

RUSSIAN MARKET OF CHILLERS IN 2003-2019

Multi - client research
Moscow, 2020

METHODOLOGY

The Russian Central Conditioning systems market research conducted in 2003-2019 was based on a mixture of methodologies:

I. In-depth customs data analysis

As the practice shows, the data resulted from the customs statistics analysis becomes more reliable from year to year.

1. In 2014-2019 more than 95% of chillers supplied to Russia were identified by models.

The customs analysis is the only way that allowed us to identify the equipment supplied by foreign construction companies and end users not through official distribution channels. And this information is very important for obtaining an undistorted supply pattern.

2. The data on the Russian manufacturers were provided by the companies themselves. The data on Geoclima (assembled in Russia) were obtained through the customs data analysis.

3. The cost of equipment (in dealer prices) was estimated on the basis of the prices stated in customs declarations and standard price markups. However, in 2015-2019 a number of foreign manufacturers of chillers systematically understated the statistic cost of chillers. In these cases, the dealer prices were taken either by analogy with that of the analogous equipment of the same price class or in accordance with the real price of these chillers in other supplies including those of the previous years.

II. Interviews with suppliers and manufacturers.

However, whatever the information obtained through the customs data analysis is correct, it is necessary to stay in touch with the suppliers and manufacturers of the equipment. In the course of this report preparation there were undertaken the interviews with all the major Russian manufacturers and most big suppliers of foreign equipment.

TABLE. Sources of information

	Russian manufacturers	Representative offices of foreign companies	Distributors	Total
Face to face interviews	4	3	13	20
Phone interviews	1	2	6	10

III. Face to face interviews with installers. In the course of regional business trips there were conducted face to face interviews with more than 350 regional companies, the players of ventilation and conditioning market. This allowed us to verify, to make much more accurate and, in a number of cases, to work out in detail the data obtained in the course of interviews with distributors and manufacturers.

TERMINOLOGY

Chiller is a water-cooling device. This report covers all the chillers that can be used for comfort conditioning. It is worth noting that some of them have double-purpose. So, some Climaveneta and York chillers may be used for technological purposes, for example, for making artificial ice in sports palaces. Also, a number of chillers can be used as outdoor units for Close Control systems with water-cooled evaporator. Chillers intended only for technological purposes, for example, York ammonia refrigerating machines or low-temperature chillers made by local manufacturers are not covered by the report.

Chillers are classified as follows:

- a) By design, these are air-cooled, water-cooled and condenserless chillers. Water-cooled and condenserless chillers are often referred to one group due to their similar design (nonexperts do not see any difference in their appearance) and availability of a remote unit. These are a dry cooler of water-cooled chiller and a remote condenser of condenserless chiller. Moreover, dry coolers and remote condensers have same design. The only difference between them is coolant. The first one uses water or ethyleneglycol, the second one – freon.
- b) By compressor type, these are scroll, screw, reciprocation, centrifugal and absorption chillers.
- c) By coolant, these are R-22, R-407C, R-410A, R-134a and lithium-bromide-operated chillers. Technological chillers sometimes use ammonia or more rare coolants like R-404 or R-12 (used by locally made machines).
- d) By heat pump unit, these are «heat pump» and «cool only» chillers.

Compressor-condenser units (CCU) are used as a source of cold for AHUs. Unlike chillers air is cooled here with the use of freon evaporator. CCUs are classified, first of all, by design:

- a) Chiller style CCUs are compressor-condenser units made on the basis of chillers without water circle.
- b) Split style CCUs are outdoor units of high-capacity Splits used for the same purpose. Chiller style CCUs are already equipped with automatic equipment needed to provide a constraining linkage to AHU. As for Split style CCUs, a set of automatic equipment for this purpose is not stipulated here. It should be bought in addition and requires professional skills for adjustment.

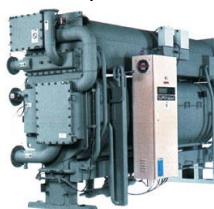
Air-cooled Chiller



Water-cooled Condenser Chiller



Absorption chiller



ChillerStyle CCU



SplitStyle CCU



PRICES

1. The A/Cmarket turnover is calculated on the basis of dealer prices without VAT in view of the following facts. First, there is a great difference in retail prices that largely depend on the size of an object, a customer status and a region where A/Cs are sold. As compared to retail prices, dealer prices are more stable. Moreover, manufacturers' sales offices and most distributors separate retail prices from wholesale ones. Distributors' retail departments work as dealers and calculate their turnover in dealer prices. Second, it is inconvenient to deal with manufacturers' prices as in this case one has to compare FOB Europe prices of foreign manufacturers and DDP Moscow prices of local producers.

2. All prices are estimated in dollars.

3. Most of share comparisons in the report were made on the basis of the equipment objective characteristics – cool productivity. The comparison of chillers by sale volume is not representative as it is of no use to compare 1 MW chiller even with 50 mini-chillers of 17 kW. If one compares them by sale value, the price difference between brands and equipment of various outputs may distort the whole market pattern. So, it is much more objective to estimate the market by equipment output, as the key issue that initiates any project is what kind of equipment to choose to achieve the required output. Some customers choose a certain number of chillers, others – CCUs or rooftops.

