CUSHMAN & WAKEFIELD

CUSHMAN & WAKEFIELD OCCUPIER RESEARCH

Oil: The Commodity We Love to Hate

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EXECUTIVE SUMMARY

Global demand for crude oil has generally kept pace with supply for the better part of the last 35 years. There have been various times, such as the oil glut of the 1980s and the period following the Gulf War, where a supply-demand imbalance occurred, but in general, the world has efficiently produced and consumed oil. That all changed in 2008. Advances in oil and gas production technology — coming mainly from a new combination of horizontal drilling and hydraulic fracturing — brought on a "shale revolution" led by the U.S. that has dramatically altered the supply dynamics in the oil and gas industries. Armed with these new techniques, the U.S. nearly doubled its production of crude oil, from 5 million barrels per day (bpd) in 2008 to 9.4 million bpd in 2015. OPEC and other energy producers rose to meet this challenge, and the fight for market share was on.

Initially, even with the new supply coming online, a rebounding global economy (post-2008 financial crisis) kept global demand for oil on pace with global supply. But with oil prices sitting comfortably at over $100 per barrel from 2011-2013, profits grew, by 27.9% during that short timeframe alone, which brought even more capital investment into the energy sector. Finally, in mid-2014, multiple years of adding new supply combined with a weakening global economic outlook caught commodities markets by surprise. That year, global oil supply exceeded global demand by 900,000 bpd. Annualized, this meant that the world produced 328.5 million barrels of oil that it could not consume that year - a trend that has continued. The global oil glut ultimately triggered a massive price correction, with Brent Crude falling from its 2014 peak of $115.19 per barrel (in the second quarter) to $26.01 in the first quarter of 2016. Although by mid-2016 supply was showing signs of adjusting to the weaker price, the general consensus is that oil prices will remain low for years.

The oil price shock has had a profound impact on global office markets. While the positives from lower oil prices outweigh the negatives in terms of impact on global economic growth, the effects on the office market are more of a mixed bag. Most energy-producing office markets have seen economic slowing and lower occupancy levels, while stronger consumer spending has boosted occupancy virtually everywhere else. Thus, for occupiers, the prolonged oil price rebalancing will create cost saving opportunities in some markets, but rental pressure in others.

In this report we assess how each of the world's major energy cities are performing during this challenging time and provide insights about the office sector fundamentals going forward.

KEY TAKEAWAYS

- The shale revolution has introduced a supply dynamic that will likely result in a lower long-term equilibrium price for oil.
- Baring a production freeze or unforeseen event, oil prices are expected to remain below $60 per barrel through 2017, and most forecast below $70 through 2020.
- The impact of a protracted low oil price scenario is mixed: energy-producing regions struggle while consumers and non-energy producing markets benefit.
- Not all energy-producing markets are created equal. While certain office markets, such as Moscow, Aberdeen, Calgary, and Houston have faced significant headwinds due to the oil shock, others are holding up well, and some are even thriving.
- For occupiers, the prolonged oil price rebalancing will create lease negotiation leverage and cost saving opportunities in some markets, but rental pressure in others.
- With oil prices remaining low, occupiers in many markets will benefit from lower office build-out costs and lower space energy costs.
- The window of opportunity will not remain open for occupiers forever, however. Many energy cities have strong long-term fundamentals, and the energy sector will ultimately recover.

OIL—WHY DO OCCUPIERS EVEN CARE?

Low oil prices — Some positives, but also some negatives

Low oil prices impact office occupiers in a number of ways. The most significant impact is through the channel of increased consumer spending. In the U.S., for example, every one penny decline in gas prices typically boosts aggregated consumer spending by $1 billion over the course of the year. This boost from the consumer typically leads to stronger business profits, which creates jobs and ultimately to increased demand for office space. Since oil prices began falling in the middle of 2014, the world economy has created 32 million net new jobs, seen demand for office space increase by 18%, and watched vacancy rates decline 50-100 basis points, depending on the region. Many other factors impact employment and the office sector, but the decline in costs attributable to lower oil prices certainly has not hurt non-energy companies. This, of course, is a double-edged sword for occupiers. Most occupiers benefit from the increases in business profits related to lower oil prices, but they also face higher real estate costs related to tighter office markets.

Oil also plays a major role in office space construction costs: oil both fuels the transportation of raw materials (steel, concrete, lumbar, glass, etc.) used in new construction and is a direct ingredient in construction products, such as roofing and carpets. Thus, when oil prices go down, the hard costs needed to build a building or fit-out space also decrease, or at least are kept lower. Likewise, energy is also one of the greatest costs in operating a building. According to the Building Owners and Managers Association (BOMA), on average, building owners spend 22% of their operating costs on energy and water. Thus, when oil prices go down, lighting and HVAC costs go down. Depending on the structure of the lease, some occupiers could benefit from these cost savings.

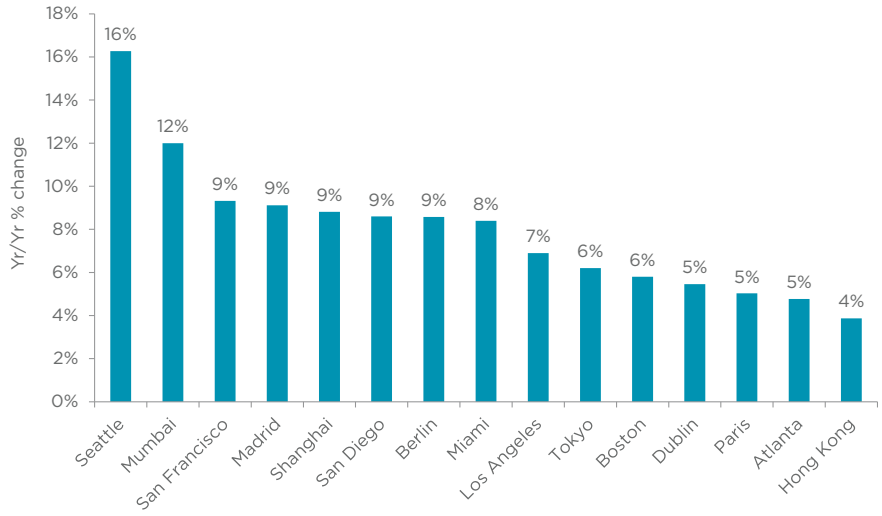
Some occupiers also work in local markets where economic growth is driven primarily by the production of oil. In these oil-centric markets, when oil prices boom, oil company profits soar, city-level economies thrive, incomes rise, and job growth and office absorption increase. When oil prices fall, these markets typically struggle — which translates to opportunities for occupiers.

Oil-centric cities—Some hit hard, others show resilience

Overall, the plunge in oil prices has been a net negative on the world's largest energy-producing markets. As a group, these markets are experiencing slower economic growth, slower job creation, and weaker office sector fundamentals. However, the impact varies greatly from one city to the next. Thus far, markets hardest hit by the oil shock include Moscow, Aberdeen, Calgary, and Houston. But even within these four markets are significant differences with respect to each one's health. Moscow, for example, has fallen into a deep recession, with 117,500 jobs lost and office rents a third lower since oil prices began to descend. In comparison, Houston's economy has slowed, but is also proving to be far more resilient. Midway through 2016, Houston was still creating jobs and actually absorbing office space (337,000 square feet (sq ft) year-to-date). Part of the reason Houston is holding up reasonably well is that the local economy has diversified greatly over the years, with more economic contributions coming from non-energy sectors (e.g. education, healthcare, retail, professional business services). During the last major oil downturn, in the 1980s, the oil and gas sector employed nearly two-thirds of all the people who worked in Houston (including upstream and downstream related industries). As the oil price correction hit this time around, that number was closer to 17%.

STRONG RENT GROWTH IN MOST NON OIL-CENTRIC OFFICE MARKETS

Yr/Yr % Chg. (Q2 16/Q2 15)



Source: Cushman & Wakefield Research

Outside of these hardest hit markets, most of the energy cities have more diverse economies, and are therefore performing much like other healthy office markets around the world. For example, Denver, CO is an oil-centric city but it also has many thriving industries (tech, tourism, professional services). As a result, Denver has seen its vacancy rate improve from 12.8% mid-2014 (when oil prices were booming) to 11.4% mid-2016 (post oil price correction). Since mid-2014, the Denver office market has absorbed 3.6 million square feet (msf) and has seen rents grow by 13%.

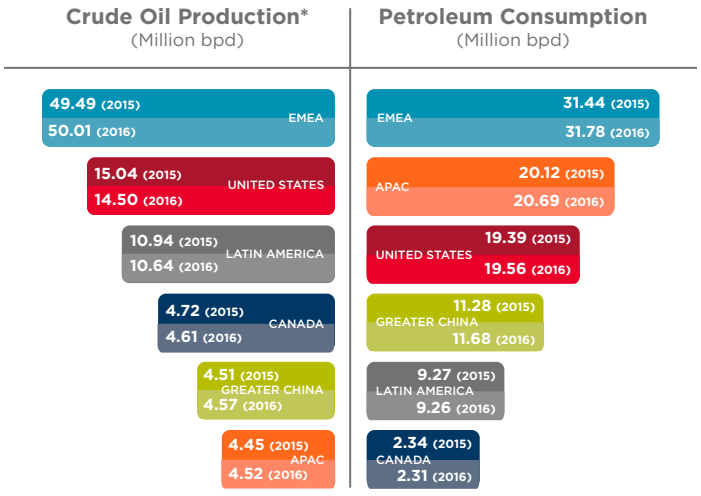
LATEST INDUSTRY DEVELOPMENTS

Oil price—Finally showing signs of firming

Over the course of the first half of 2016, Brent crude saw its price rebound from a low of $26 per barrel in January to over $52 per barrel at the beginning of June. Since then, oil prices have bumped around and, as of this writing in September, were currently hovering around $45 per barrel.

The oil market continues to be subjected to abundant supply, an excess of refined products, and a waning outlook for the global economy. Recent crude build in the U.S. and production resumption in Canada and Nigeria means the re-balancing of global oil market supply/demand is now a more distant prospect. In July, OPEC production reached 33.2 million bpd from a revised 33.3 million bpd in June. In addition, following an agreement between the UN-backed government and an armed force, Libya said its state oil company would reopen oil ports in the country, and that it would act quickly to resume exports. Libya is looking to increase exports to 900,000 bpd by the close of 2016. Finally, drillers have continued to add oil rigs in the U.S. As of August 12, U.S. drillers had 481 oil rigs in production, up 17 from the prior count but still down 403 from the same time last year.

GLOBAL OIL PRODUCTION AND CONSUMPTION BY REGION (2015/2016)

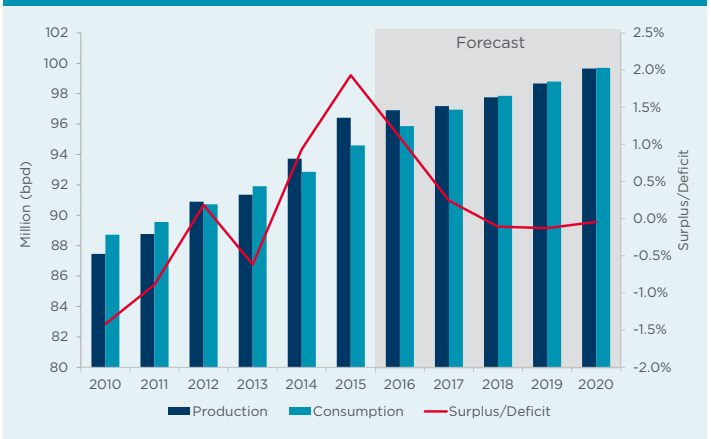


Note: Production includes OPEC and non OPED countries. Consumption includes OECD countries.

*Crude includes lease condensates.

Source: EIA, Cushman & Wakefield Research

GLOBAL OIL PRODUCTION AND CONSUMPTION 2010 - 2020



Source: EIA, IEA, Cushman & Wakefield Research

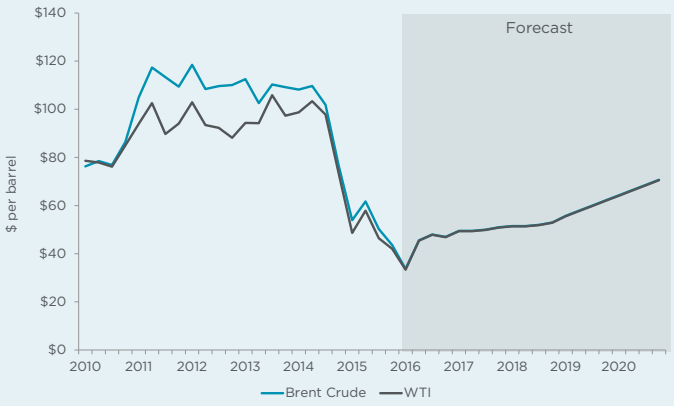
Oil prices will remain low

As oil production has recently increased, demand growth has weakened slightly. In Europe, Brexit dampened the outlook for economic growth in the UK, while in Asia, Japanese manufacturing activity contracted in July, with new export orders falling by the sharpest amount in more than three and a half years. Moreover, China's economy is slowing; however, with policy loosening, growth should remain stable in the near-term. Along with steady demand from the rest of Asia and other emerging markets, this stability should buoy global demand for oil for the rest of 2016. Nevertheless, according to the EIA, global supply of oil will continue to exceed demand in 2016 and 2017, before evening out in 2018. Although oil price forecasts vary, in general they are expected to remain below $60 per barrel through 2017, and most forecast below $70 through 2020.

Profitability to improve but remain low

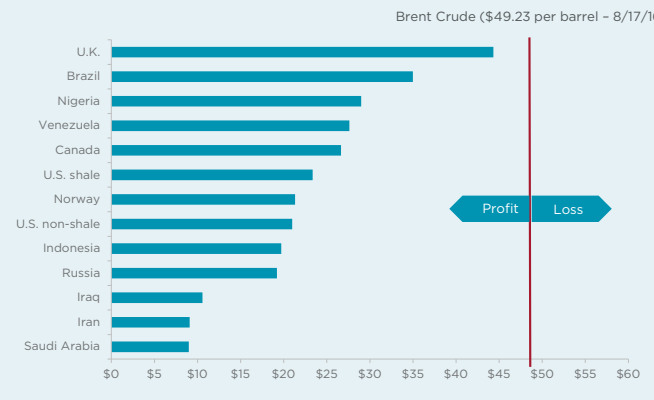
Low oil prices, coupled with stable extraction costs, transportation costs, and taxes on profits have resulted in the erosion of net profits for oil companies since the $100 per barrel oil price high in July 2014. As prices slowly improve, profitability should also improve, but remain low. On a country basis, the UK currently is the most expensive place to produce oil. This is due to the offshore, deep-water location of most wells as well as an aging infrastructure requiring much maintenance. Saudi Arabia, however, remains the most inexpensive place to extricate crude oil because fields are sizable, on land, and lie close to the surface. The breakeven point for most oil production globally is roughly $50 per barrel, so as oil prices rise to this level — as we are seeing now — drillers begin to return, which boosts supply again and places downward pressure on pricing.

