

AEB REAL ESTATE MONITOR

Magazine of the Association of European Businesses

CAPITAL · OFFICE · RETAIL · WAREHOUSE · HOSPITALITY · HOUSING



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Publication name/ Наименование издания: AEB Real Estate Monitor ("ACCOЦИАЦИЯ ЕВРОПЕЙСКОГО БИЗНЕСА: Обозрение рынка недвижимости") Published by/Учредитель:
Non-profit making partnership "Association of
European Businesses"/Некоммерческое партнерство
"АССОЦИАЦИЯ ЕВРОПЕЙСКОГО БИЗНЕСА"

Hot Topics

and carbon footprint

Chief Editor/ Главный редактор: M.E. Konischev/Конищев М.Е. Publication volume and number/Номер выпуска: 02, 2016

Energy efficiency in construction: sandwich panels cut costs

Release date/Дата выхода: 17 June 2016/ 17 июня 2016 Cost/Цена: Distributed free of charge/Бесплатно Publisher's address/ Адрес издателя, редакции: 16, bld. 3, Krasnoproletarskaya str., 127473, Moscow, Russia/ Россия, 127473, г. Москва, ул. Краснопролетарская, д. 16, стр. 3

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Frank SchauffChief Executive Officer,
Association of European
Businesses

Dear readers,

In 2015, Russian Real Estate market experienced a considerable slowdown caused by high volatility of oil prices. This year, the situation has changed slightly – rouble devaluation makes real estate in Russia more attractive for investors. Some experts predict a slight growth that will be caused by improvement of the real estate market conditions and competent asset management.

However, some market segments, for example, retail maintain a negative trend. In 2015, the Russian consumer confidence index dropped to 26% – buyers preferred to save money rather than buy new products.

Analytical reports on the Russian real estate market development you will find in this publication. It is my hope that the AEB Real Estate Monitor would be a useful source of information that would help you to grow your business. I look forward to seeing you at our upcoming Real Estate Committee events.

I would like to take this opportunity to thank the members of our Real Estate Committee who have contributed to this publication and other committee related activities.

Enjoy the reading!



Filippo Baldisserotto
Chairman of the AEB Real
Estate Committee;
AEB Board Member;
Managing Partner,
Italcantieri

Dear readers,

Since last year, when we summarised the results of the first six months of 2015, which showed that the economy was contracting and there was a drop across the entire real estate industry, we have to say that the situation has changed very little. While this year there has been an easing in the slump, we see a continuation of the downturn trends and uncertainty on the market.

However, the market is not dead or standing still. It is slowly evolving, with most of the smaller players leaving, and the biggest and strongest players with the greatest vision making the changes needed to consolidate their market share.

On a positive note, real estate owners and developers are redefining formats, sizes and approaches to deal with the "new normal", and the future holds promise.

As before, and in fact even more so in the current situation, the Real Estate Committee considers that it is important to provide its members with as much information, guidance and advice on any changes as we can.

For this purpose we are holding a series of events, networking meetings and our annual conference Real Estate Day planned for 22 September 2016 and we encourage and invite our members to share with us their information, views and ideas.

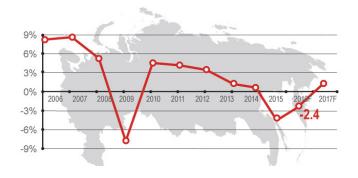
Thank you all and we are looking forward to seeing you at the upcoming Real Estate Committee meetings and events.

Russian Investment Market | Q1 2016

- The Russian economy is continuing to struggle. The consumer sector is suffering from weak demand stemming from declining real incomes due to low wage growth and high inflation. However, some production indicators showed their first signs of improvement.
- Better activity was also recorded in the commercial real estate investment sector. In Q1 2016, Russian real estate investment almost doubled in YoY terms and reached USD 1,007 million.
- Prime yields remained unchanged in Q1 2016 at 10.5% and 10.75% for Moscow offices and shopping centres respectively, and 12.0% for warehouses.
- •In Q1 2016, investor interest was as usual focused on the office segment that accounted for 81% of total investment volume, with the most important sale being

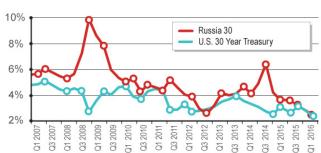
- the Evolution Tower. The industrial sector took 12% of investment due to the sale of PNK-Chekhov-3 and PNK-Severnoye Sheremetyevo.
- Investors continued to focus on assets in Moscow: these accounted for 91% of all deals in Q1 2016. Investment in the St. Petersburg real estate market reached USD 86 million, which is comparable to that of 2015.
- The share of foreign capital in Russian investment deals came to 15% for Q1 2016 vs. 34% for the same period of 2015.
- In view of the current active negotiations and due diligence activities, we project investment in 2016 to reach USD 4 billion, although we continue to see downside risks to this forecast. (1–9)

1 RUSSIA REAL GDP GROWTH



Source: Rosstat, Oxford Economics

2 ▶ GOVERNMENT SOVEREIGN DEBT YELDS



Source: VTB Capital, U.S. Department of the Treasury

3 ► EXCHANGE RATE DYNAMICS, RUR/USD



Source: Central Bank of Russia

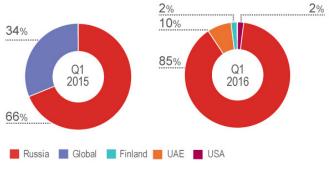
4 ► RUSSIA INVESTMENT VOLUME DYNAMICS*



*Investment deals excluding deals with land plots, joint ventures, sales of residential real estate to the end-users.