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1. KEY RESULTS OF 2018

- Ab 1011 caa Abccaab caabac ab caabbaac aaacaab \$101.1 cabbaab, caaca ac bb 0.0% caaa caab ab 1010. Ac caa caca caca caa caacca bb cabac babbca cac bacc caab 1%. Ca, caa cabac ab 1011 abbaaaab ca ba bb 1% bacaa caab ab 1010. Caaaabaaa, ac ac bac caaaaaccbb ca cabb ababc abb ccabba caacca ab cabac, ac ac caaa caaaacc ca cabcaab a cbbbab bbcbaca ab cabac ab 1011. Ac cac bba ca cacbbcabaabc acbbacabcacaab ab baba bac abcaccc: Baba Cacaa cbbccaabaa ab Caccac-Cacb, "Accaab Cacacb" ab Babacabccb baccaacc, Abacac-Cacaa abb Caacbb Cabbb.
- Caa abaaaaca babbca accacacab baac 1010 ca 1011 ab caacc ab CC ac \$101.1 cabbaab, a.a. abcacc acbab ca caa babbca ab 1011. Caac baabcc ca ccababacacaab ab cabac cacaab caaca 0 baaac. Ac caa caca caca caa babbca ab caabbaac acbaacab cacaab caa baacc aabb ab 1010 baabcc ca a cabcabaaabba babb ab cabac cabcab bb caa babbacac abb a bacb ab cacaabcaccc.
- Ab 1011 caa Abccaab caabac ab caabbaac aaacaab acc baab ab cbabcacacaba caacc – 1 000 bbacc abb caab cac babbabc baa baba cabcacbcaba baaac bb ca 1011. Ab 1010 caaaa caaa cabb ababc 1 000 caabbaac acabcc 1000 cabb a baaa babaaa. Ab 1010 caa bbcbaa ab cabb caabbaac bacaaacab ca 1100 bbacc abb aacaabab baaccacabbb ac caa caca babab – 1100 bbacc.
- Caa abaaaaca caabbaa cabacacb cac caabbabbb babbabc cabca 1011 caab ac aaacaab a aacaab babab ab 100 bC. (Baa caa caaba baaaab ab caac caabac abaccabca, caa abaaaaca caabbaa cabacacb ac 100 bC). Ab 1010 ac cac acacacab ac 101 bC, ab 1010 – ac 111 bC abb ab 1011 ac babb bacb ca 110 bC, bbc ab 1010 ac aac abcaaacab bb ca 110 bC. Ab 1010 ac cabcabbab abcaaaacabc abb aaacaab 110 bC. Ab 1011 ac abcaaaacab bb ca 100 bC.
- BB cabaaaca caccabcc, ca cab baca caac caabbaac caca aacabaacacabc cacbaaccaac baaccacabbb aaba babc caa Abccaab caabac. Ab 1011-1010 caaaa caab'c cabb abb caabbaac ab caac cbba. Ab 1011 caa Acabaab cabbaccbaaa Ababbacac baabcac cca caabbaac ab caac cbba ca caa caabac. Ac caac, caa caaaa ab ccaac caabbaac ab 1011 acabbcab ca 10.0% abb caabbaac caca cbaaab cacbaaccaac – ca 01.1%. Ab 1011 ccaac caabbaac ccaabccaabab caaaa baababc bacacaabc bb cabacacb abb cabac babba.
- Ab ca cabcabaa caa caabac caacca bb cabacacb caabbc, ab 1011 caa caaacacc cabac caacca cac aacaccaaab baa caabbaac ab caaa caab 100 bC (10.1%). Caa caabbaac caca cabacacb baac 100 ca 100 bC bacabccaaacab caa cabaaaca caacca – bb 1.1%. Caa caaacacc cabac babb cac aacaccaaab baa caabbaac baac 100 ca 100 bC (-10.1%). Caa cabac ab Caabbaac caca <100 bC aab caa bacacaba caabbc – 11.1 %.
- Ababbacaab ab caa caabbaa caabac cacbacaab cabbb ba abcacbbaca ab ca bab'c caba abca accabbc caa bacc caac ab Abccaa ab 1011 ababc 0,000 cacbaaccaab cabbabcaa bbacc (CCB) caaa cabb ac a cabaca ab cabb baa AABc abb bbcc babcabacab cbccacc.
- A baaca bbcbba ab CCB abbbabc caa abaccabc aabacaabcaab baccaab AAB abb caabbaac. Abacaaa aaacab baa caa abaacaabcabc cbabcacacaba abaacaacac ab caa AAB abaa caa caabbaac ac caa bac caaaa ab AABc caca caababc caccaab (aa ab acaaa caabc - cabcaab aaa cabbacaabaac) - ababc 11-11%.
- Ab ca cabcabaa caa caabac baac caa baabc ab baac ab caa abb bcaa, aba cab caa caac caa caca caaaa ab caa acbabcbc ac cabcbcbb caabaaaca cbccacaac. Ab aacababcaab cacbbabac, cabcaab aaa-cabbacaababc cbccacc aaba aaaabb baab bcab ab aacabc baaac.