GLOBAL OIL PRICE



Source: EIA, EIU, Chicago Mercantile Exchange, Haver Analytics, Cushman & Wakefield Research

OIL PRODUCTION COST & BREAKEVEN POINT August 2016, $ Per Barrel



Source: The Wall Street Journal, Cushman & Wakefield Research

WHERE ARE THE ENERGY-CENTRIC MARKETS?

Top 100 companies—Lion's share located in the US

Prior to the recent collapse in oil prices, increased profitability encouraged an oil-drilling fest in the U.S., particularly shale drilling in areas such as Texas and North Dakota. This resulted in a more energy independent country set to surpass Saudi Arabia as the top country producer globally. By the end of 2015, the outright largest global oil production company was Saudi Aramco, followed by Gazprom and National Iranian Oil. Of the top 100 global energy companies, 39 firms are headquartered in the U.S. Of these, 10 are in Houston, including Phillip 66, ConocoPhillips, and Enterprise Products Partners. Outside the U.S., Moscow, London, Beijing, Singapore, Mumbai, Kuala Lumpur, Jakarta, Perth, Caracas, Bogotá, and Rio de Janeiro are other examples of global cities that are centers for oil company headquarters.

Two city subcategories—Energy-dependent and corporate hubs

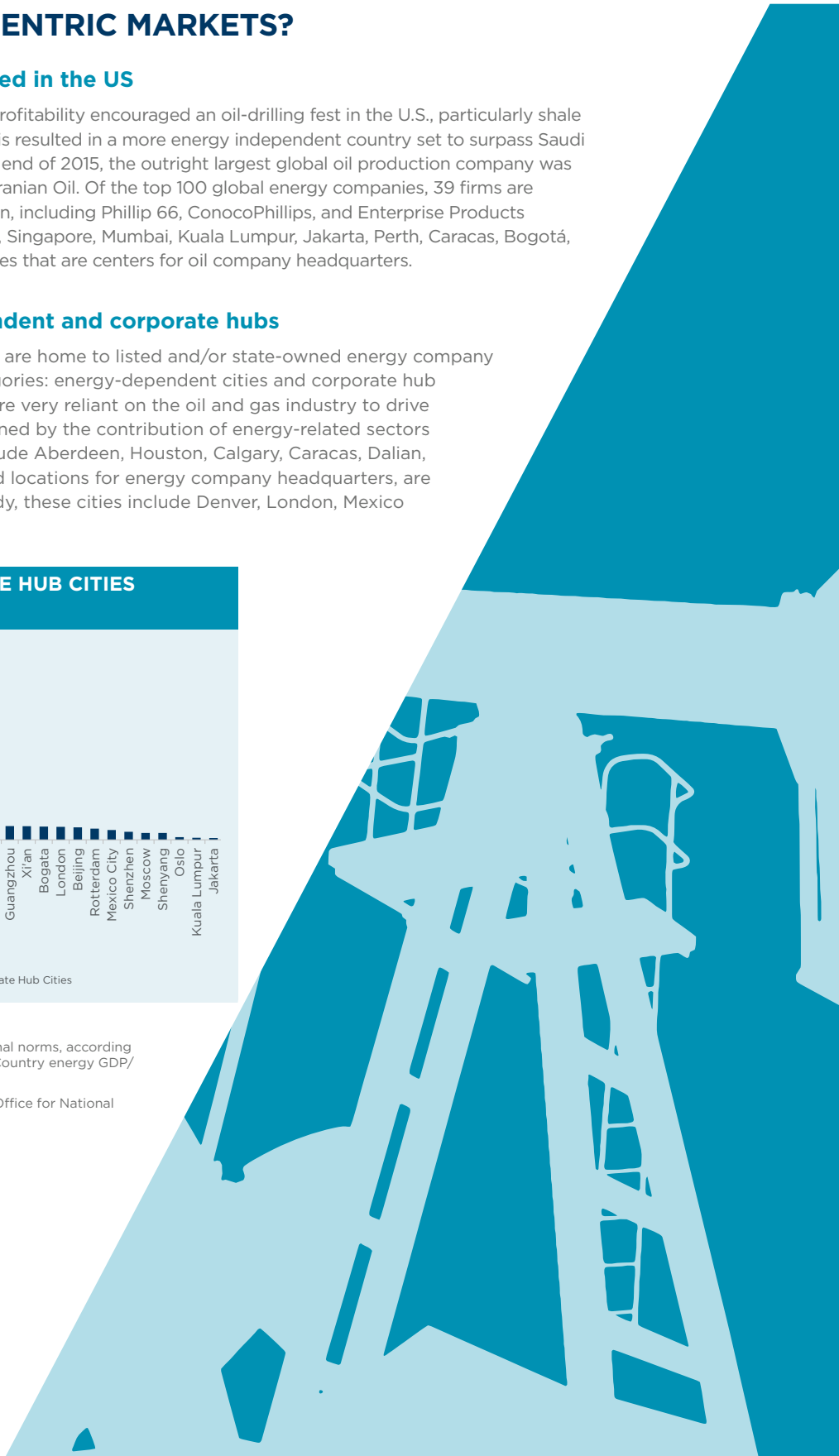
Our select group of energy-centric cities — which are home to listed and/or state-owned energy company headquarters — can be divided into two subcategories: energy-dependent cities and corporate hub cities. The energy-dependent cities in our study are very reliant on the oil and gas industry to drive their economies and property sectors, as determined by the contribution of energy-related sectors to the broader local economy. Example cities include Aberdeen, Houston, Calgary, Caracas, Dalian, and Perth. Corporate hub cities, which are favored locations for energy company headquarters, are noticeably less reliant on the oil sector. In our study, these cities include Denver, London, Mexico City, Beijing, and Singapore.

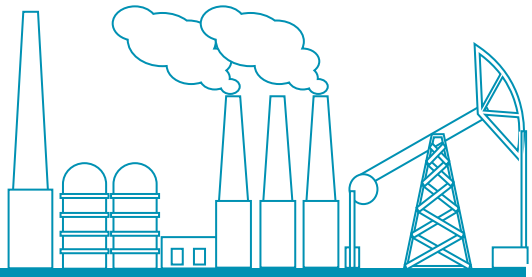
ENERGY-DEPENDENT CITIES/CORPORATE HUB CITIES
City Level Energy GDP Quotient (2015)

Note 1: Energy includes mining, quarrying and utilities

Note 2: The city level quotient evaluates city energy GDP to national norms, according to the following calculation: (City energy GDP/City total GDP) / (Country energy GDP/ Country total GDP)

Source: Oxford Economics, National Bureau of Statistics (China), Office for National Statistics (UK), Cushman & Wakefield Research





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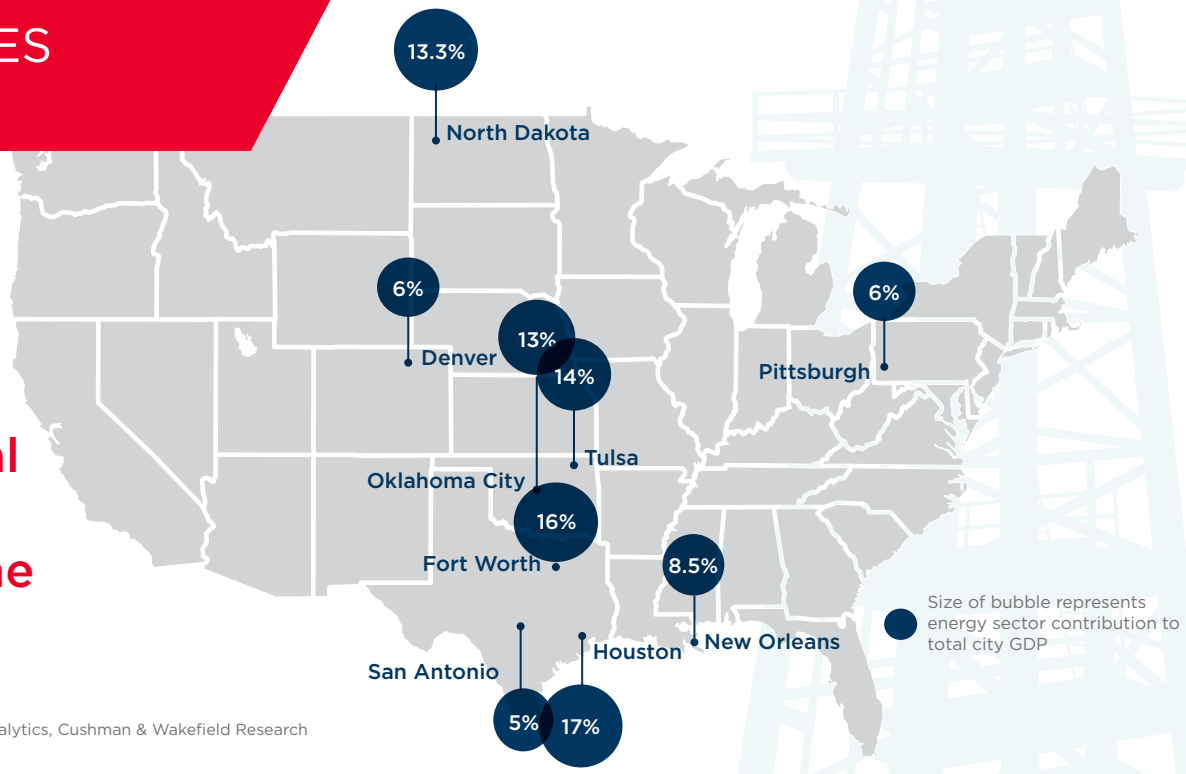
TOP 100 LISTED ENERGY COMPANIES

United States	Exxon Mobil Corp. Chevron Corp. Phillips 66 ConocoPhillips Valero Energy Corp. Marathon Petroleum Corp. Enterprise Products Partners LP EOG Resources, Inc. NextEra Energy, Inc. Southern Co. Edison International Exelon Corp. PG&E Corp. Entergy Corp. American Electric Power Co, Inc. Duke Energy Corp. Tesoro Corp. Public Service Enterprise Group Inc. Devon Energy Corp. Hess Corp.	Chesapeake Energy Corp. Williams Companies, Inc. PPL Corp. Plains All American Pipeline, LP Consolidated Edison, Inc. Sempra Energy DTE Energy Co. Dominion Resources Inc. Spectra Energy Corp. Xcel Energy Inc. Noble Energy Inc. Murphy Oil Corp. Calpine Corp. Kinder Morgan, Inc. Energy Transfer Equity, LP Pioneer Natural Resources Co. The AES Corp. Marathon Oil Corp. Continental Resources, Inc.
China	CNOOC Ltd PetroChina Co., Ltd China Shenhua Energy Co., Ltd China Petroleum & Chemical Corp. Huaneng Power International, Inc.	CLP Holdings Ltd China Resources Power Holdings Co., Ltd Zhejiang Zheneng Electric Power Co., Ltd Huadian Power International Corp., Ltd GD Power Development Co., Ltd
Canada	Canadian Natural Resources Ltd Suncor Energy Inc. Ecana Corp. Husky Energy Inc.	Enbridge Inc. TransCanada Corp. Cenovus Energy Inc.
Russia	OJSC Rosneft Oil Co. OJSC Surgutneftegas OJSC LUKOIL Oil Co.	OAO Tatneft Oil Transporting JSC Transneft OJSC Gazprom
India	Reliance Industries Ltd Oil & Natural Gas Corp. Coal India Ltd	NTPC Ltd Bharat Petroleum Ltd Indian Oil Corp. Ltd
UK	National Grid plc SSE plc	BP p.l.c
Spain	Respol,SA Iberdrola, SA	Gas Natural SDG SA
Italy	Eni SpA Enel SpA	Snam SpA
France	Electricite de France SA Total SA	Engie SA
Poland	Polska Grupa Energetyczna SA	Polskie Gornictwo Naftowe | Gazownictwo
Japan	Tokyo Electric Power Co., Inc.	Tokyo Gas Co Ltd
Other	Argentina: YPF SA Australia: Woodside Petroleum Ltd Brazil: Companhia Energetica de Minas Gerais SA Chile: Empresas Copec SA Colombia: Ecopetrol SA Czech Republic: CEZ, a.s. Finland: Fortum Oyj Germany: RWE AG	Netherlands: Royal Dutch Shell plc Malaysia: Tenaga Nasional Berhad Combo Norway: Statoil ASA Portugal: EDP- Energias de Portugal , SA Saudi Arabia: Saudi Electricity Co. South Africa: Sasol Ltd South Korea: Korea Electric Power Corp. Thailand: PTT Plc

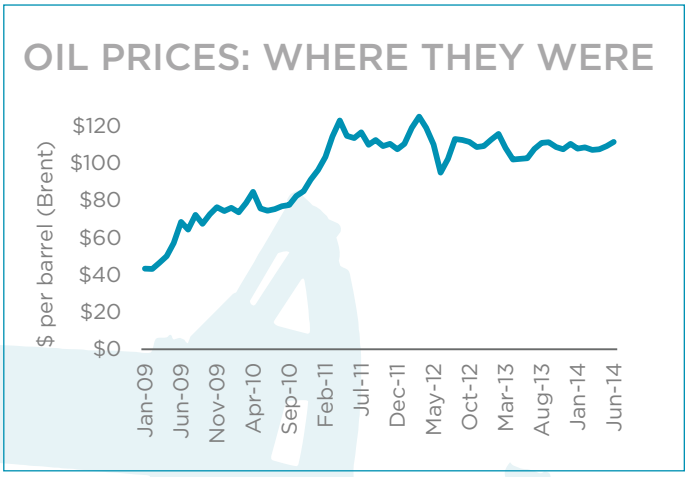
Source: Platts Top 250 Global Energy 2015, Cushman & Wakefield Research

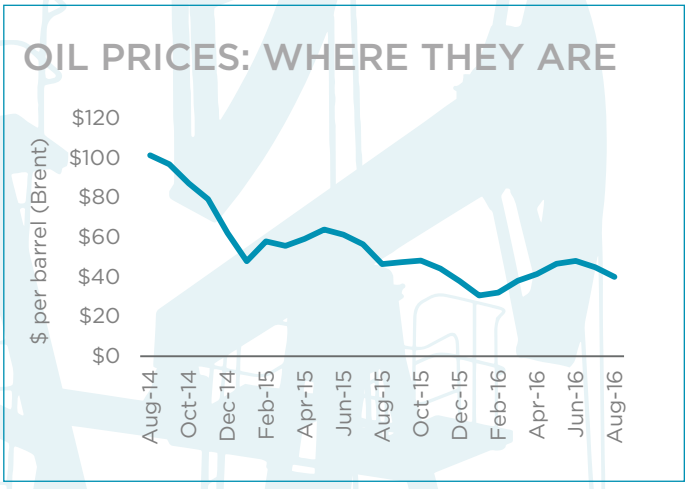
UNITED STATES



13.9% of global oil production comes from the United States.