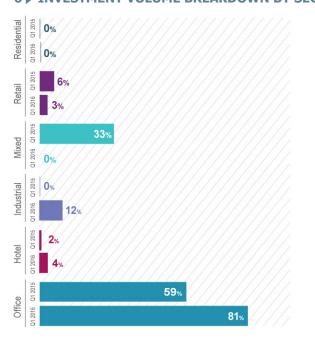
Source: JLL

5 INVESTORS BY SOURCE OF CAPITAL



Source: JLL

6 ► INVESTMENT VOLUME BREAKDOWN BY SECTOR



Source: JLL

7 ▶ PRIME YIELD DYNAMICS IN MOSCOW

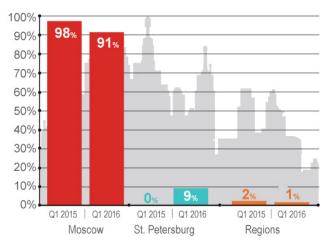






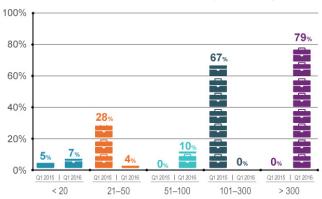
Source: JLL

8 ► INVESTMENT VOLUME BREAKDOWN BY REGION



Source: JLL

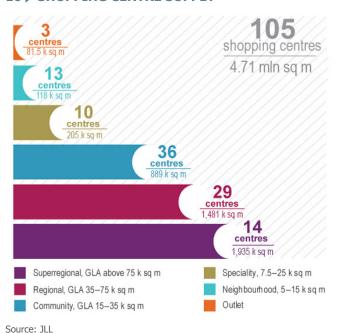
9 ► INVESTMENTS BY DEAL SIZE (VOLUME)



Moscow Shopping Centre Market, Q1 2016

• The Moscow retail market saw no completions in Q1 2016 for the first time since 2007. Despite the slow start, around 460,000 sq m¹ of new quality shopping centres are on track to enter the Moscow market in 2016, with most openings announced for Q2–Q3. However, due to several announced projects being put on hold and no new schemes announced recently, the decline in completions will likely continue in 2017–2018.

10 ► SHOPPING CENTRE SUPPLY



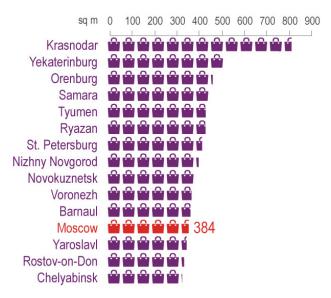
11 > SHOPPING CENTRE COMPLETIONS



• The large new shopping centre supply in the last two years (over 1.1 million sq m in each) amid the struggling economy and shrinking demand from retailers has driven up vacancy rates. The lack of new projects in Q1 brought the average vacancy rate down to 8% (-0.3 pp). However, upcoming completions will likely push the vacancy rate up to 10% in H2 2016.

 Eight new international brands entered the Russian market in Q1 2016, six of which opened their first stores in Moscow.
 No retailers left the market. (10–18)

12 ► STOCK PER 1,000 INHABITANTS IN RUSSIAN CITIES



Source: JLL

6

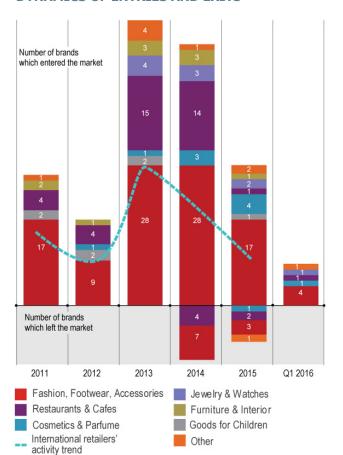
¹ Hereinafter we use gross leasing area (GLA)

13 PRIME RENT: EUROPEAN COMPARISON



Source: JLL

14 ▶ NEW RETAILERS ON THE RUSSIAN MARKET: DYNAMICS OF ENTRIES AND EXITS



Source: JLL

15 ► AVAILABILITY



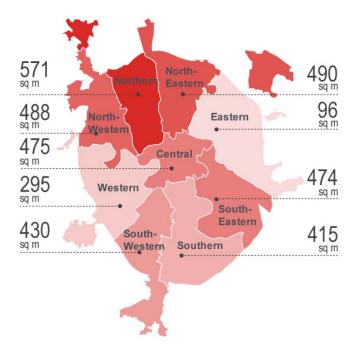
16 PRICING



17 ▶ VACANCY RATE BREAKDOWN BY MOSCOW DISTRICTS

North-5.4% 7.0% Northern Eastern 3.4% 7.9% North-Eastern Nestem 6.7% Central 16.3% Western 4.2% 8.4% 7.2% Western Southern

18 ► SHOPPING CENTRE DENSITY BY MOSCOW DISTRICTS (SQ M PER 1,000 INHABITANTS)

