be useful for us when managing the huge amount of seismic data we have. This is a major R&D project. Another involves looking at how the shipping and auto-manufacturing industries handle their supply chains. We have a lot to learn in the oil and gas industry in this area."

The challenges of digitalization

Many companies are finding that the first challenge of digitalizing is deciding which areas to prioritize. Michael Utsler explained that, "Finding the right area to prioritize for



"The first winner with the implementation of digital technology is operational effectiveness, but, with it, comes improved efficiency, including energy efficiency."

Christoph Frei, Secretary General, World Energy Council

analysis, when we have so much data available, is a huge challenge. At Woodside, we focus on using data to improve our operations and efficiency, looking primarily at geophysics, and this year moving on to look at areas like marketing and trading."

However, beyond this, companies must deal with a scarcity of resources and a lack of experience in this area. "Data scientists are being sought after by many industries, many of which are more advanced in this area," Utsler explains. Currently, none of the companies Woodside is working with on digitalization has a background in oil and gas. "The industry is competing in this arena against a diminishing pool of available expertise. Additionally, having a workforce that knows the right questions to ask and the best way to use the insights gained from this data is massively important."

Another challenge is dealing with the security issues around digitalization. "Much of the data generated by oil and gas companies is business sensitive, and operators demand uncompromising protection through rigorous security systems," explained DNV GL's Molazemi. "You have to be able to prove that any data project takes the necessary steps to protect that data, and that robust and uncompromising security mechanisms are in place."

Our survey asked respondents how advanced they considered themselves to be when it came to digital adoption across their physical assets and operations. Those that placed themselves high on this scale (8 or above on a scale of 1 to 10) accounted for 20% of the overall sample.

13 <https://www.dnvgl.com/oilgas/perspectives/unconventionals-to-shrug-off-current-blues.html>

IN-DEPTH

03

BALANCING SHORT-TERM COST CONTROLS WITH LONG-TERM VALUE

Companies across the value chain continue to struggle with finding the correct balance between making cost-efficiency gains in the low-oil-price environment, while still focusing on their long-term goals. This is a cyclical issue, but, despite the fact that many companies have dealt with it before, there still seems to be a lack of consensus on the best way to approach the situation. Over half of respondents (56%) said that the oil and gas industry is repeating many of the same mistakes made in prior price downturns.

Even companies that feel they are managing the downturn well must still concentrate on reducing costs in the coming year. "We have positioned ourselves well through cost discipline and a strong focus on cost management since 2013, leaving us in an excellent position to manage through the current situation," said Michael Utsler of Woodside. "But that doesn't mean we won't be looking to continuously improve in our drive to bring cost and operational efficiencies into our capital spend and operating spend programmes."

Failing to learn from the past

The top five issues that the industry has not taken on board when responding to the fall in oil price, according to our survey respondents