Source: Oxford Economics, BP, Moody's Analytics, Cushman & Wakefield Research





Source: EIA, Cushman & Wakefield Research

Top Energy Markets - Oil Price Boom

	Total Employment Growth Ranking (# Jobs)*	Total Employment Growth Ranking (% Change)*	Vacancy Rate Ranking (65 top cities) Q2 14	Rent Growth Ranking (65 top cities) Q1 09 - Q2 14
Denver	13	27	25	29
Fort Worth	23	41	28	12
Houston	2	16	20	19
New Orleans	48	126	14	16
North Dakota	25	4	2	13
Oklahoma City	36	63	26	25
Pittsburgh	41	227	5	20
San Antonio	22	24	39	15
Tulsa	69	180	45	10

*(390 Cities) 2009-2014

Top Energy Markets - Oil Price Correction

	Total Employment Growth Ranking (# Jobs)*	Total Employment Growth Ranking (% Change)*	Vacancy Rate Ranking (65 top cities) Q2 16	Rent Growth Ranking (65 top cities) Q2 14 - Q2 16
Denver	12	39	24	16
Fort Worth	38	203	28	30
Houston	84	315	57	10
New Orleans	132	286	19	49
North Dakota	390	386	3	34
Oklahoma City	139	298	53	27
Pittsburgh	387	347	12	65
San Antonio	33	33	45	38
Tulsa	386	362	58	62

*(390 Cities) 06/30/15-06/30/16

Source: U.S. Bureau of Labor Statistics, CoStar, Cushman & Wakefield Research

The world's largest consumer

The United States has been the world's largest oil consumer for decades. It currently consumes roughly 19.4 million bpd. As recently as 2008, two-thirds of that demand was met by imports. However, since then, the U.S. has seen a production surge as hydraulic fracturing technology allowed producers to tap into shale oil reserves and nearly double domestic output. While recent oil price declines have led to lower output, U.S. oil production remains near record highs.

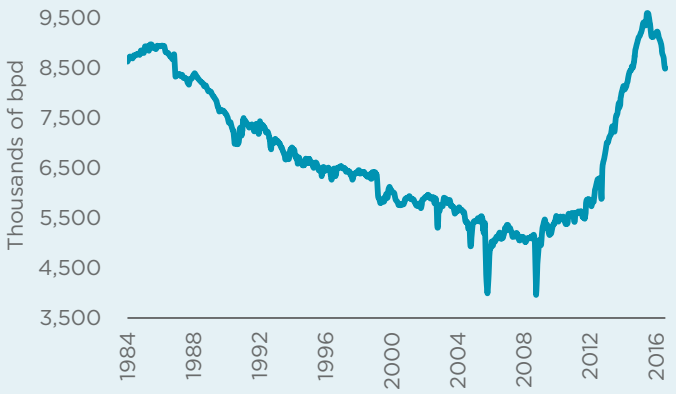
Clustered in Southwest

The U.S. oil industry is concentrated in the Southwest part of the country — along the Gulf of Mexico coast from Louisiana to Texas, and north from Texas into Oklahoma. As these regions became centers for production, imports and refining, cities in the area — led by Houston, Texas and Oklahoma City, Oklahoma — became the major oil centers in the U.S. The energy industry accounts for between 13% and 17% of all economic activity in each of these cities. In addition, the shale oil revolution has generated oil booms in areas near large shale deposits, such as Denver, North Dakota and Pittsburgh.

Boom times during price surge; slowdown since 2014

During the production surge of 2009 to 2014, U.S. oil centers were among the best-performing office markets in the nation. In five of the top ten job growth cities in the nation in that timeframe, energy played a major role, and those markets experienced strong absorption of space, declining vacancy rates, and rising rents. They also saw building booms — by mid-2014, buildings under construction in those U.S. oil centers accounted for 2.8% of inventory, double the 1.4% national average. In Houston, new construction accounted for more than 5% of U.S. inventory. But as oil prices began to fall, these markets felt the impact as that new, "production-surge" construction was delivered and demand slowed. Today, oil-centric markets in the U.S. register some of the highest vacancy rates in the nation. Office markets in energy-centric metros with more diverse economies — Dallas and Denver — have held up much better.

U.S. OIL PRODUCTION

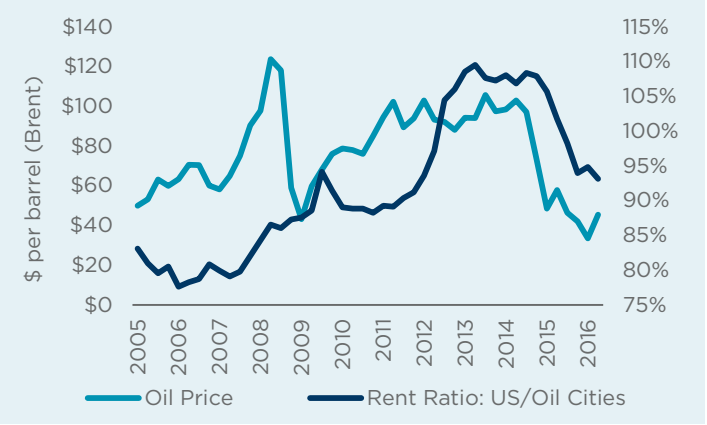


Source EIA, Cushman & Wakefield Research

U.S. NATURAL GAS PRICE

Source: International Monetary Fund, Cushman & Wakefield Research

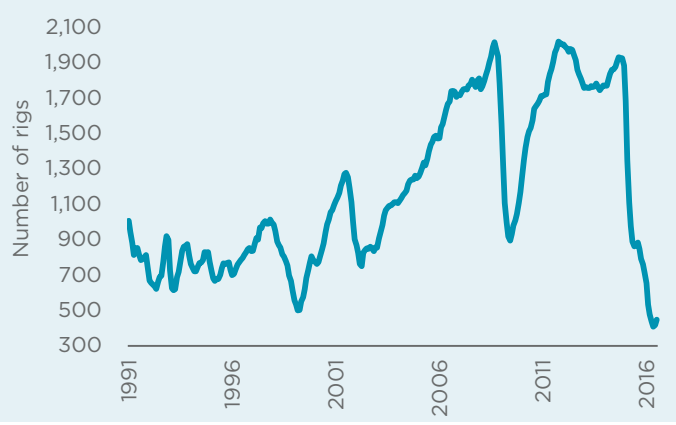
OIL PRICE VS. OIL CITY VACANCY RATIO



Note: Vacancy Ratio is U.S. vacancy/oil city vacancy. A rising ratio means that oil cities are doing better than the U.S. as a whole

Source: EIA, Cushman & Wakefield Research

RIG COUNT



Source: Baker Hughes, Cushman & Wakefield Research

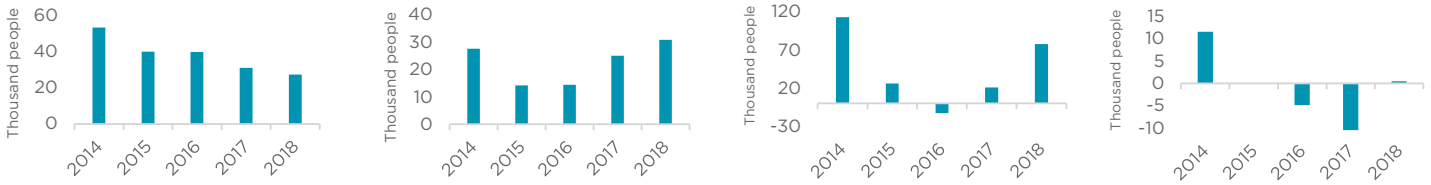
UNITED STATES

MARKET INDICATORS

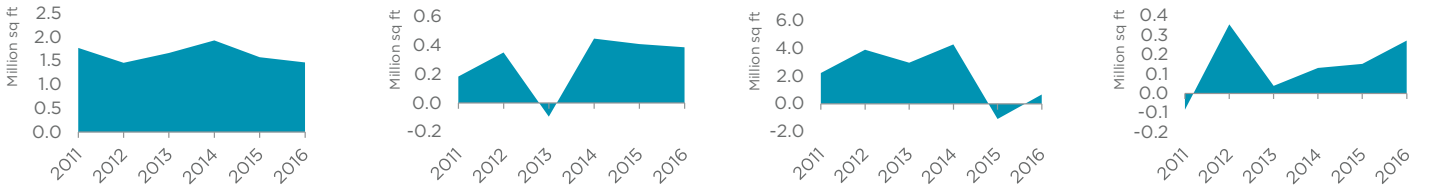
MARKETS

DENVER	FORT WORTH	HOUSTON	NEW ORLEANS

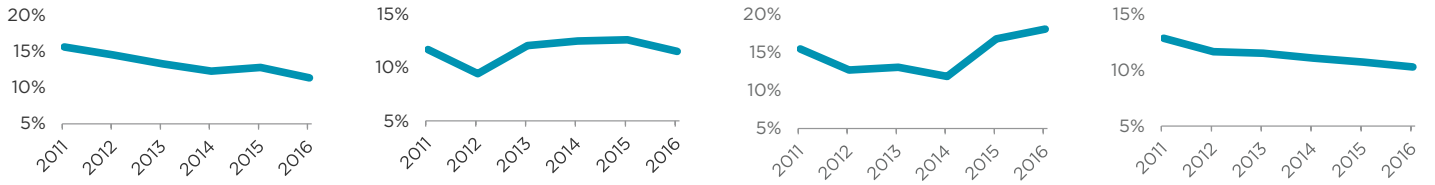
Job Growth



Office Absorption



Office Vacancy



Rent Growth (Q2 15 - Q2 16)

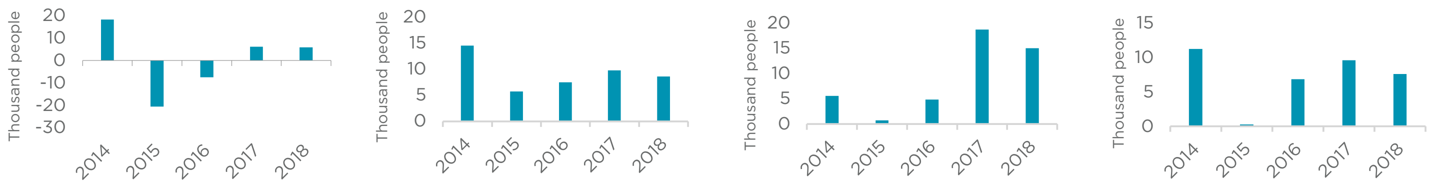
Landlord/Tenant (Q2 16) (→ 5 year average availability ratio)

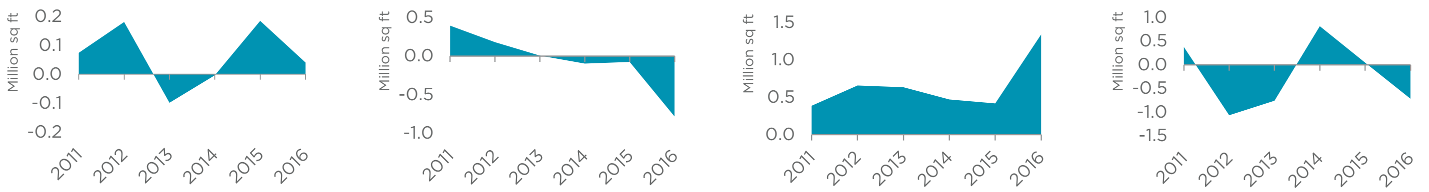
Rent Growth Forecast (Q2 16 - Q2 17)

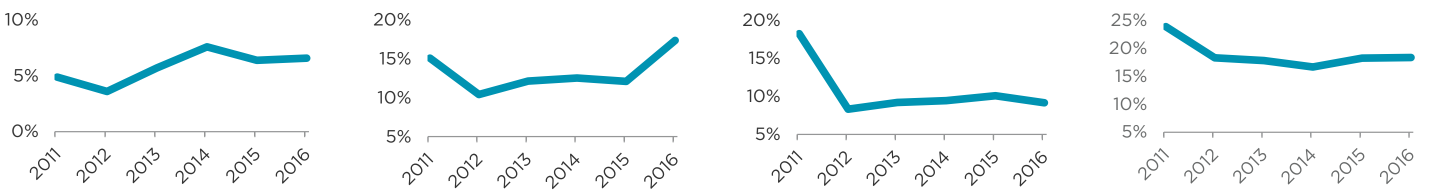
Pipeline (Completions - Q2 16 - Q4 18)

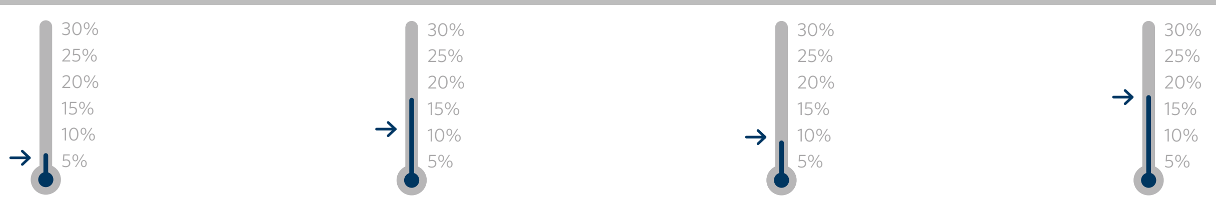
Source: Moody's, U.S. Bureau of Labor Statistics, Cushman & Wakefield Research