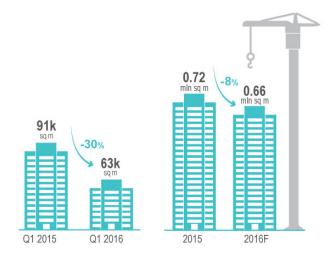


Source: JLL Source: JLL

Moscow Office Market, Q1 2016

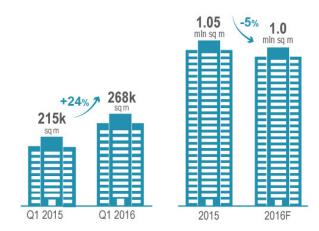
- Only four office projects with a total area of 63,000 sq m were commissioned during Q1. This marked a record low level of new supply over the past decade. The largest project commissioned was Nagatino i-Land (Phase II) Descartes (28,000 sq m of office space). All completed buildings were Class B+.
- Over the full year, new supply is expected to reach 663,000 sq m, which will be 8% lower YoY. In fact, actual completions in 2016 may be even lower due to the challenging economic environment, which is forcing many developers to adjust their construction plans by putting some projects on hold at an early stage of construction and by postponing planned projects.
- On the demand side, office take-up in Moscow in Q1 was 267,000 sq m, which was 24% higher YoY. This was mainly driven by one large deal: the purchase of Evolution Tower (79,053 sq m of office space) by Transneft. Not including this deal, the office take-up in Q1 2016 was 12% lower YoY.
- At the end of March, the overall vacancy rate in Moscow offices remained roughly unchanged from Q4 2015, at 15.8% versus 16.0%. The Class A vacancy rate declined marginally to 22.4% from 22.8%.
- Asking rents for premium offices remained stable at 600–800 USD/sq m/year in Q1, while Class A asking rents ranged from 400–600 USD/sq m/year, with Class B+ asking rents at 14,000–22,000 RUR/sq m/year. (19-26 ▶)

19 NEW SUPPLY

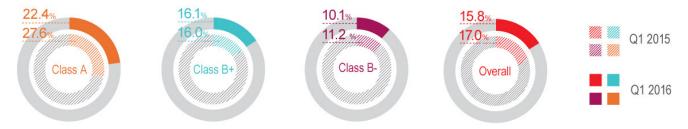


Source: JLL

20 ▶ OFFICE TAKE-UP

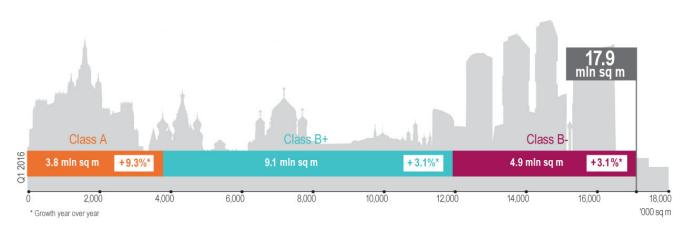


21 VACANCY RATES BY CLASS



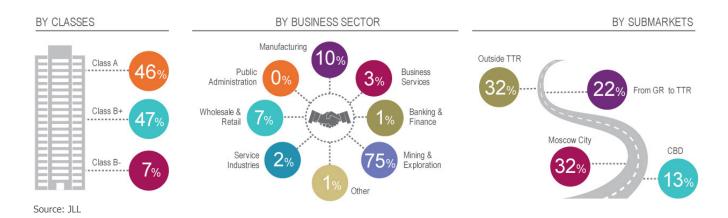
Source: JLL

22 MOSCOW OFFICE STOCK BY CLASS



Source: JLL

23 TRANSACTED SPACE BY CLASS, LOCATION AND SECTOR, Q1 2016

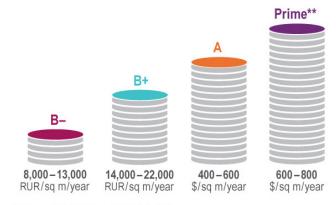


24 OFFICE PROPERTY CYCLE IN MOSCOW



Source: JLL

25 ► ASKING RENTS*

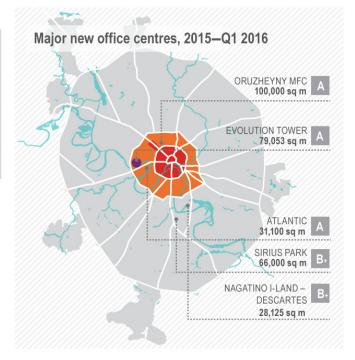


Source: JLL

26 ► MOSCOW OFFICE SUBMARKETS, Q1 2016

	CBD*	MOSCOW CITY	GR TO TTR **	OUTSIDE TTR ***
Stock, sq m	3,940,960	910,785	4,426,997	8,519,070
Availability, sq m	470,412	149,550	545,116	1,659,856
Vacancy Rate, %	11.9	16.4	12.3	19.3
Transacted Space, sq m	36,043	86,627	58,524	86,713

^{*} The Central Business District submarket comprises the area within and in close proximity to the Garden Ring and Tverskaya-Yamskaya Street



^{*}Asking rents (including pre-lets) exclude VAT
**Prime rents refer to rents in high quality buildings in the Central Business District (CBD)

^{**} Excludes Moscow City

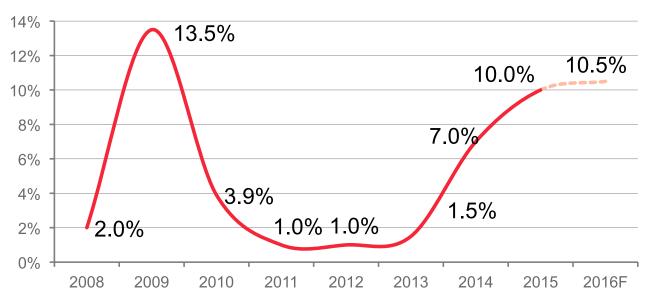
^{***} Including Outside MKAD projects

Warehouse market

TRENDS. MOSCOW REGION

The high vacancy rate is a key factor influencing the warehouse market. During the past 6 months the vacancy rate in Moscow has remained stable at the level of 10%. The vacancy rate is not dropping because of high construction volumes and extra warehouse space on the market after space optimisation by tenants. (27 >>)