Losing experienced people through headcount reduction



Lack of cost discipline when oil price was high and stable



Failure to work against the cyclical price of oil

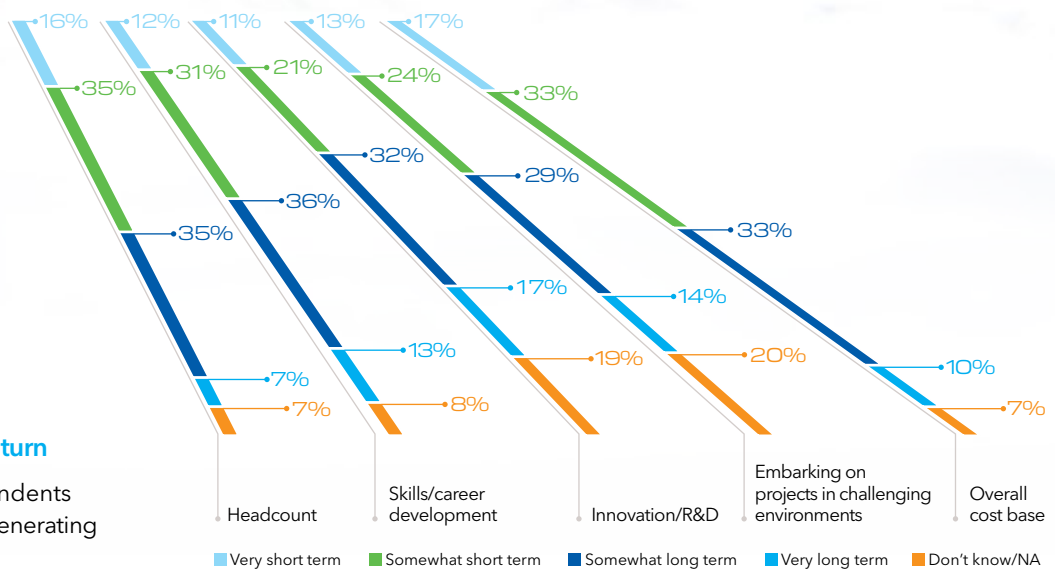


Failure to take a long-term view of the industry



Failure to take advantage of investment opportunities when the oil price is low



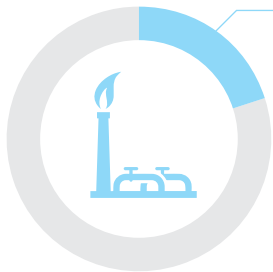


Responding to the downturn

The extent to which respondents think their organization is generating short- and long-term value

Key emerging technologies for 2016

Technologies highlighted by respondents as having a key impact on the oil and gas sector this year



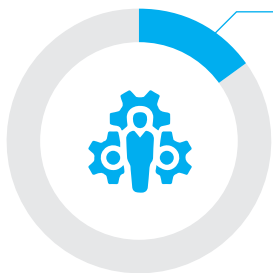
20%
Unconventional gas extraction technologies



16%
Big data and analytics



15%
Internet of things/smart technology



15%
Digital oilfields



11%
Advanced materials (e.g. coatings)

“Developing marine and river transports to LNG fuel has the potential to have a huge impact on overall air quality in countries like China, and even help European countries lower their overall emissions.”

Pål Rasmussen, Secretary General, International Gas Union

Forty-five per cent of respondents said their company would favour investment in projects that could adapt within shorter time frames in response to the current situation - a move towards flexibility, but not long-term revenue generation. “It’s currently very difficult to convince shareholders of the viability of large projects with little flexibility in terms of cash flow,” said the World Energy Council’s Frei. “However, there will be an increasing appetite for shorter-term, higher-flexibility projects, particularly those that are directly tuned to customers: projects where gas is being brought directly into cities, for example.”