NORTH DAKOTA	OKLAHOMA CITY	PITTSBURGH	TULSA



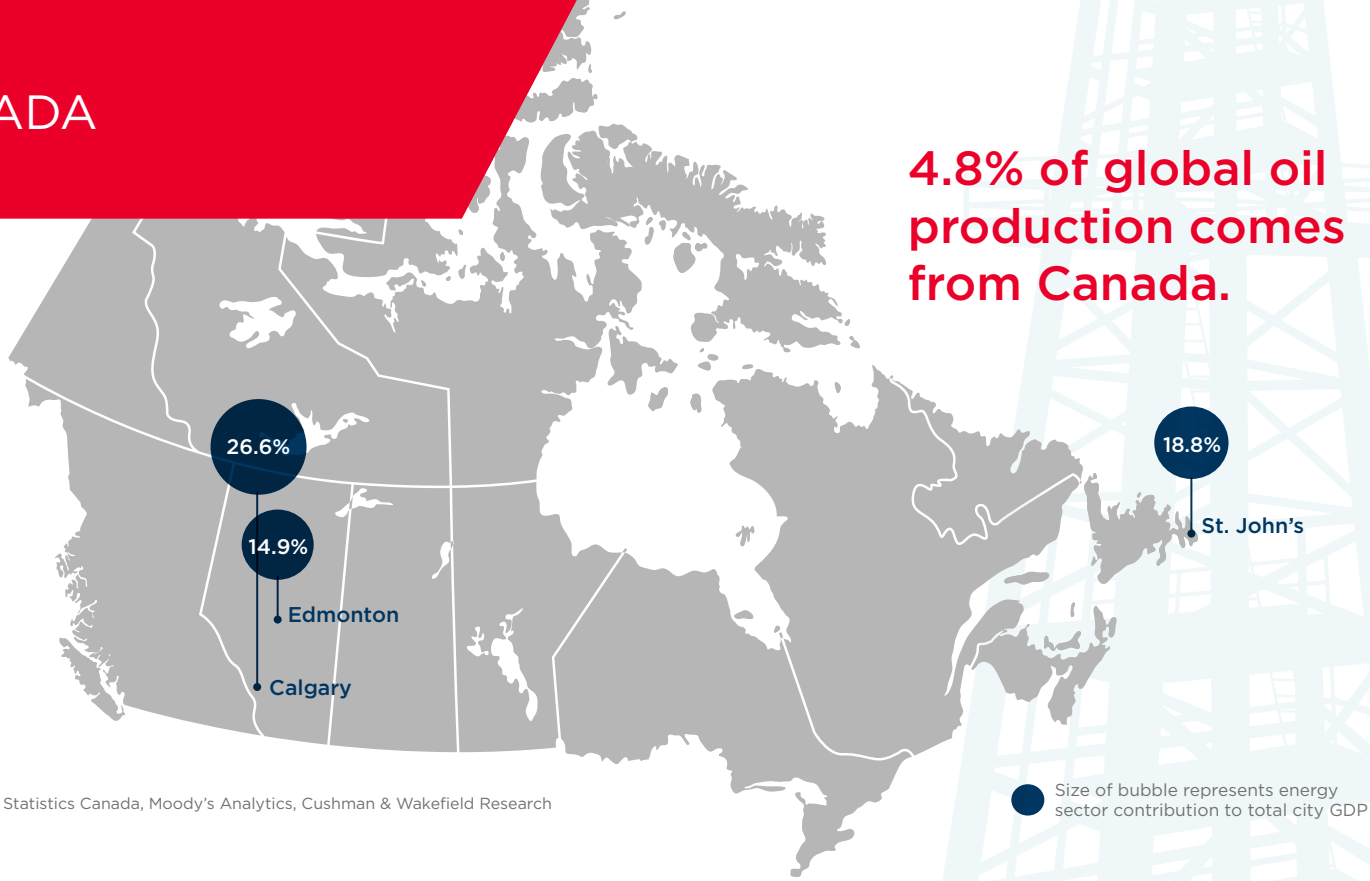






CANADA

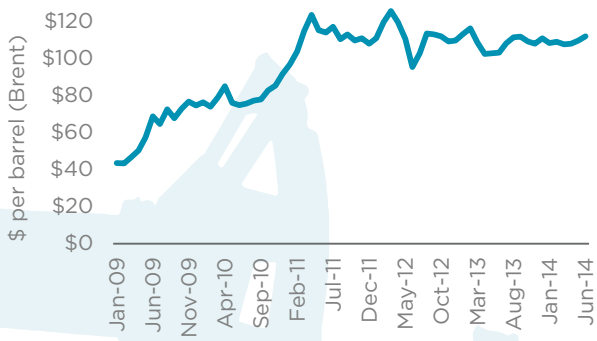
4.8% of global oil production comes from Canada.



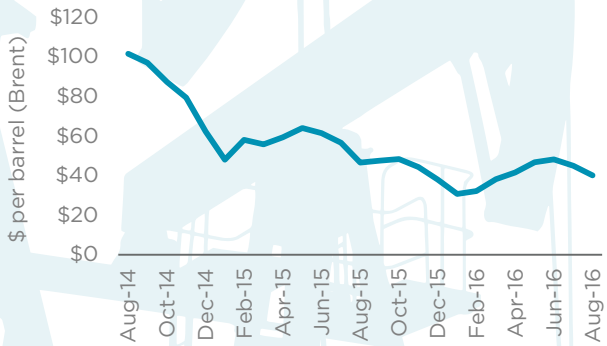
Source: EIA, BP, Statistics Canada, Moody's Analytics, Cushman & Wakefield Research

Size of bubble represents energy sector contribution to total city GDP

OIL PRICES: WHERE THEY WERE



OIL PRICES: WHERE THEY ARE



Source: EIA, Cushman & Wakefield Research

Top Energy Markets - Oil Price Boom

	Job Growth Ranking*	Vacancy Rate Ranking (12 Cities) Q2 14	Rent Growth Ranking (12 Cities) Q1 09 - Q2 14
Calgary	3	2	2
Edmonton	2	7	12
St. John's	1	1	1

* (12 Cities) 01/01/09-12/31/13

Top Energy Markets - Oil Price Correction

	Job Growth Ranking*	Vacancy Rate Ranking (14 Cities) Q2 16	Rent Growth Ranking (14 Cities) Q2 14 - Q2 16
Calgary	8	12	14
Edmonton	4	7	10
St. John's	11	10	9

* (13 Cities) 01/01/14-12/31/15

Source: Statistics Canada, Cushman & Wakefield Research

Energy-producing provinces feel the pinch

Canada's mighty resource sector accounts for almost one-fifth of the country's GDP and about 1.8 million jobs. Ranked fifth in the world in oil production, Canada produces 3.9 million bpd, 97% of which is from Alberta, Manitoba, and Newfoundland and Labrador. Alberta is the leading producer, responsible for almost 80% of the country's total output. Not surprisingly, the oil shock and sustained low prices have weighed heavily on the most exposed office markets of Calgary, Edmonton, and St. John's.

Taking a heavy toll on Alberta

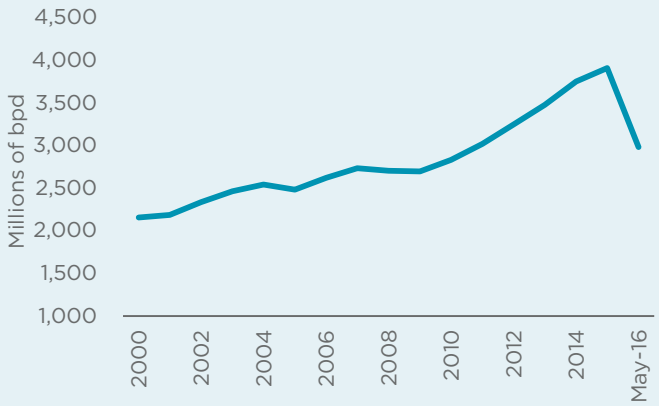
Calgary is home to most of Canada's heavyweight oil and gas companies, including EnCana, Husky Energy, and Suncor Energy. Since late 2014, roughly 46,000 jobs have been eliminated in Alberta due to the oil shock, and Calgary's CBD office sector has seen 4.3 msf of space returned to the market. Prior to the oil price bust, Calgary boasted the highest 15-year CBD office growth rate in the country, with 750,000 sq ft absorbed per year. With 2.7 msf of new developments underway, the availability rate in Calgary's premium class A CBD buildings is projected to reach around 27.5% by late 2017.

While Edmonton's CBD office market has the advantage of few significant oil tenancies, energy continues to be a key driver of the city's economy. Government is a major occupier of space, and both the federal and provincial levels have been grappling with serious shortfalls in oil and gas tax revenues since late 2014. Against weak demand and 1.7 msf of new development in the CBD, availability is projected to register 21.2% by Q4 2018.

St. John's—Weathering the storm

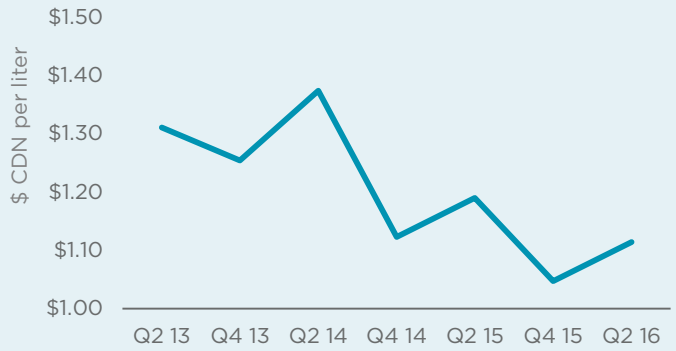
Three billion barrels of oil and 11 trillion cubic feet of natural gas have been discovered in Newfoundland and Labrador, and 200,000 bpd is currently being produced from offshore projects Hibernia, Terra Nova, and White Rose, with Hebron under development. The economic contraction that impacted the St. John's office market in 2015 was due to both a 20% drop in oil production and lower oil prices. While its CBD office market has seen a huge slowdown in momentum, most energy tenants are service-related, and a large proportion of them have recently renewed their space commitments — a event which will stabilize this market. The desire for quality space has kept Class A availability at 8.8%, although space returning to market will push it to 19.8% by Q4 2017.

CANADIAN OIL PRODUCTION



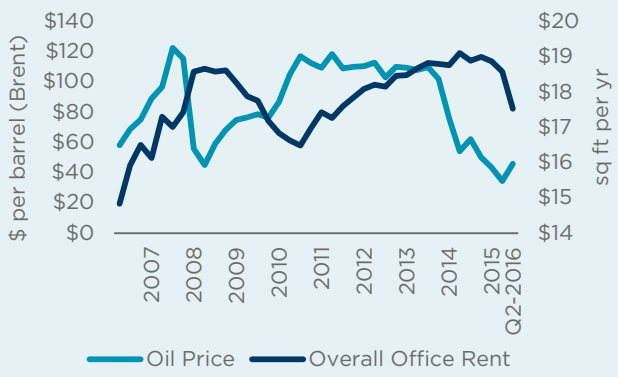
Source: National Energy Board, Cushman & Wakefield Research

CANADIAN GAS PRICE



Source: National Energy Board, Cushman & Wakefield Research

OIL PRICE VS. CANADIAN RENT CORRELATION



Source: EIA, Cushman & Wakefield Research

CANADIAN EMPLOYMENT - OIL, GAS, & PIPELINE SECTORS

Source: Statistics Canada, Cushman & Wakefield Research

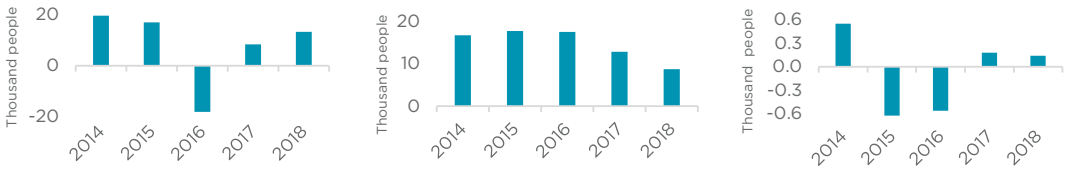
CANADA

MARKET INDICATORS

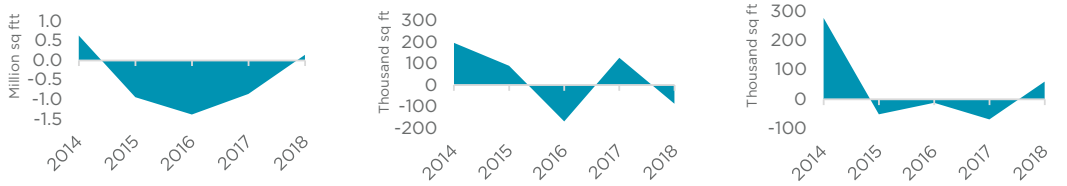
MARKETS

CALGARY	EDMONTON	ST. JOHN'S

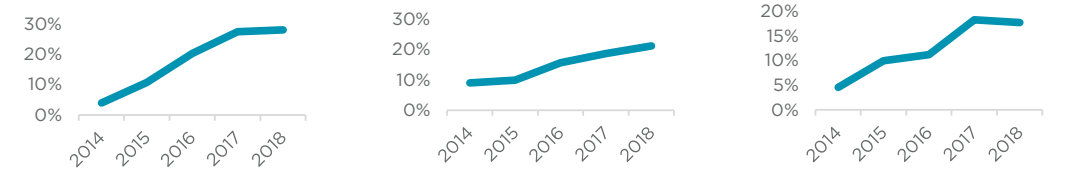
Job Growth



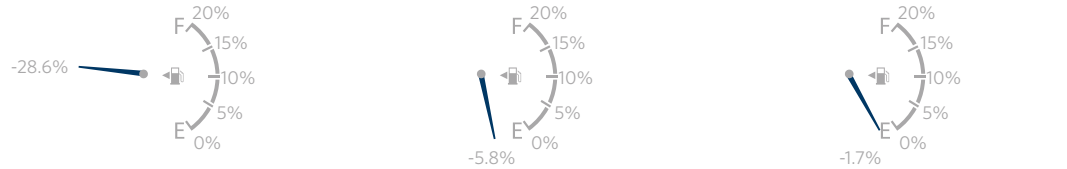
CBD Class A Office Absorption



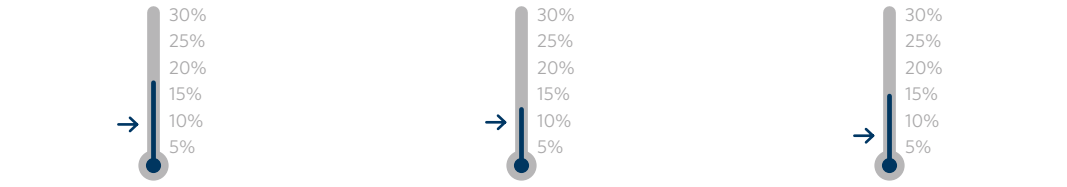
CBD Class A Office Vacancy



Rent Growth (Q2 15 - Q2 16)



Landlord/Tenant (Q2 16) (→5 year average availability ratio)

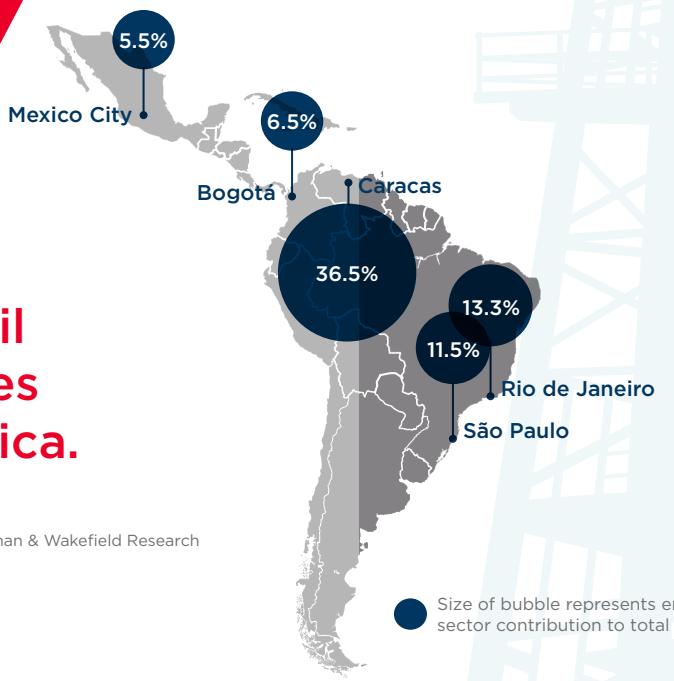


Rent Growth Forecast (Q2 16 - Q2 17)

Pipeline (Completions - Q2 16 - Q4 18)

Source: Oxford Economics, Moody's, City Statistics Bureau, Cushman and Wakefield Research

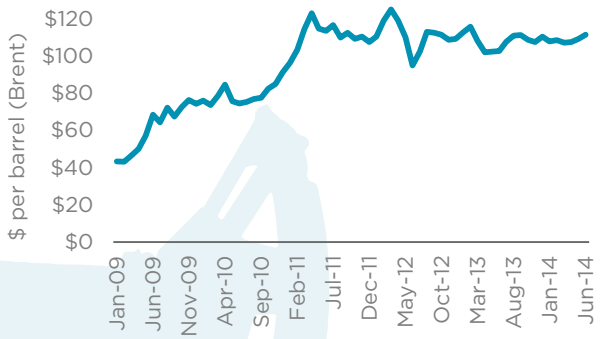
LATIN AMERICA



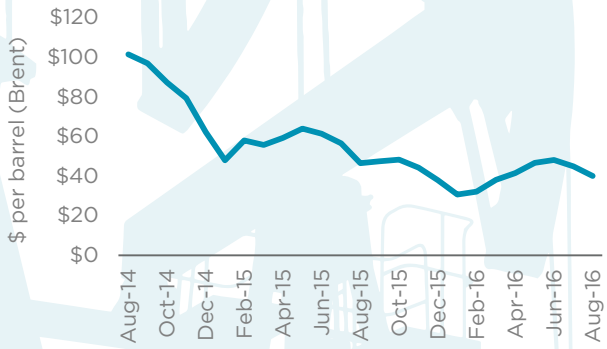
11.2% of global oil production comes from Latin America.