27 ▶ VACANCY RATE, CLASS A

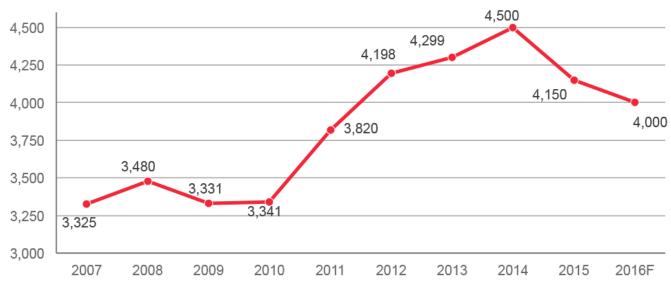


Source: Cushman & Wakefield Research

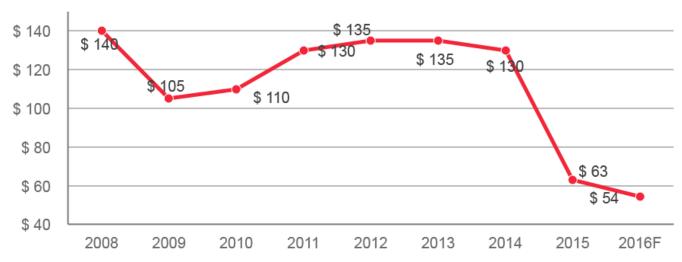
In order to quickly increase occupation, some landlords have decreased rental rates. In Q1 2016, the rental rate in the Moscow region dropped by 3–5% and now comprises

RUR 3,800–4,000 per sq m/year. The lease term is getting shorter. (28-29 \blacktriangleright)

28 ▶ NET RENTAL RATE IN ROUBLES (RUR/SQ M/YEAR)



29 ▶ NET RENTAL RATE IN US DOLLARS (USD/SQ M/YEAR)



Source: Cushman & Wakefield Research

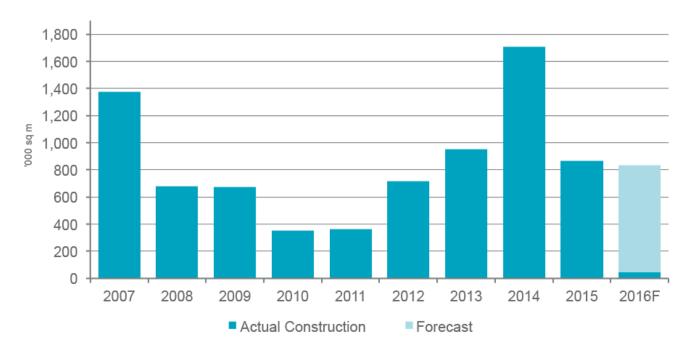
NEW CONSTRUCTION. MOSCOW REGION

In Q1 2016, 47,000 sq m of quality warehouse space was delivered to the market. Developers have announced that 824,000 sq m of warehouse space will be delivered to the market by the end of 2016, which is the same as in 2015. Only 20% of the new space is from new projects,

with the rest of the space from new phases of existing warehouses.

The vacancy rate did not change in Q1 2016 and is now at the level of 10%. At the end of the year we forecast that the vacancy rate will be the same at 9.5-10.5%. (30 \triangleright)

30 ▶ NEW CONSTRUCTION, CLASSES A AND B



DEMAND. MOSCOW REGION

Lease and purchase transactions in Q1 2016 exceeded the 2008–2015 average by 60% and comprised 218,000 sq m. Demand is being supported by retail chains specialising in food and household goods. Although the price of warehouse space is now low, consumers prefer to lease than purchase; in Q1 2016 only 6% of the space was purchased. (31 >)

Tenants are benefiting from low rental rates nominated in roubles and the sufficient availability of vacant space – they are more actively renegotiating existing lease contracts, relocating to higher quality projects, and consolidating warehouse space.

31 ▶ TAKE UP, CLASSES A AND B, '000 sq m



Source: Cushman & Wakefield Research

REGIONS

New construction decreased in the regions. We forecast that around 470,000 sq m of quality warehouse space will

be constructed by the end of the year, which is 40% lower than last year. (32)

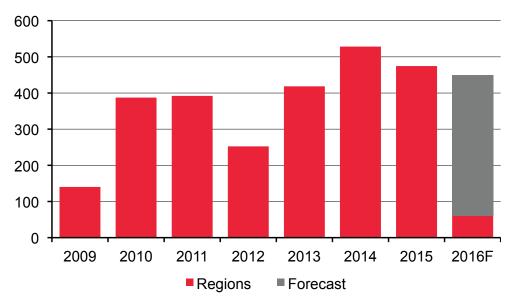
32 ▶ NEW CONSTRUCTION, CLASSES A AND B, '000 sq m



Local developers are continuing to construct small warehouse projects (less than 30,000 sq m). Large federal developers are offering build-to-suit options on their land plots.

In Q1 2016, take up exceeded the 2008–2015 average by 10% and comprised 61,000 sq m. We forecast the volume of lease and purchase transactions to be the same as in 2015 and to comprise around 450,000 sq m. (33 ▶)

33 ► TAKE UP, CLASSES A AND B, '000 sq m



Hospitality - Moscow Hotels in Q1 2016

The upscale segment saw growth in rouble ADR (average daily rate) and RevPAR (revenue per available room) from Q1 2015 and showed a 6% and 10% increase (RUR 12,146 and RUR 7,172) respectively. US dollar ADR and RevPAR figures fell by 9% and 6% and comprised USD 166 and USD 99 respectively. Overall occupancy increased by 2% (59%).

Business hotels showed the following results in January–March 2016. The US dollar RevPAR dropped by 13% (USD 52), which comprised a slight 1% occupancy increase and a 14% fall of ADR nominated in US dollars (USD 84). The rouble RevPAR increased by 2% (RUR 3,776) in line with a 1% ADR rise (RUR 6,147).

A decline was observed in the results for the midscale segment. ADR and RevPAR nominated in US dollars dropped by 22% and 17% respectively, and amounted to USD 61 and USD 40. The rouble ADR and RevPAR decreased by 9% and 2% (RUR 4,422 and RUR 2,944). The only positive result was in overall occupancy which increased by 4% (66%).