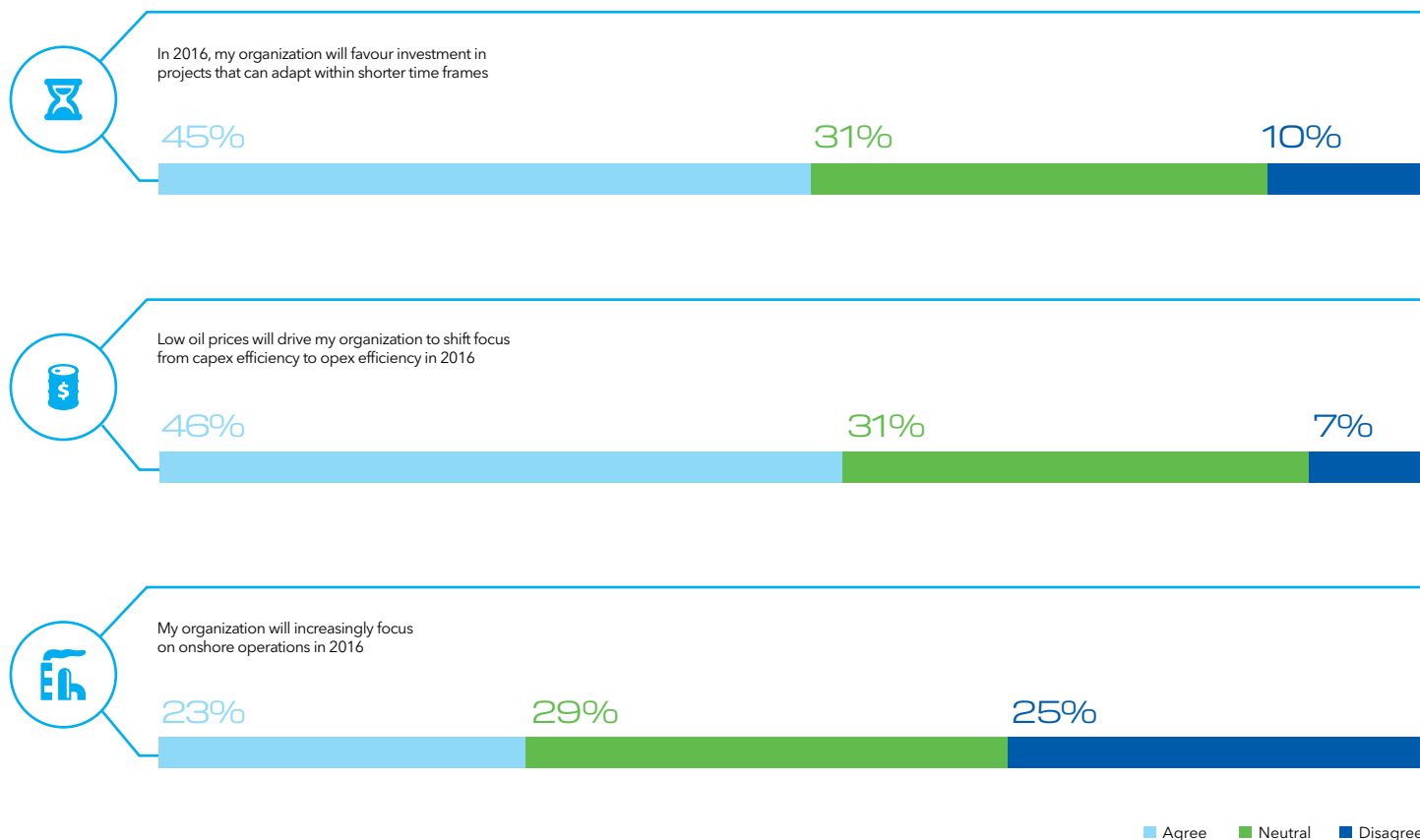
While our survey shows upstream and midstream companies planning to work on shorter-term, flexible projects (45% and 44%, respectively), only 37% of downstream companies said that they planned to do this, perhaps because of the less flexible nature of downstream infrastructure projects.

However, there are some areas where companies seem to be continuing to focus on the long term. For example, almost half of respondents were confident that their company’s R&D efforts had not suffered in the current environment. Forty-nine per cent said that their company’s response to the downturn had generated long-term value when it came to R&D and innovation, compared to 32% who said that they have had a short-term response in the current environment.

Two priorities stand out for 2016 among respondents for the focus of their R&D: subsea and LNG. “Subsea is currently a big area for R&D right now,” said Graham Bennett of DNV GL. “Offshore fields are getting deeper, further away from shore and in colder and more challenging subsea environments. The challenge is to find technology to adapt to these new conditions, but also to find ways to reduce costs on such projects.”

Pål Rasmussen, Secretary General of the IGU, believed that growing demand for gas as countries seek to lower carbon emissions will drive investment in innovative LNG projects. “Developing marine and river transports to LNG fuel has the potential to have a huge impact on overall air quality in countries like China, and even help European countries lower their overall emissions,” he explained.

Responses to the market downturn



Counting heads and pennies

Headcount can be difficult to approach in a downturn, particularly when trying to devise a strategy that considers both short-term and long-term goals (for more on this, see in-depth section 1). Our survey shows that some cuts to headcounts will continue in 2016. Over half of respondents (51%) said that overall headcount in the industry would decrease in 2016. However, only 31% said that their company would prioritize reducing the labour force as a way to impose stricter cost control in 2016.

Despite the fact that some of the cost-efficiency gains being made in the current environment are clearly focused on the short term, there may still be long-term advantages to be drawn from them, as Frei explained. "Although many of the current efficiency gains are being driven by necessity, rather than creativity and long-term strategy, they will have long-term benefits. We have seen this clearly in the North American shale segment. So, although there are short-term drivers for these strategies, they will have positive long-term implications."