Source: EIA, BP, National Statistics Bureaus, Cushman & Wakefield Research

OIL PRICES: WHERE THEY WERE



OIL PRICES: WHERE THEY ARE



Source: EIA, Cushman & Wakefield Research

Top Energy Markets - Oil Price Boom

	Employed Population Ranking*	Job Growth Ranking*	Vacancy Rate Ranking (5 cities) Q2 14	Rent Growth Ranking (5 cities) Q1 09 - Q2 14
Bogotá	3	2	1	4
Caracas	12	22	2	5
Mexico City	2	17	3	3
São Paulo	1	18	5	2
Rio de Janeiro	5	14	4	1

*(28 cities) 01/01/09-12/31/13

Top Energy Markets - Oil Price Correction

	Employed Population Ranking*	Job Growth Ranking*	Vacancy Rate Ranking (5 cities) Q2 16	Rent Growth Ranking (5 cities) Q2 14 - Q2 16
Bogotá	1	8	1	1
Caracas	5	6	3	2
Mexico City	18	24	2	3
São Paulo	26	26	4	5
Rio de Janeiro	27	27	5	4

*(28 Cities) 01/01/14-12/31/14

Source: Oxford Economics, Cushman & Wakefield Research

A diverse set of oil producers

Economic growth related to the oil industry has varied across Latin America due to the different political structures and economic conditions in the region's countries. Between 2006 and 2013, strong growth in the energy sector supported the broader economic growth enjoyed by the top four oil producing countries in Latin America — Brazil, Colombia, Mexico, and Venezuela. Population and economic growth led to increasing demand for oil products in other countries in the region. On the supply side, Brazil and Colombia experienced robust development during the same period, and favorable investment terms from oil companies led to increased production. Note that Mexico and Venezuela are important sources of crude oil for the United States, but their oil industries are government-dominated. Those governments limited the amount of reinvestment into exploration, production, and refining, which eventually resulted in output declines.

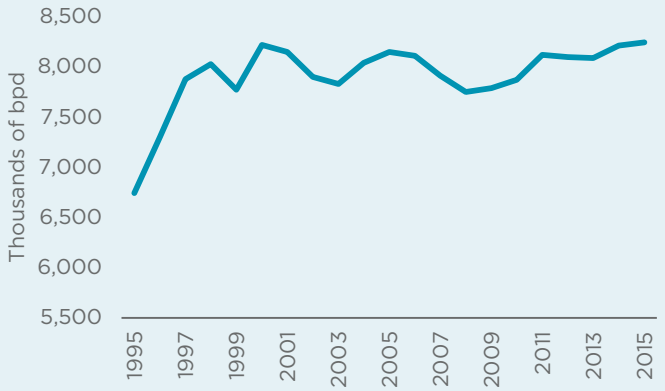
Caracas, Mexico City, Bogotá and Rio office markets – Oil influenced

Of the top four oil countries in Latin America, Brazil and Colombia have the largest number of foreign companies that own domestic oil assets. In Venezuela, international firms account for only a 35% share of oil leases. Mexico only opened up its government monopoly-led oil industry beginning in 2014. Of the major Latin American oil-centric metro markets, Caracas has an office market that is highly influenced by the oil industry, while office markets in Mexico City and Bogotá are impacted to a lesser degree. São Paulo, a business powerhouse in Brazil, is home to a number of oil-related companies, but the lion's share of oil firms are based in Rio de Janeiro, which is closer to the country's largest producing fields.

Oil is not what it used to be, except in Venezuela

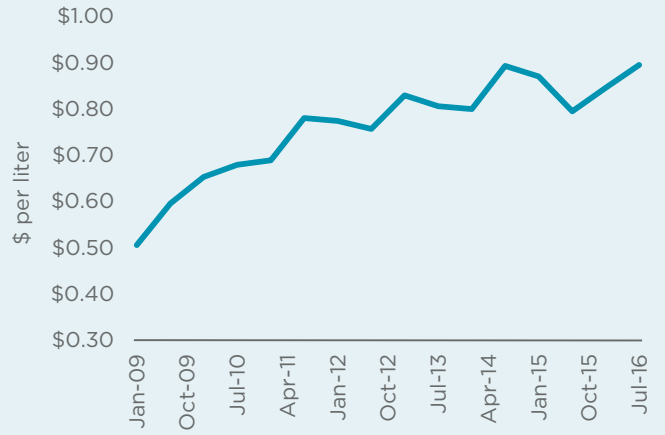
Currently, Mexico and Brazil have complex and diversified economies with employment growth correlating primarily to manufacturing and services. Mexico City's employment base is spread across a number of industries other than oil, especially financial services. Rio de Janeiro boasts a sizable oil industry, but São Paulo's economy is more about manufacturing and the financial services sector. Meanwhile, Bogotá is enjoying strong growth due to macroeconomic stability strong enough to overcome a weaker oil export value. Caracas, however, sits apart as its economy is dominated by oil. The negative impact of low oil prices on this city's office market has been compounded by the catastrophic mismanagement of the overall economy in Venezuela.

LATIN AMERICA OIL PRODUCTION



Source: EIA, Cushman & Wakefield Research

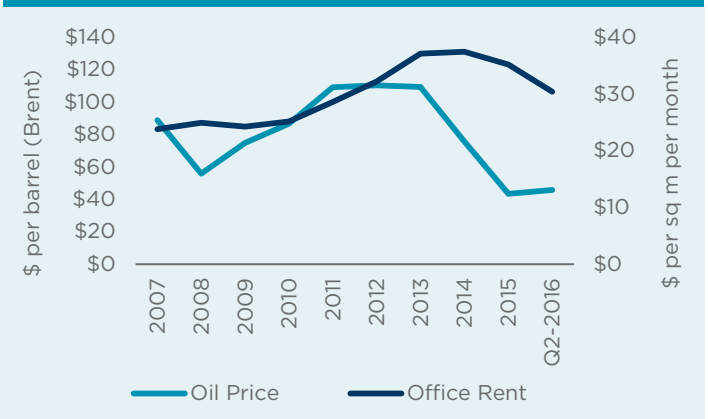
LATIN AMERICA GAS PRICE



Note: Price represents the average price for Venezuela, Colombia, Brazil, and Mexico

Source: World Bank, Colombian Oil and Gas Information System, Brazilian National Agency for Oil, Mexican National Oil Company (Pemex), Cushman & Wakefield Research

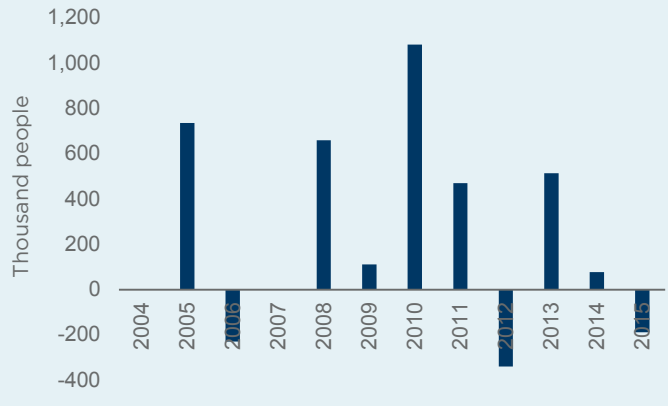
OIL PRICE VS. LATIN AMERICA RENT CORRELATION



Note: Rental is average rent for the five tracked oil markets in Latin America

Source: EIA, Cushman & Wakefield Research

LATIN AMERICA EMPLOYMENT, ANNUAL GROWTH



Note: Employment figures are the sum of the five tracked oil markets

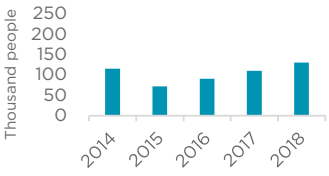
Source: National Statistics Bureaus, Cushman & Wakefield Research

MARKET INDICATORS

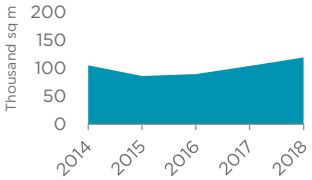
MARKETS

BOGOTÁ

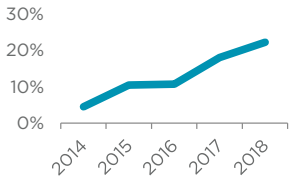
Job Growth



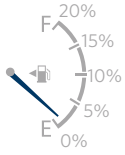
Office Absorption



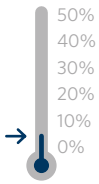
Office Vacancy



Rent Growth (Q2 15 - Q2 16)



Landlord/Tenant (Q2 16) (→5 year average availability ratio)



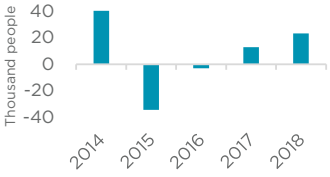
Rent Growth Forecast (Q2 16 - Q2 17)

Pipeline (Completions - Q2 16 - Q4 18)

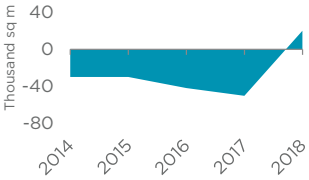
677,302 sq m

CARACAS

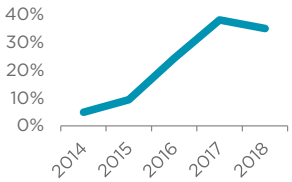
Job Growth



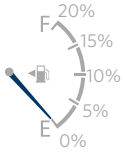
Office Absorption



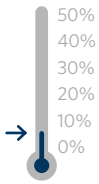
Office Vacancy



Rent Growth (Q2 15 - Q2 16)



Landlord/Tenant (Q2 16) (→5 year average availability ratio)



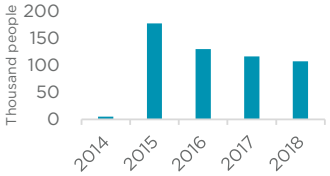
Rent Growth Forecast (Q2 16 - Q2 17)

Pipeline (Completions - Q2 16 - Q4 18)

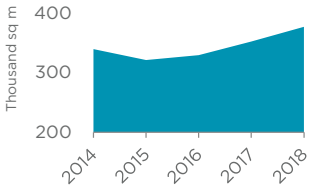
168,840 sq m

MEXICO CITY

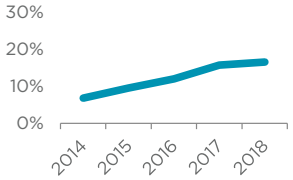
Job Growth



Office Absorption

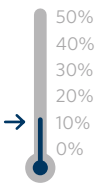


Office Vacancy



Rent Growth (Q2 15 - Q2 16)

Landlord/Tenant (Q2 16) (→5 year average availability ratio)



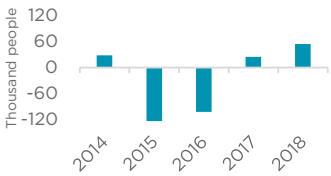
Rent Growth Forecast (Q2 16 - Q2 17)

Pipeline (Completions - Q2 16 - Q4 18)

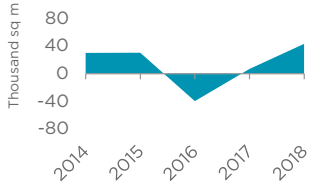
1,592,563 sq m

RIO DE JANEIRO

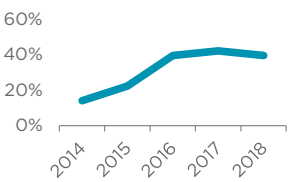
Job Growth



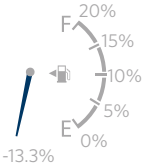
Office Absorption



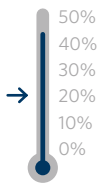
Office Vacancy



Rent Growth (Q2 15 - Q2 16)



Landlord/Tenant (Q2 16) (→5 year average availability ratio)



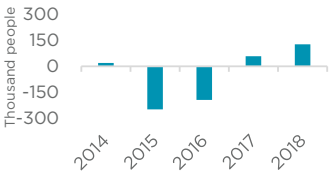
Rent Growth Forecast (Q2 16 - Q2 17)

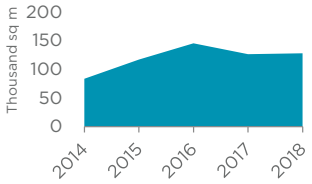
Pipeline (Completions - Q2 16 - Q4 18)

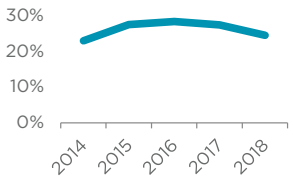
401,177 sq m

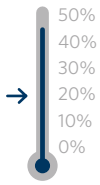
Source: National Statistics Bureau, Oxford Economics, Cushman & Wakefield Research

SÃO PAULO



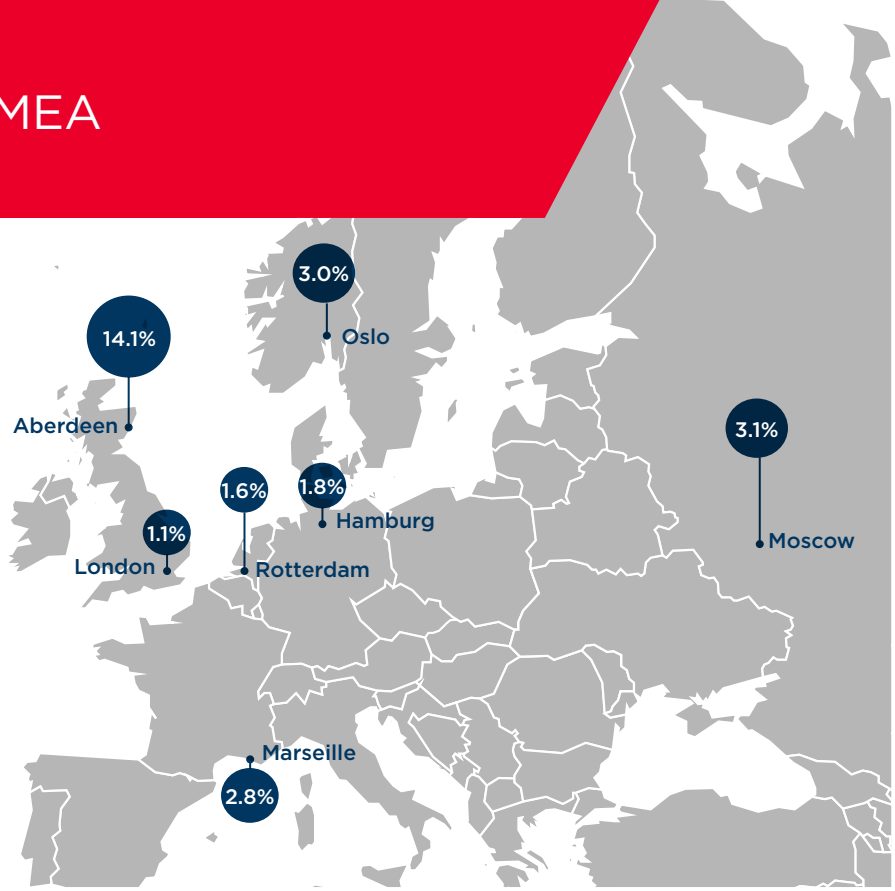






339,376 sq m

EMEA

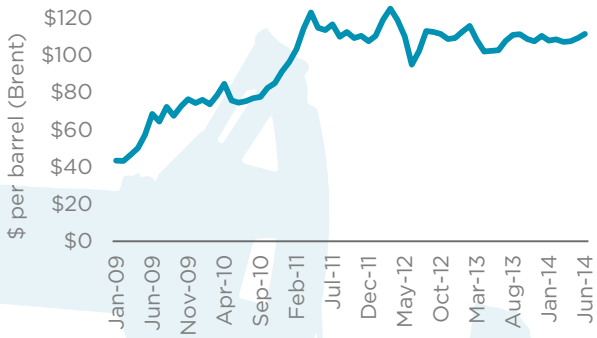


61% of global oil production comes from EMEA.