Average occupancy across all market segments of Moscow hotels in Q1 2016 grew by 2% (60%) from the same period of 2015. During Q1 2016, both the dollar ADR and RevPAR decreased (13% and 11% respectively), and amounted to USD 104 and USD 64. At the same time, ADR

nominated in roubles increased by 1%, and amounted to RUR 7,572, along with RevPAR which demonstrated a 5% increase (RUR 4,631).

Comparing the results of Q1 2016 to last year when we observed extreme fluctuations of the US dollar against the rouble, today we can conclude that these fluctuations have become less pronounced. The US dollar in January–March 2016 exceeded the exchange rate in the corresponding period of 2015 by 16%.

The absolute gap in RevPAR between market segments has changed and demonstrated the following results:

- The variation between the upscale and midscale segments comprised USD 59/RUR 4,228, compared to USD 56/RUR 3,532 in the same period of 2015.
- The difference in RevPAR between upscale and business hotels changed to USD 47/RUR 3,396 compared to USD 45/RUR 2,839 in Q1 2014.

No new hotels opened in Moscow and the Moscow region in Q1 2016.

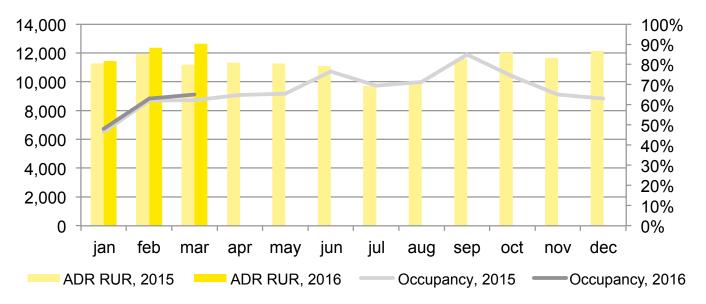
We expect the following hotels to open in 2016: (34–39 ▶)

34 ▶ FUTURE HOTELS ANNOUNCED FOR OPENING IN MOSCOW IN 2016

Name	Room number	Address	Class				
Moscow							
Holiday Inn Seligerskaya (former Iris Congress Hotel – rebranding)	201	Korovinskoe Highway, 10	4 stars				
Novotel Moscow Kievskaya	250		3 stars				
Adagio Moscow Kievskaya	150	Intersection of Kievskaya street and 2 nd Bryansky pereulok	3 stars				
Ibis Moscow Kievskaya	300	_ S. / a. i.s. / porce. i.s.	3 stars				
Hyatt Regency Moscow Petrovsky Park	298	Leningradsky Avenue, 36	4 stars				
Ibis Moscow Oktyabrskoe Pole	242	Marchala Duhalko Stroot 2	3 stars				
Ibis Budget Oktyabrskoe Pole	108	Marshala Rybalko Street, 2	2 stars				
DoubleTree by Hilton Vnukovo Airport	432	Vnukovo Airport	4 stars				
Total: 8 hotels	1,981						

Source: EY database, open sources, operator data

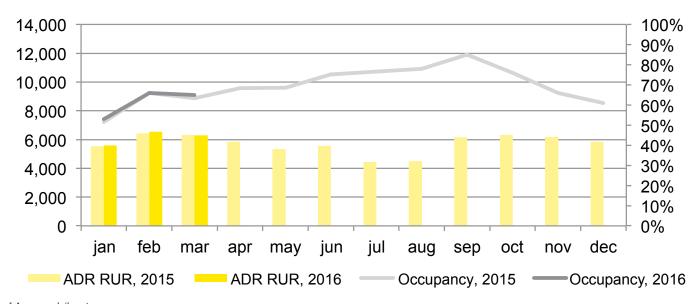
35 ▶ 5-STAR HOTELS: ADR* (RUR) AND OCCUPANCY, 2016 VS. 2015



^{*} Average daily rate

Source: EY analysis

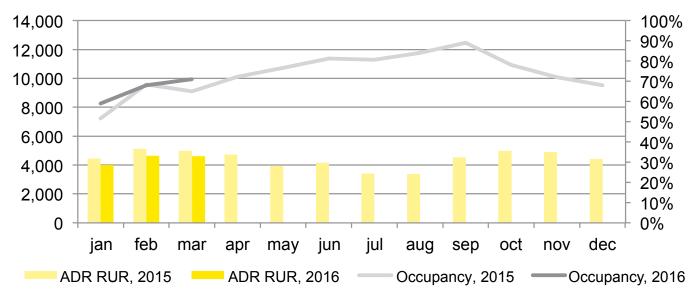
36 ▶ 4-STAR HOTELS: ADR* (RUR) AND OCCUPANCY, 2016 VS. 2015



^{*} Average daily rate

Source: EY analysis

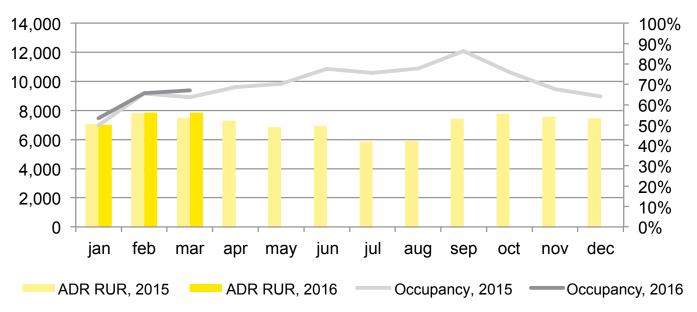
37 ▶ 3-STAR HOTELS: ADR* (RUR) AND OCCUPANCY, 2016 VS. 2015