Cost inflation has been rising sharply in the oil and gas industry for more than a decade - and scope inflation has been rising even faster. Capex per barrel of oil rose by an enormous 11% compound annual growth rate between

1999 and 2013. The cause of this is ballooning complexity, which has inflated expenses and timelines across the industry. Until very recently, this inefficiency has been 'hidden' behind the high oil prices. But now, weaknesses have been exposed, providing challenges for many, but also a once-in-a-decade opportunity to reset to sustainable margins and create healthy businesses across the oil and gas value chain.



"There will be an increasing appetite for shorter-term, higher-flexibility projects, particularly those that are directly tuned to customers: projects where gas is being brought directly into cities, for example."

Christoph Frei, Secretary General, World Energy Council

CONCLUSION: HOT TOPICS FOR 2016

In the 'lower-for-longer' oil-price environment, companies across the value chain must work carefully to balance cost-cutting programmes with a longer-term strategy that ensures that they will be well placed come the upturn. This is the resounding priority for senior executives in 2016. Other areas highlighted as priorities for this year are building a lower, long-term cost base as a platform for sustainable growth, and continuing to prioritize safety.

Thinking long-term

In such a cost-pressured environment, the challenge, as our survey has shown, is on maintaining long-term strategy while still making necessary short-term cost cuts. "The industry needs to maintain a medium term outlook, whilst not taking its eyes off the short-term position", said DNV GL's Bennett. "The industry is correct in focusing on cost saving at the moment, but it also needs to think about how to be sustainable and resilient beyond the two-year horizon. We need to be in a situation where we are replacing reserves, and looking at future industry challenges so that we don't keep going through these boom and bust cycles."

"The winners will be the companies that think ahead," said Lundin Norway's Færøvik. "What we discover in 2016 will not be producing for some time to come. However, you need to have liquidity to think this way, and a number of companies are struggling to find this financing, particularly smaller operators and exploration-only companies."



"The industry is correct in focusing on cost saving at the moment, but it also needs to think about how to be sustainable and resilient beyond the two-year horizon. We need to be in a situation where we are replacing reserves, and looking at future industry challenges so that we don't keep going through these boom and bust cycles."

Graham Bennett, Vice President, DNV GL

Building a robust cost base

"We don't know when the environment will change again," said Færøvik. "Therefore, to be successful in the next 12 months, companies will need to establish a robust cost base."

Dato' Wee of Petronas believes industry cooperation will be critical in making such cuts a reality. "Both IOCs and NOCs will have to try to find the best and cheapest way, and to collaborate with the rest of the industry, particularly in the area of shared innovation, where I think there is still a lot of room for improvement."

Putting safety first

Safety is the watchword for IPIECA's Brian Sullivan when it comes to industry success in 2016. "Safety cannot be compromised when optimizing costs - and this includes everything from human safety to operational risks like oil spills," he said.

DNV GL's Molazemi worries that there are already some early signs that costs have been cut in the wrong areas by some companies. "We can't lose sight of the requirement to make sure assets continue to operate safely," she urged. "Any of these cost savings that these companies are considering would be dwarfed by the costs associated with a major accident. I would encourage the industry to take a step back and ensure that the cuts that they are making at the moment are sustainable." The costs of not addressing this, Molazemi believes, range from a repeat of the boom and bust cycle, to another Macondo-type incident if safety barriers are ignored.

"Both IOCs and NOCs will have to try to find the best and cheapest way, and to collaborate with the rest of the industry, particularly in the area of shared innovation, where I think there is still a lot of room for improvement."

Dato' Wee Yiau Hin, Executive Vice President and CEO,
Upstream, Petronas



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In the oil and gas industry, we enhance safety, increase reliability and manage risks in projects and operations. Our oil and gas experts offer local access to global best practice in every hydrocarbon-producing country. Driven by a curiosity for technical progress, we provide a neutral ground for collaboration; creating competence, sharing knowledge and setting industry standards.

Our independent advice enables companies to make the right choices. Together with our customers, we drive the industry forward towards a safe and sustainable future.