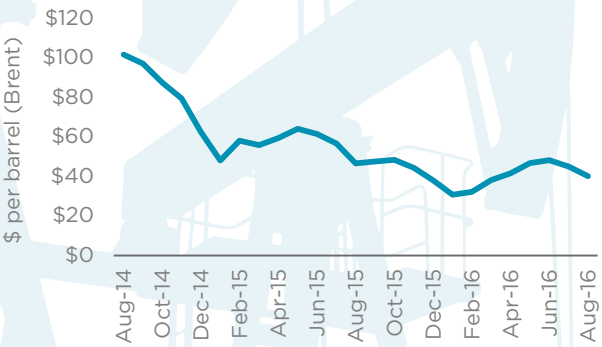
Size of bubble represents energy sector contribution to total city GDP

Source: EIA, BP, OPEC, Cushman & Wakefield Research

OIL PRICES: WHERE THEY WERE



OIL PRICES: WHERE THEY ARE



Source: EIA, Cushman & Wakefield Research

Top Energy Markets - Oil Price Boom

	Employed Population Ranking*	Job Growth Ranking*	Vacancy Rate Ranking (44 cities) Q2 14	Rent Growth Ranking (44 cities) Q1 09- Q2 14
Aberdeen	142	124	6	13
Hamburg	59	153	8	16
London	3	111	3	2
Marseille	167	191	1	7
Moscow	5	120	37	10
Oslo	119	165	9	4
Rotterdam	249	246	43	21

*(280 Cities) 2009-2014

Top Energy Markets - Oil Price Correction

	Employed Population Ranking*	Job Growth Ranking*	Vacancy Rate Ranking (15 top cities) Q2 16	Rent Growth Ranking (44 cities) Q2 14 - Q2 16
Aberdeen	217	210	46	44
Hamburg	92	193	9	16
London	4	130	2	6
Marseille	203	221	1	17
Moscow	279	243	42	46
Oslo	228	234	18	27
Rotterdam	145	189	43	10

*(280 Cities) 2014-2016

Source: EIA, Cushman & Wakefield Research

The oil industry

Oil production in EMEA reached 485 million bpd in 2014, 20% higher than 20 years ago. However, there are some disparities at a regional level. While Europe has seen a decrease in oil production of more than 40% since the oil price bust, the Middle East and Africa have seen increases of 38% and 19%, respectively. The Middle East is by far the largest oil producer in the EMEA region, accounting for over two-thirds of the supply in 2014. But Europe is the biggest source of demand, consuming almost as much in petroleum and other liquids as Russia, the Middle East, and Africa combined.

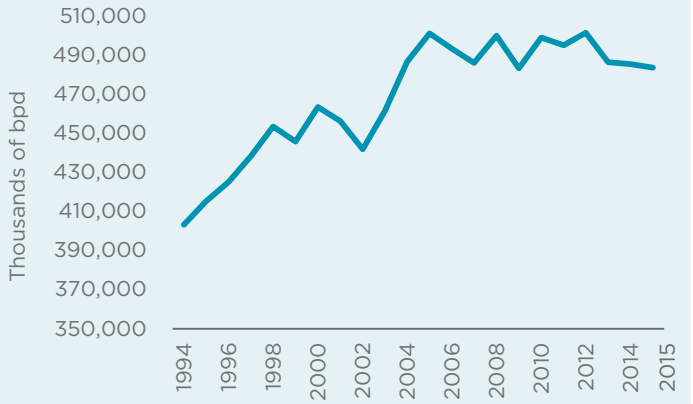
Energy employment

Energy employment has fallen across many EMEA cities — a trend likely to continue. Moscow and Abu Dhabi employ the largest number of energy workers at 90,000 and 60,000, respectively. Energy-centric cities like Aberdeen, Stavanger, and Norway employ less energy workers overall, but are still dependent on the energy industry. Aberdeen employs 38,000 energy workers and is eight times more dependent on the sector than the Scottish national average, while Stavanger employs 10,000 energy workers and is five times more dependent on the energy sector than Norway as a whole. This leaves both cities vulnerable to oil price fluctuations and associated pressure surrounding energy sector employment. Cities with broader business sector employment, including London, Oslo, and Rotterdam, are less dependent on the performance of the energy market. In fact, these cities are likely to benefit from lower oil prices as other industries are buoyed by lower costs of production.

Office market outlook

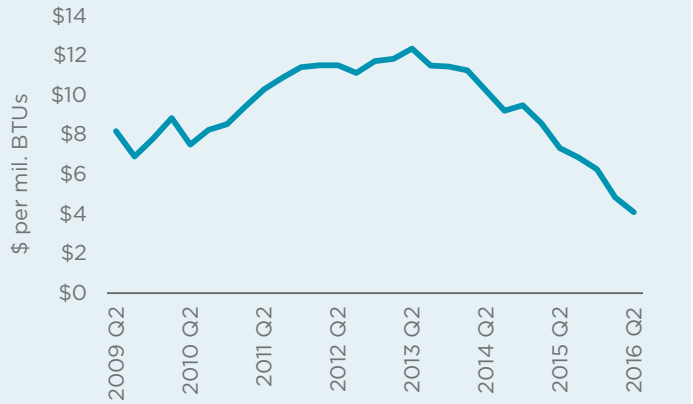
Oil companies are weathering the fall in crude prices and its effect on the economy, becoming increasingly conscious of both real estate and staff costs. Energy sector demand for office space across EMEA is likely to fall as a result, but the impact of this will diverge at the city level. The Moscow office market has seen rents fall by almost a third year-over-year due to the weakness of the Russian economy brought about by lower oil prices, trade sanctions, and increases in new supply. A continuation of these factors means office take-up and rental growth will be below trend next year. The high number of energy employees in Abu Dhabi and the high proportion of energy employees in Aberdeen leave both cities exposed to the risk of increased vacancy and flat-to-negative rental growth. But the impact will be felt differently in less energy-centric cities, including London. Such cities will begin to see oil and associated companies attempt to reduce real estate costs, though their diverse occupier base means the effect on the office market will be limited.

EMEA OIL PRODUCTION



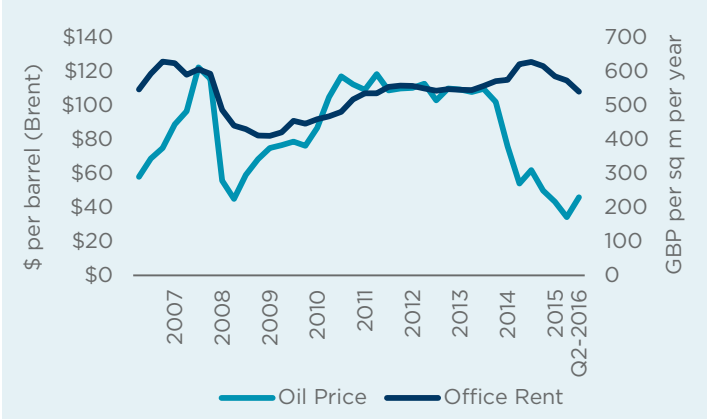
Source: EIA, Macrobond, Cushman & Wakefield Research

EMEA GAS PRICE



Source: Oxford Economics, World Bank, Haver Analytics, Cushman & Wakefield

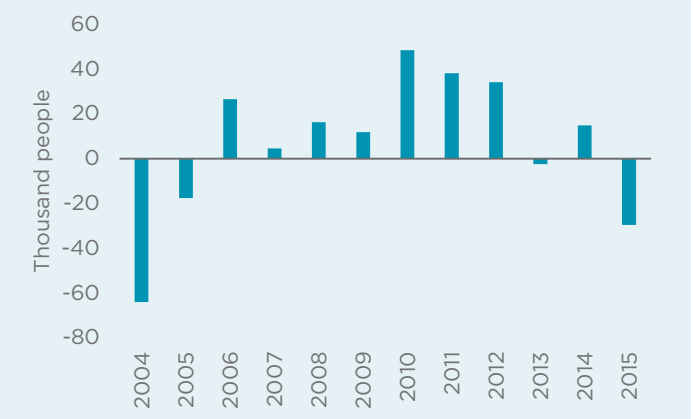
OIL PRICE VS. EMEA RENT CORRELATION



Note: Rental is average rent for the seven tracked markets in EMEA

Source: EIA, Cushman & Wakefield Research

EUROPE ENERGY SECTOR EMPLOYMENT, ANNUAL GROWTH



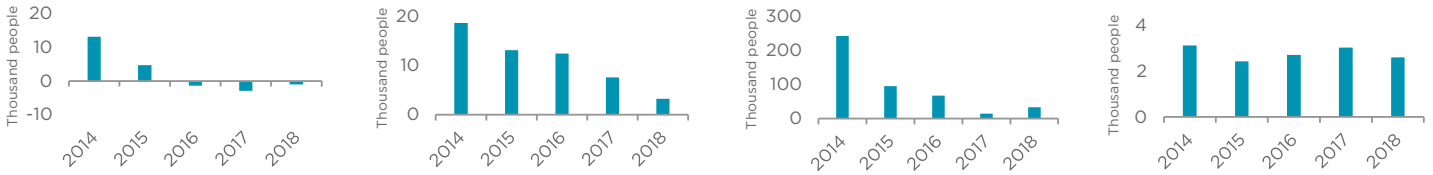
Source: Oxford Economics, Cushman & Wakefield

MARKET INDICATORS

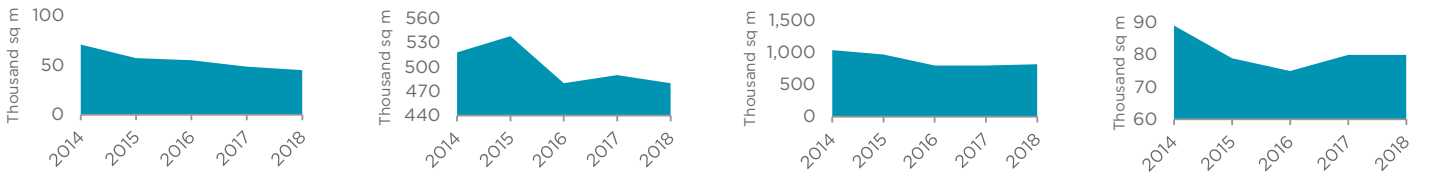
MARKETS

ABERDEEN	HAMBURG	LONDON	MARSEILLE

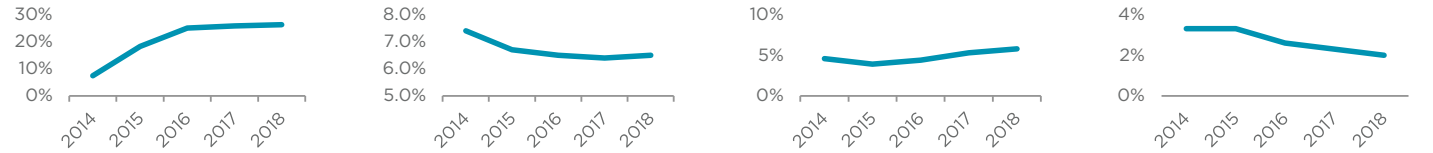
Job Growth



Office Take-up



Office Vacancy



Rent Growth (Q2 15 - Q2 16)

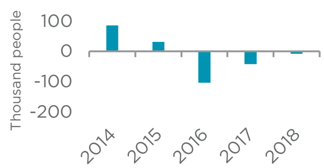
Landlord/Tenant (Q2 16) (→ 5 year average availability ratio)

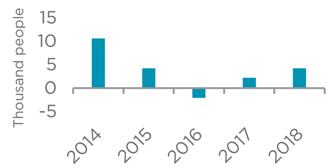
Rent Growth Forecast (Q2 16 - Q2 17)

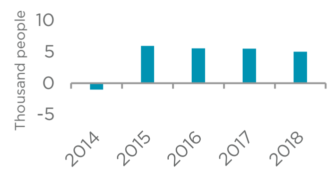
Pipeline (Completions - Q2 16 - Q4 18)

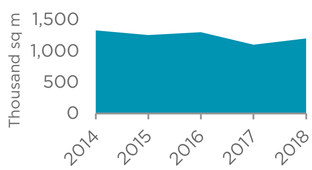
Source: PMA, Oxford Economics, Cushman & Wakefield Research