* Average daily rate

Source: EY analysis

38 ▶ AVERAGE MARKET ADR* (RUR) AND OCCUPANCY, 2016 VS. 2015



* Average daily rate Source: EY analysis

39 ▶ **OPERATIONAL INDICES**

	January-March 2016 (US dollars/roubles)	January-March 2015 (US dollars/roubles)	January-March 2016/January- March 2015, %	2015					
5 stars									
Occupancy	59%	57%	2%	67%					
Average daily rate (ADR)	USD 166/RUR 12,146	USD 183/RUR 11,456	-9%/6%	USD 184/RUR 11,258					
Revenue per available room (RevPAR)	USD 99/RUR 7,172	USD 105/RUR 6,545	-6%/10%	USD 124/RUR 7,578					
4 stars									
Occupancy	61%	60%	1%	70%					
ADR	USD 84/RUR 6,147	USD 98/RUR 6,099	-14%/1%	USD 93/RUR 5,713					
RevPAR	USD 52/RUR 3,776	USD 60/RUR 3,706	-13%/2%	USD 65/RUR 3,962					
3 stars									
Occupancy	66%	62%	4%	74%					
ADR	USD 61/RUR 4,422	USD 78/RUR 4,851	-22%/-9%	USD 72/RUR 4,423					
RevPAR	USD 40/RUR 2,944	USD 49/RUR 3,013	-17%/-2%	USD 53/RUR 3,245					
Average									
Occupancy	62%	60%	2%	70%					
ADR	USD 104/RUR 7,572	USD 119/RUR 7,469	-13%/1%	USD 116/RUR 7,131					
RevPAR	USD 64/RUR 4,631	USD 71/RUR 4,421	-11%/5%	USD 81/RUR 4,928					

Source: Smith Travel Research, EY analysis

Moscow Housing Market

CURRENT OFFER

By the end of April 2016, the supply of apartments in the high-budget rental market in Moscow remained almost unchanged month-on-month (less than a 1% decline). However, since January there has been a marked decline (-12%) of luxury rentals on the market in response to high demand from tenants. Nevertheless, in comparison to the pre-crisis years, the supply is still significant: 17 vacant apartments for each tenant, compared to just 10 in April 2014.

"Since the beginning of 2016, the demand in the highbudget rental market in Moscow has almost reached the pre-crisis levels last seen in spring of 2014. On a positive note, there is increased interest in "quality" deals and units over RUR 600,000 per month."

DEMAND

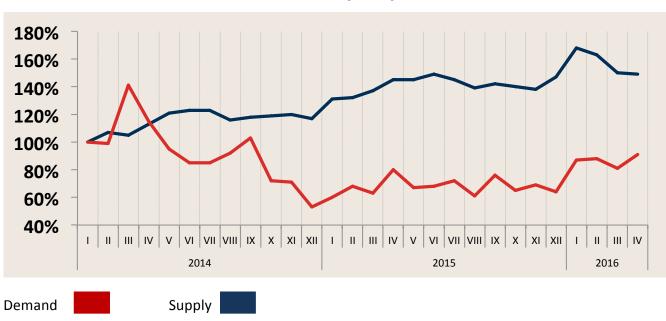
In April 2016, Intermark recorded the highest demand over the last 18 months. Year-on-year this translates as a 13% increase. The largest number of requests (nearly 30%) were for two-bedroom apartments with two bathrooms. The demand for properties with one and three bedrooms is distributed equally (25% each), 17% for studio apartments and 5% for spacious homes with 5+ bedrooms.

BUDGETS

Since the beginning of 2016, budgets have been stable at RUR 230–250,000 per month on average. Landlords are currently trying to find tenants and close contracts before the start of the summer (low market activity) based on adjusted rates tied to the exchange rate.

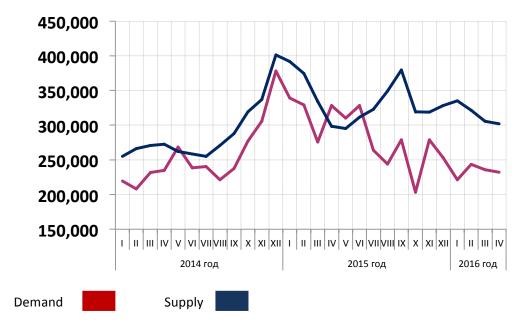
In fact, landlords stand to lose up to RUR 750,000 on average during the next three months, and up to RUR 1-1.3 million in the most popular and expensive areas. (40-42 \triangleright)

40 ► SUPPLY-DEMAND CORRELATION JANUARY 2014 (100%)-APRIL 2016



Source: Intermark Relocation

41 ▶ AVERAGE SUPPLY AND DEMAND BUDGETS JANUARY 2014 (100%)—APRIL 2016 (RUR)



Source: Intermark Relocation

St. Petersburg market overview

Office market

In Q1 2016, the modern office stock (Class A and B) in St. Petersburg increased by 55,100 sq m, with five office buildings delivered to the market. All the completed business centres were Class B+/B buildings. The total level of completions in 2016 is expected to be about 180,000 sq m, which is higher than in 2015 (163,000 sq m). Also, the administrative building of the Nevskaya Ratusha project was commissioned in Q1 (total area of 106,000 sq m, primarily designed for city administration committees). Due to uncertainty about its future, the building has not been included in the modern office stock.

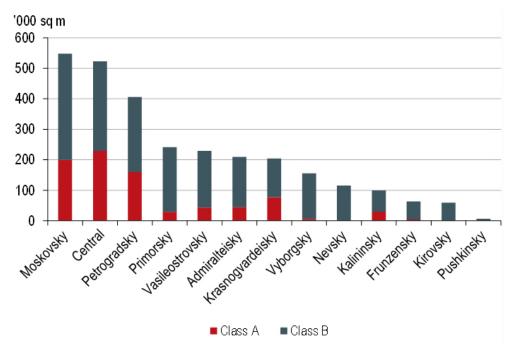
For the first time the total stock in Moskovsky District surpassed that of Central District. At the moment the modern office stock is equal to 2.86 mln sq m. Out of that, 548,000 sq m, or 19.1%, is located in Moskovsky District. 18.3% of

the office stock is located in Central District, which is a drop from last year.