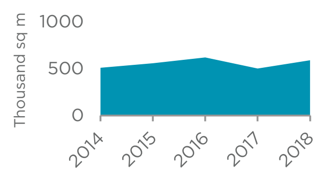
MOSCOW	OSLO	ROTTERDAM

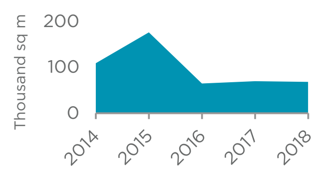


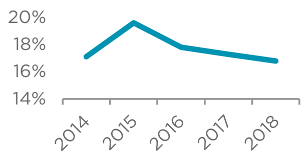


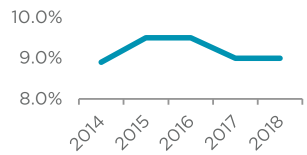


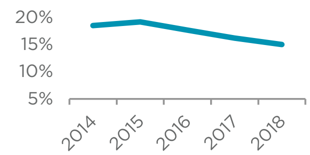


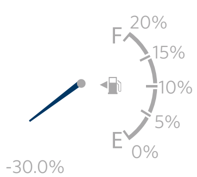


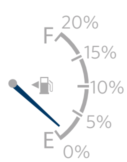


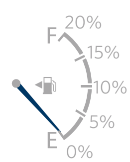


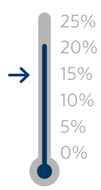


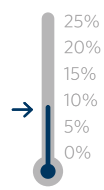


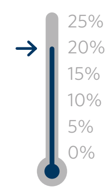












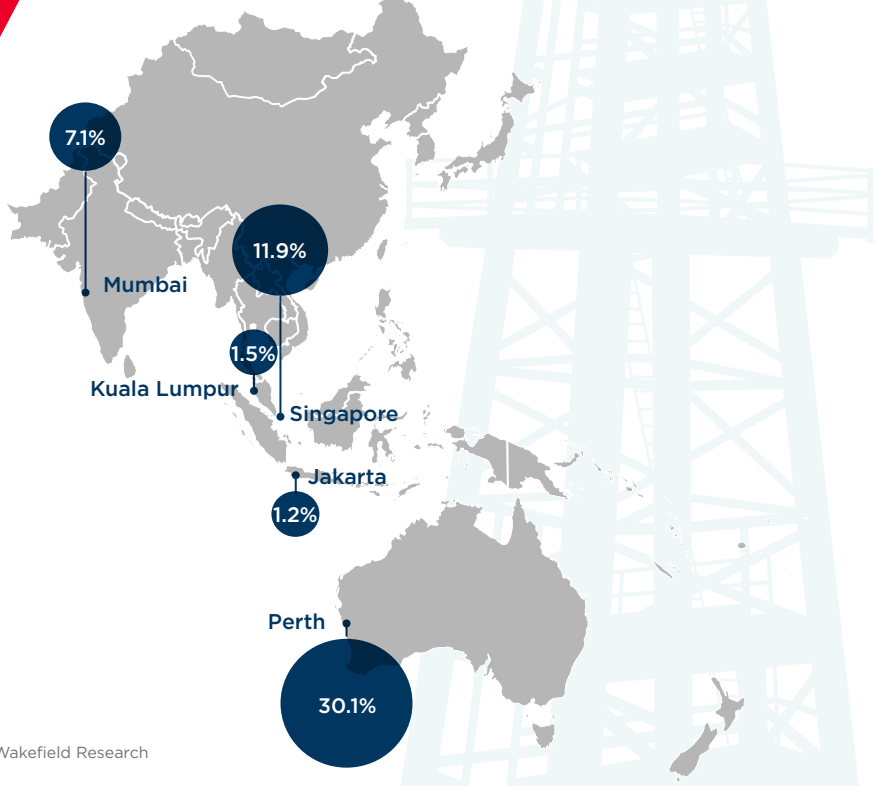
↘	↗	→

2,422,832 sq m

385,000 sq m

0 sq m

APAC



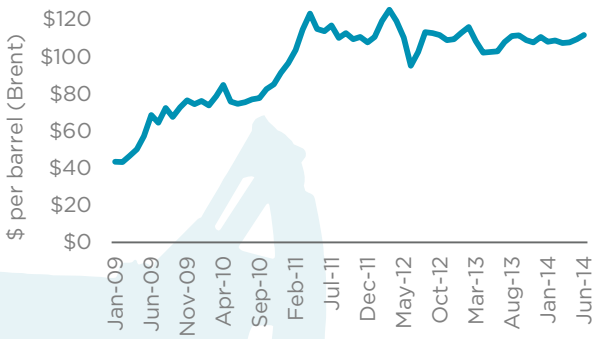
4.4% of global oil production comes from APAC

Size of bubble represents energy sector contribution to total city GDP

Note: APAC excluding Greater China

Source: EIA, BP, National Statistics Bureaus, Cushman & Wakefield Research

OIL PRICES: WHERE THEY WERE

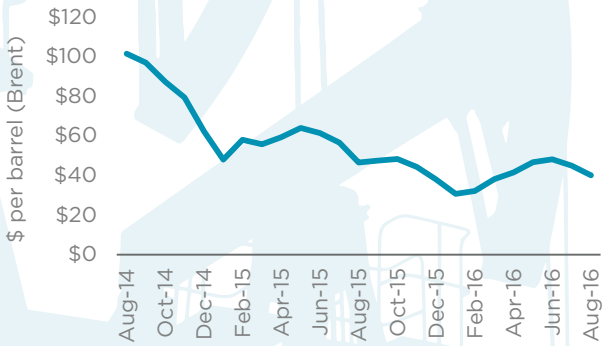


Top Energy Markets - Oil Price Boom

	Employed Population Ranking*	Job Growth Ranking*	Vacancy Rate Ranking (5 cities) Q2 14	Rent Growth Ranking (5 cities) Q1 09 - Q2 14
Mumbai	1	5	5	5
Kuala Lumpur	7	1	4	2
Singapore	4	2	1	4
Jakarta	3	6	2	1
Perth	11	4	3	3

*(14 Cities) 01/01/09-12/31/13

OIL PRICES: WHERE THEY ARE



Source: EIA, Cushman & Wakefield Research

Top Energy Markets - Oil Price Correction

	Employed Population Ranking *	Job Growth Ranking*	Vacancy Rate Ranking (5 cities) Q2 16	Rent Growth Ranking (5 cities) Q2 14 - Q2 16
Mumbai	1	1	3	1
Kuala Lumpur	13	7	4	3
Singapore	2	4	1	4
Jakarta	12	3	5	2
Perth	11	11	2	5

*(14 Cities) 01/01/14-12/31/14

Source: Oxford Economics, Cushman & Wakefield Research

A major net importer of oil

Generally, markets in the Asia Pacific region have benefited from the weakness in oil prices. The filtering down of lower oil prices to lower food and fuel prices has subdued inflationary pressures, boosted consumer spending, and given Asian central banks greater scope for monetary easing. Although APAC's direct exposure to the energy sector is relatively small, certain pockets within the region are oil and gas producers, and those areas are being negatively impacted.

Office sector – Minimal impact

The footprint of oil and gas companies is relatively small in the Asia-Pacific region — estimated at less than 10% of total occupancy. As such, the impact of the slump in oil prices on office space has been relatively muted. Low oil prices have affected companies in the offshore and marine sector, with many downsizing to stay afloat. In Singapore, BW Offshore and Modec, for example, have carried out retrenchment exercises as demand for new floating production projects declined. In addition, Keppel Corporation slashed its Singapore sub-contract workforce by 7,900, while Sembcorp Marine revealed plans to release 3,000 to 4,000 workers. However, monetary authorities in Singapore have reiterated that any impact on asset quality remains manageable as total exposure to the sector is less than 6%. In addition, these companies account for less than 3% of total Grade A Central Business District (CBD) office space leased. Consequently, the impact on rents is expected to be minimal. Likewise in Malaysia, the impact on Kuala Lumpur office rents has been contained thus far since the proportion of space that energy companies occupy is not overwhelmingly large.

In Australia, the city of Perth is the metro area most influenced by commodities (inclusive of oil and gas). Demand for office space is heavily impacted by service industries such as engineering, information technology (IT), accounting, and legal that support the resource sector. Perth's office vacancy rate increased to 17.2% since the correction from 15.2% during the oil price boom. The rise is not all oil-related, of course, but oil has played a significant role.

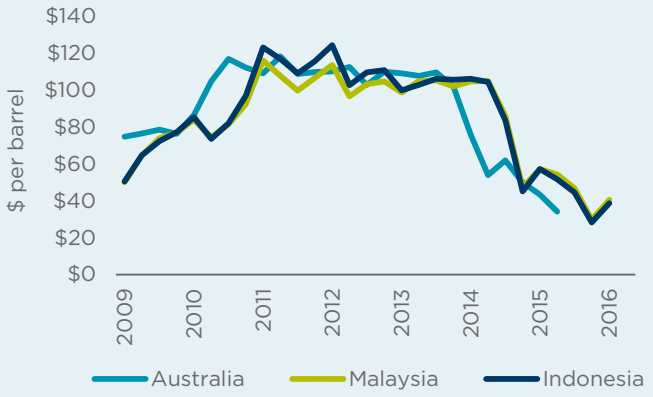
Lots of supply, and lots of demand

Economic growth in the region is poised to improve in 2017. As a result, leasing demand across the 30 major cities tracked by Cushman & Wakefield is expected to reach new highs through next year. In some markets, that increased demand will coincide with a wave of new supply, which could lead to higher vacancies and greater opportunities for tenants.

APAC OIL PRODUCTION

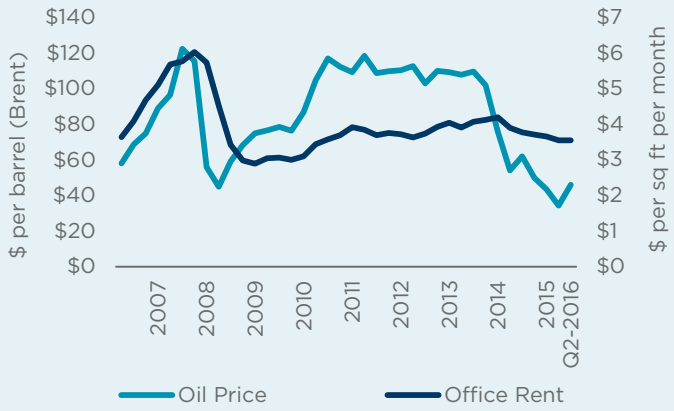
Source: EIA, Cushman & Wakefield Research

APAC GAS PRICE



Source: Australian Institute of Petroleum, National Bureau of Statistics, World Bank, Cushman & Wakefield Research

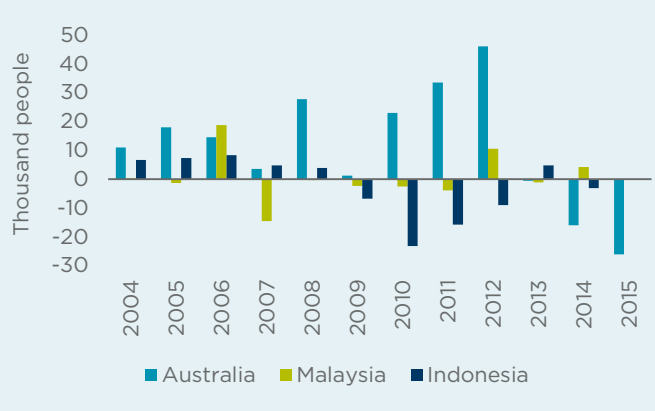
OIL PRICE VS. APAC RENT CORRELATION



Note: Rental is average rent for Singapore, Mumbai, Jakarta

Source: EIA, Cushman & Wakefield Research

APAC ENERGY SECTOR EMPLOYMENT, ANNUAL GROWTH



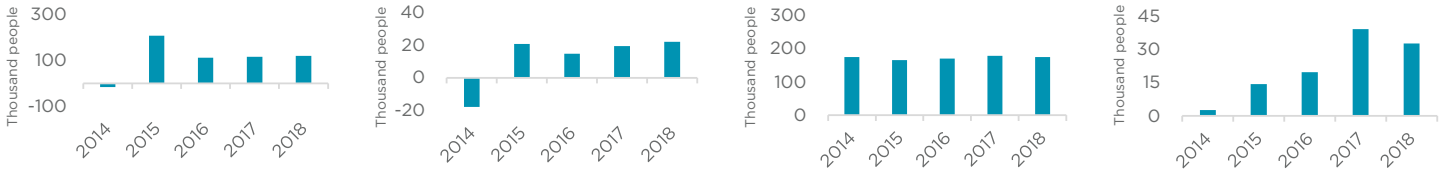
Source: Deloitte Access Economics, Department of Statistics, Malaysia, National Bureau of Statistics, Cushman & Wakefield Research

MARKET INDICATORS

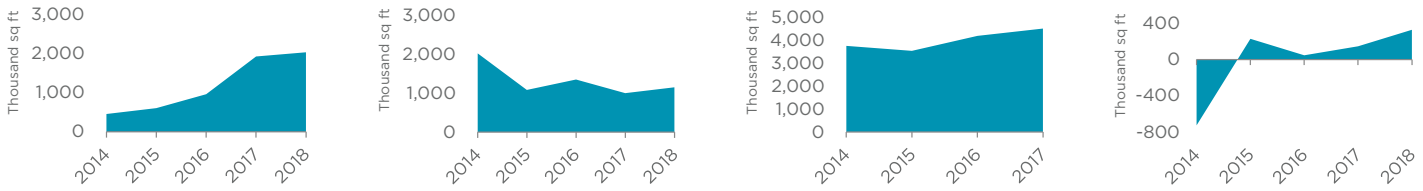
MARKETS

JAKARTA	KUALA LUMPUR	MUMBAI	PERTH

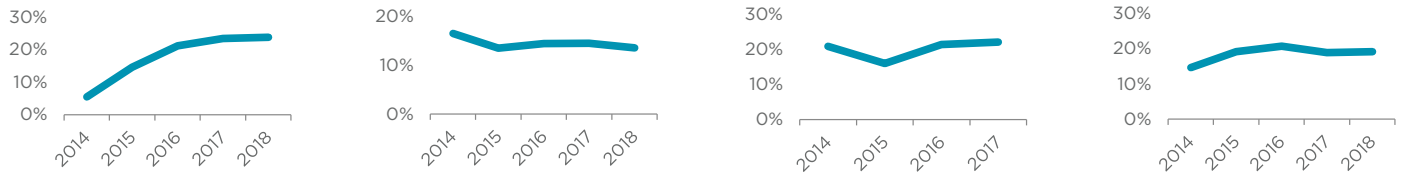
Job Growth



Office Absorption



Office Vacancy



Rent Growth (Q2 15 - Q2 16)

Landlord/Tenant (Q2 16) (→5 year average availability ratio)

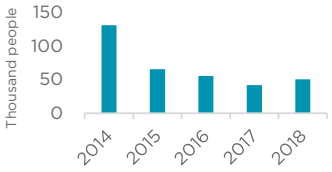
Rent Growth Forecast (Q2 16 - Q2 17)

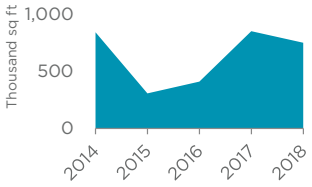
Pipeline (Completions - Q2 16 - Q4 18)

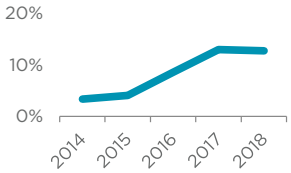
Source: Oxford Economics, Cushman & Wakefield Research

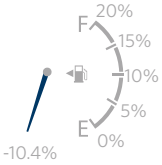
Note: Average availability ratio – Mumbai and Perth – 4-year average

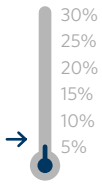
SINGAPORE











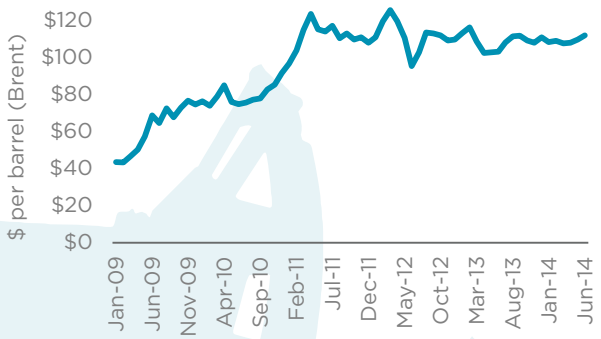
4,311,599 sq ft

GREATER CHINA

4.7% of global oil production comes from China.