Net absorption in Class A and Class B office centres in Q1 2016 was comparable with the completion level and amounted to 64,520 sq m. Vasileostrovsky District was the only district with negative net absorption. The vacancy rate did not change and is equal to 12.2%. In Class A the vacancy rate by the end of Q1 was equal to 11.3%, in Class B 12.8%.

In Q1 2016, rental rates in Class A increased by 1.5%, and in Class B- by 0.4%. The average asking rent was about RUR 1,580 per sq m/month in Class A and about RUR 1,125 per sq m/month in Class B (including VAT and operating expenses). (42 ▶)

42 OFFICE STOCK GEOGRAPHICAL DISTRIBUTION



Retail market

There were no quality shopping centres delivered to the market in Q1 2016. Two shopping centres are planned for completion in H2 2016 – Okhta-Mall SEC (78,000 sq m GLA) and Port Nahodka SC, phase II (10,900 sq m).

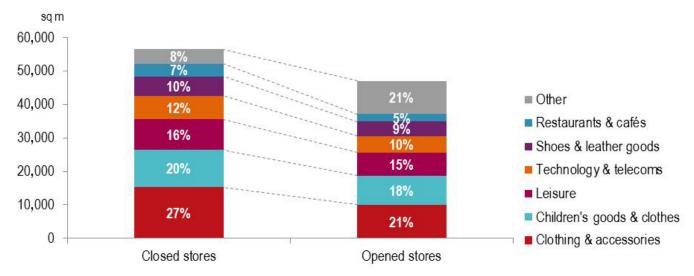
In Q1 2016, prime base rents in quality shopping centres were stable at RUR 75,000–80,000 per sq m/year (excluding VAT and operating expenses).

By the end of Q1 2016, the vacancy rate on the retail market increased by 0.5 pps, from 5.9% to 6.4%. Vacancy

rates increased in all the submarkets of St. Petersburg, except the eastern part of the city. The most significant increase occurred in the northern part, with vacancy rates going up from 5.5% to 6.6%.

The total closed retail space in Q1 2016 exceeded the area of opened retail space by 17%. Active rotation was observed in clothing & accessories and children's goods. In the Other category, only the health and beauty, household and furnishings, books, music and gifts segments showed active growth. (43 >)

43 ► TENANT CHANGES IN SHOPPING CENTRE IN Q1 2016



Street-retail market

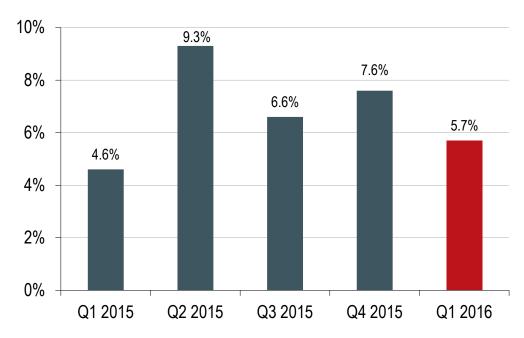
In anticipation of the opening of Vasileostrovskaya metro station, maximum base rents on 6–7th Lines and Sredny Ave V.O. increased by 15–30% in Q1 2016. At the same time, prime rents (typical for Nevsky Ave.) declined due to seasonally low tenant activity. In Q1 2016, the upper bound of rental rates decreased from RUR 12,500/sq m/month to RUR 12,000/sq m/month (including VAT). By the summer of 2016 we expect a stabilisation of prime rents and potential growth later this year.

The vacancy rate on the main street retail corridors continued to decline, and by the end of Q1 reached 6.4%, having decreased by 0.3 pps.

Rotation on the main street retail corridors in Q1 2016 was equal to 5.7%. This is lower than in Q4 2015 but comparable with the rotation in the first three months of 2015. In Q1, the highest rotation was observed on Kamennoostrovsky Ave. (9.4%) and Sredny Ave. V.O. (8.1%). This was the first time over the last year in which the quarterly rotation did not exceed 10% on all street retail corridors.

In Q1 2016, there was a balance of opened and closed street retail premises. The number of opened stores exceeded the number of closed stores by 6%. (44)

44 ▶ QUARTERLY ROTATION ON THE MAIN STREET RETAIL CORRIDOR



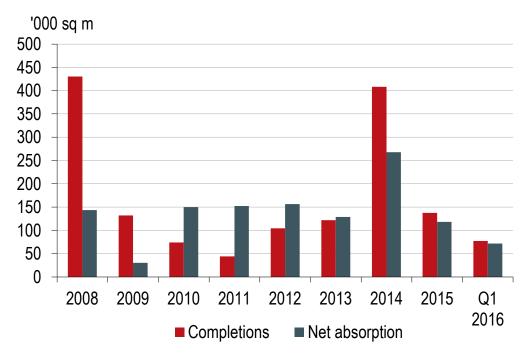
Warehouse market

In Q1 2016, four quality warehouse complexes were delivered to the market, with a total area of 77,000 sq m. All of them are built-to-suit projects. Another 192,000 sq m is announced for completion in Q2–Q4 2016, of which 51% is speculative space. If all the announced projects are delivered to the market, the total warehouse stock will reach 2.9 mln sq m.

The total take-up amounted to 59,000 sq m. This is almost twice the take-up of the same period of last year (31,000 sq m). Retail companies were the leaders on the demand side, with 39% of the total leased volume.

Net absorption in Q1 2016 reached 72,000 sq m, the highest volume in the first quarter in the last four years. Asking rental rates amounted to USD 50–55/sq m/year (without OpEx and VAT). (45 >)

45 ▶ COMPLETION AND NET ABSORPTION ON THE WAREHOUSE MARKET



Hot Topic:

Energy efficiency in construction: sandwich panels cut costs and carbon emission footprint



Senatorov Roman Sales Director Component Business, Ruukki

Modern requirements for buildings are getting "greener". Nowadays, when designing a building, engineers and architects have to take into account factors that help make them more environmentally friendly, e.g. to reduce the carbon footprint. This trend is encouraging the development of new innovative construction materials and technologies.

Unfortunately, so far it has not been possible to construct buildings which are completely harmless to the environment. However, there are solutions that help make buildings more energy efficient.

Scandinavian countries, such as Finland, are the global leaders in energy efficient construction. For example, in 2015 HAMK University in partnership with Ruukki built what was the first in Finland near zero-energy retail and commercial mall.

The company installed 24 solar collectors on the roof of the mall's technical area. Special energy piles were installed in the foundations to generate renewable energy to heat the building. Despite the fact that solar energy can meet the needs of the building only in summer and covers 50% of the total energy demand during spring and autumn, it is

still a big step in energy efficient building for countries with a lack of sunlight.

The demand for energy efficient buildings in Russia remains fairly low. However, at the same time there is a growing interest in energy efficient materials which enable heat insulation levels to be enhanced and energy consumption to be reduced.

Advanced sandwich panels are a good example of modern innovative materials for the construction industry. The exterior walls of a building made of sandwich airtight panels reduce heating costs and provide savings in overall lifetime costs. In addition, they significantly reduce carbon dioxide emissions. The use of modern energy efficient materials also raises the overall value of the building.

Sandwich panels are most commonly used in facades, partition walls and ceilings. The typical applications include industrial, office and commercial buildings, sports halls, warehouses and power plants. The panels are also suitable for food industry construction and demanding clean room applications.

Sandwich panels are cost-efficient prefabricated components that consist of an inner insulation core between two layers of colour-coated steel sheets.

The insulating core can be made from urethane plastic foam, polyester-styrene foam, polypropylene, polyisocyanurate (PIR), mineral wool plate or glass optical fiber. Polyusocyanurate (PIR) and glass optical fiber are the most environment friendly insulation materials, because the former does not consist of any substances that are harmful to the ozone layer, and the latter is usually produced from recycled glass cullet.

There is a wide range of sandwich panels on sale in Russia. However, not every manufacturer offers materials which are in compliance with the obligatory Russian requirements (GOSTs). When choosing sandwich panels for buildings you should make sure that the steel is galvanised and the thickness of the Zn layer is not less than 275 gr/m² or 22 micrones, as is required by GOST 14918-80. It is also important to note that only galvanised and polymer coated (e.g. PE, Hiarc, Hiarc Max, Pural, Pural Farm or PVDF) steel is long lasting (up to 50 years). Polymer coating protects steel from harmful ultraviolet rays and metal corrosion.

If a producer of sandwich panels follows all the rules and requirements, the product is suitable even for use in adverse climatic conditions. Despite the fact that the construction of buildings in regions with extremely cold or high temperatures requires extra attention in respect of the quality of the materials utilised, in Russia there are several projects in which sandwich panels have been successfully used. Examples of these projects are: military units located on Franz Josef Land and Samoylovsky Island on River Lena; schools in Labytnangi in the Yamalo-Nenets autonomous region and in the Sakha (Yakutia) Republic, where temperatures can fall below -60°C. An interesting fact is that the producer of the sandwich panels used in these buildings provides all of its customers with a warranty of up to 50 years.

Sandwich panels are extensively used in Europe, the USA and Canada. This material is even used to build houses in the public sector. An energy panel system can save up to 20% in the heating costs of a building. The highly airtight envelope solution increases a building's energy efficiency class and reduces its carbon footprint through the reduction in energy used for heating purposes. This

often results in higher LEED & BREEAM credits, which are needed to raise a building's investment value.

In Russia this product is not widely used, and mostly for industrial or retail buildings. But the projects completed in adverse climatic conditions provide evidence of the cost and energy efficiency of sandwich panels. This means that soon we will likely see a demand in growth for these panels.

Ruukki has production facilities in the Kaluga region, where it manufactures three-layer sandwich panels for walls and roofing. In 2016, the company launched a new production line of energy efficient sandwich panels. The new product is made of up to 85% recycled materials (steel and glass fiber) and reduces the carbon footprint by up to 45%. In addition, the company is heavily involved in developing energy-efficient solutions for the construction industry.

Speaking about the first near zero-energy mall to be built in Finland, scientists and engineers used not only solar collectors, energy piles and sandwich panels, but they also designed an entire system to create an energy efficient building: they installed large windows and utilised special window panels with opal polycarbonate sheets, which help to defuse daylight without glare and extra heat gain. This measure helps to reduce artificial light by up to 55%.

The first near zero-energy mall for retail and commerce purposes to be built in Finland was the first successful project in a country with a low number of sunny days per year. So scientists and manufacturers are on the right path to finding alternatives to traditional construction techniques and materials in favour of more energy efficient and environmentally friendly ones.



AEB REAL ESTATE COMMITTEE

The AEB Real Estate Committee was founded in 2003 and brings together real estate professionals from a variety of areas including developers, investors, financiers, consultants, project and facilities managers, and other service providers.

The Real Estate Committee has three primary objectives around which its activities are structured: to facilitate the exchange of information regarding real estate and development issues in Russia; to influence existing procedures in order to increase the attractiveness of foreign and domestic investment; and to establish a "bridge" between the AEB, the Moscow Government, State Duma and other relevant governmental bodies.

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