Source: EIA, BP, City Statistics Bureaus, Cushman & Wakefield Research

OIL PRICES: WHERE THEY WERE

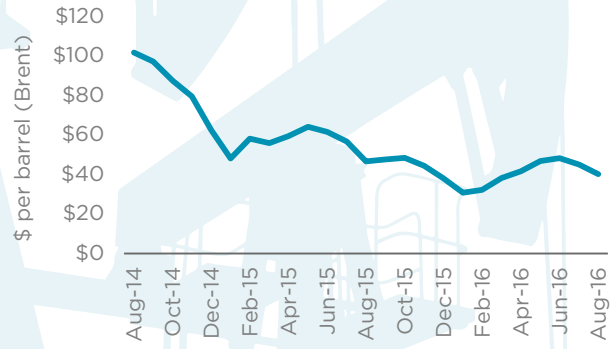


Top Energy Markets - Oil Price Boom

	Employed Population Ranking*	Job Growth Ranking*	Vacancy Rate Ranking (15 top cities) Q2 14	Rent Growth Ranking (15 top cities) Q1 09 - Q2 14
Dalian	29	9	10	9
Tianjin	3	14	7	10
Beijing	5	25	1	2
Shanghai	12	40	4	14
Guangzhou	8	24	3	6
Shenzhen	1	12	2	3
Xi'an	13	20	8	15
Shenyang	31	41	11	4

*(49 Cities) 01/01/09-12/31/13

OIL PRICES: WHERE THEY ARE



Source: EIA, Cushman & Wakefield Research

Top Energy Markets - Oil Price Correction

	Employed Population Ranking*	Job Growth Ranking*	Vacancy Rate Ranking (15 top cities) Q2 16	Rent Growth Ranking (15 top cities) Q2 14 - Q2 16
Dalian	43	44	9	7
Tianjin	2	13	12	12
Beijing	8	27	1	9
Shanghai	1	2	5	3
Guangzhou	3	14	4	8
Shenzhen	37	40	2	1
Xi'an	32	38	8	15
Shenyang	25	31	7	14

*(49 cities) 01/01/14-12/31/14

Source: City Statistics Bureaus, Cushman & Wakefield Research

Energy producing provinces feel the bite

China is the world's largest net oil importer and the second largest oil consumer. Petroleum and total liquids production in China in 2014 was nearly 4.6 million bpd, a 50% increase from 20 years ago. Recently, energy and production activity has been concentrated in the offshore regions of the South China Sea and Bohai Bay, as well as onshore regions in central and western provinces such as Sichuan, Inner Mongolia, Gansu, and Xinjiang. China's national oil companies dominate the oil and natural gas upstream and downstream market in the country. International oil companies, however, do have access to the more technically challenging onshore and offshore fields.

National and international HQs favor Beijing

Beijing is home to both the headquarters of China's large national oil companies and the China headquarters of international oil companies doing business in the country. Other energy-centric markets in the region are the preferred locations for the divisional and sub-regional offices of both national and international oil companies. But there are city-level specific energy-centric markets. In Xinjiang, Karamay's energy sector accounts for a substantial 77% of overall city GDP. However, office users in markets like Karamay tend to own rather than lease. Other markets, specifically Dalian and Tianjin, not only boast a significant energy component in their local economies, but they also have established office leasing markets.

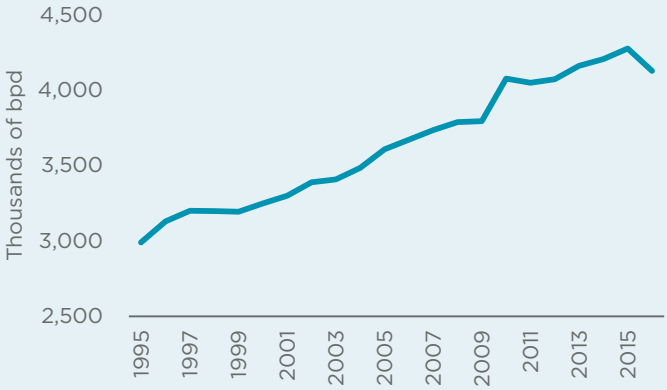
High prices – Dalian job growth; Low prices – Shanghai job growth

As oil prices rose prior to the end of 2014, energy sector-dominated markets such as Dalian and Tianjin experienced the largest job growth in percentage terms. When oil prices declined in late 2014, job growth in both of these areas slowed sharply, but remained positive. Conversely, non-energy centric cities such as Shanghai saw significant job growth over that same period. Benefiting from the net positive economic effects of cheaper oil, companies in the non-energy centric markets consequently used their profitability to raise headcounts in an attempt to gain greater market traction.

Substantial office supply expected in coming years

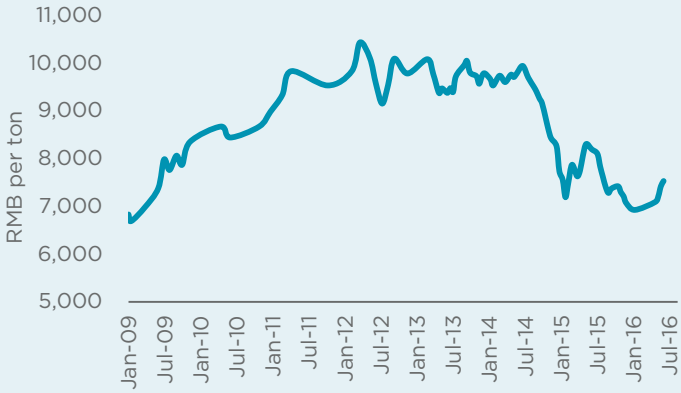
In the next two and a half years, office supply is expected to increase across a number of oil-centric markets in China, leading to an increase in space availability.

CHINA OIL PRODUCTION



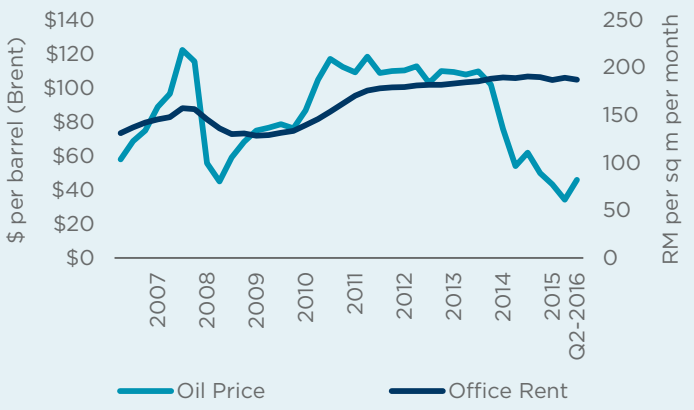
Source: EIA, Cushman & Wakefield Research

CHINA GAS PRICE



Source: National Development & Reform Commission, Cushman & Wakefield Research

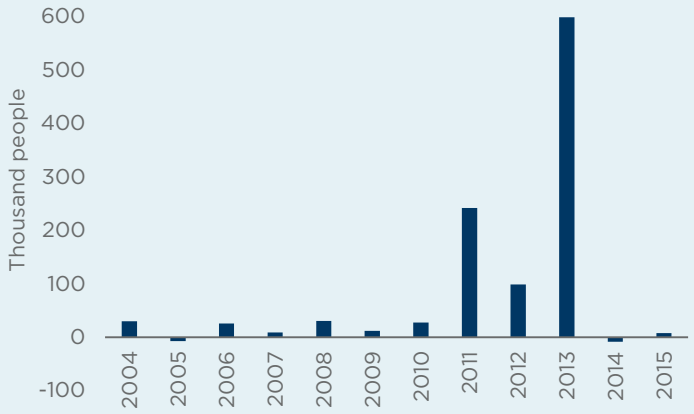
OIL PRICE VS. CHINA RENT CORRELATION



Note: Rental is average rent for the eight tracked oil markets in China

Source: EIA, Cushman & Wakefield Research

CHINA ENERGY SECTOR EMPLOYMENT, ANNUAL GROWTH



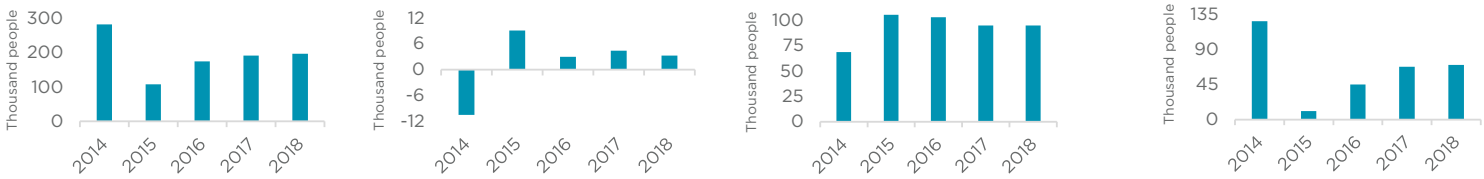
Note: 2015 figure is estimated

Source: National Statistics Bureau, Cushman & Wakefield Research

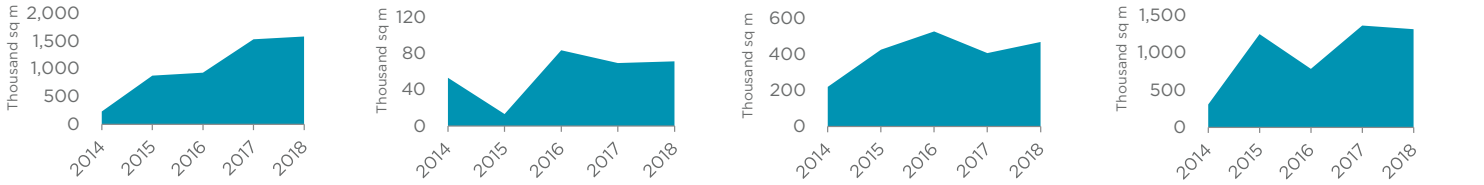
MARKET INDICATORS

GREATER CHINA

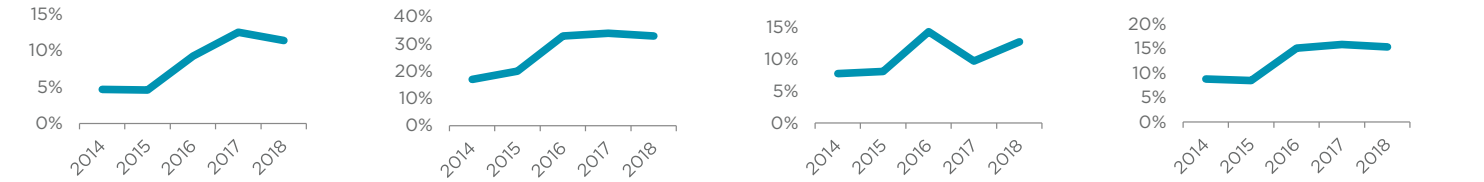
Job Growth



Office Absorption



Office Vacancy



Rent Growth (Q2 15 - Q2 16)

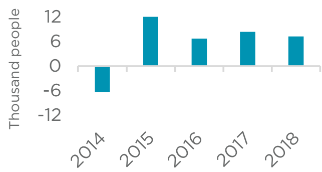
Landlord/Tenant (Q2 16) (→ 5 year average availability ratio)

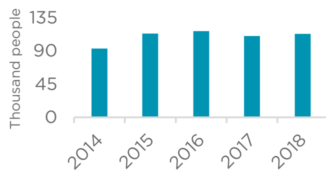
Rent Growth Forecast (Q2 16 - Q2 17)

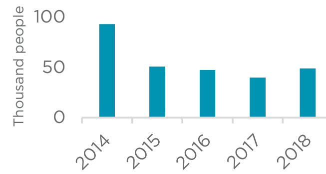
Pipeline (Completions - Q2 16 - Q4 18)

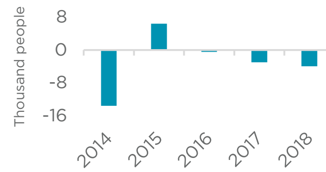
Source: City Statistics Bureaus, Oxford Economics, Cushman & Wakefield Research

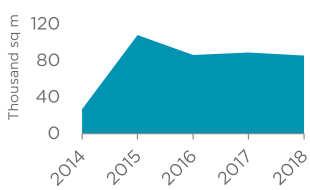
SHENYANG	SHENZHEN	TIANJIN	XI'AN

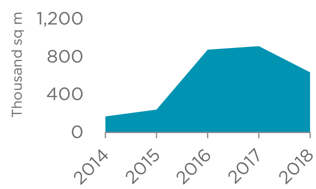


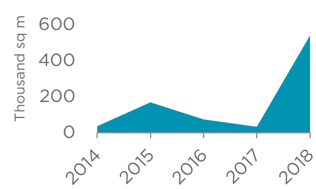


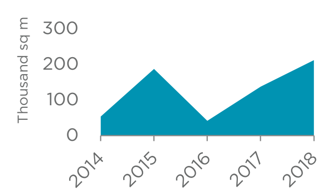


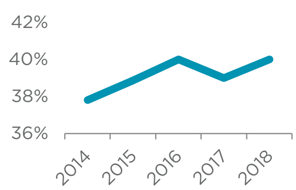


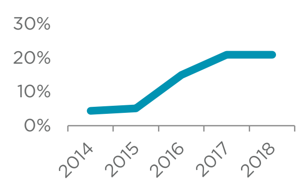


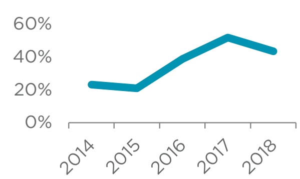


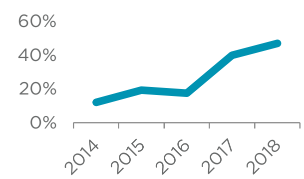


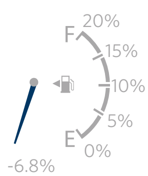


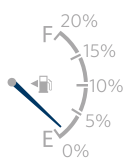


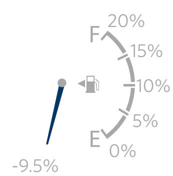


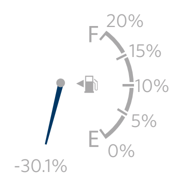


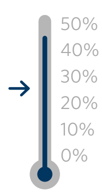


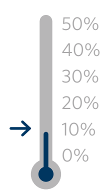


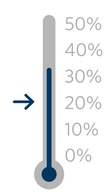


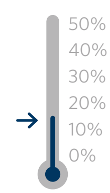












SHENYANG	SHENZHEN	TIANJIN	XI'AN
451,100 sq m	3,424,803 sq m	1,461,254 sq m	1,361,534 sq m

CUSHMAN & WAKEFIELD

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