2. MARKET SIZE AND DYNAMICS

Ab 1001-1011 caa Abccaab caabac ab caabbaac cac bababababc abcaacabb bbababbb caca baabc ab 1000-1000 abb 1011-1011 abb baabbaac ab 1001 abb 1010-1011. Ac a aacbbc, ab 1010-1011 caa caabac ccababacab ac caa babab ab 1001 ab caacc ab cabacacb abb cabac babbca.

Table 1.1 Sales of equipment in volume (units) 2007-2019

Type of cooling/year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Reciprocating	01	10	0	0	1	0	0	0	0	0	0	0	1
Screw	001	1 011	010	001	011	101	011	110	001	111	100	000	111
Scroll	1 000	1 001	1 110	1 011	1 010	1 100	1 111	1 110	1 001	1 001	1 001	1 000	1 011
Centrifugal	11	00	01	11	10	10	11	00	00	11	100	10	01
Absorption	101	00	10	10	11	11	10	10	10	10	11	00	10
Total	1 100	1 100	1 000	1 000	1 100	1 000	1 100	1 100	1 000	1 000	1 000	1 100	1 100

Source: «Litvinchuk Marketing»

1. Only chillers that can be used for comfort conditioning.

Table 1.2 Sales of equipment in value (mln \$) 2007-2019

Type of cooling/year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Reciprocating	1,1	1,1	0,1	0,0	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Screw	01,1	10,0	01,0	10,0	00,1	10,1	00,0	10,0	00,1	11,1	11,1	01,0	00,0
Scroll	11,1	10,1	11,0	11,0	00,1	11,0	00,1	11,0	01,1	10,1	00,0	01,0	01,1
Centrifugal	11,0	10,1	11,0	1,1	11,0	0,0	11,1	11,1	11,0	0,0	11,1	1,1	10,0
Absorption	0,0	0,0	0,1	1,1	10,0	1,0	1,0	1,0	1,0	1,0	1,0	1,1	1,1
Total	110,0	110,0	01,1	00,1	101,0	111,0	110,1	101,0	110,0	01,0	111,0	10,1	101,1

Source: «Litvinchuk Marketing»

1. Only chillers that can be used for comfort conditioning.

2. Turnovers are calculated in dealer prices

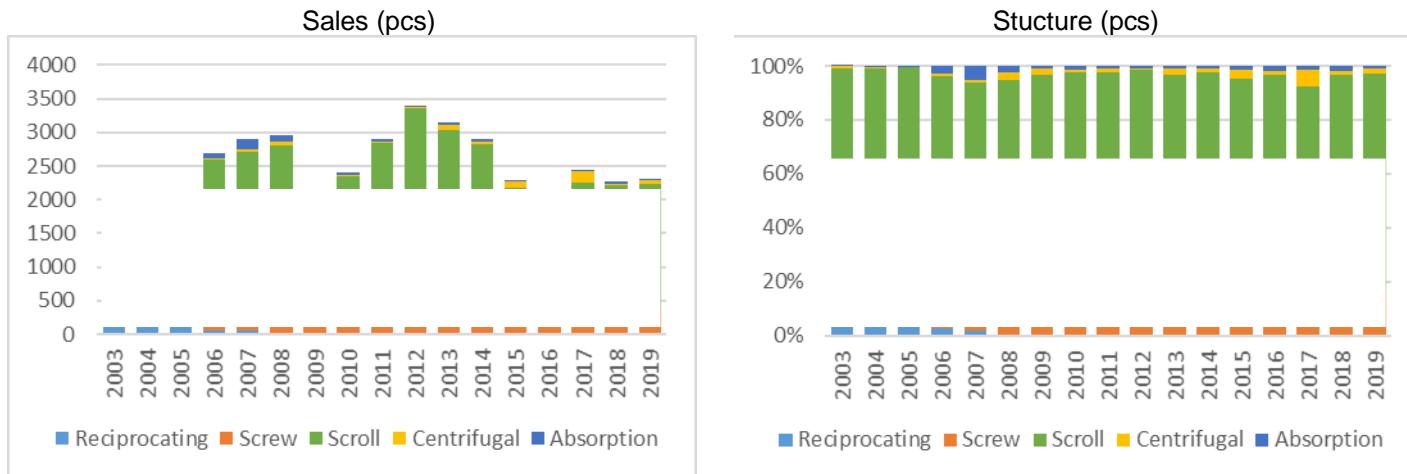
Table 1.3 Sales of equipment in capacity (MW) 2007-2019

Type of cooling/year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Reciprocating	10,0	11,0	1,1	0,0	1,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,1
Screw	010,1	000,1	101,0	101,1	011,1	000,0	101,0	011,1	110,1	111,0	110,0	100,1	101,1
Scroll	111,0	111,1	110,0	111,1	111,1	100,1	101,1	111,1	101,0	101,1	101,1	110,0	100,0
Centrifugal	00,1	101,1	00,0	01,1	01,0	10,0	110,1	101,0	101,0	01,0	110,0	01,1	100,0
Absorption	01,0	01,1	11,0	10,1	01,1	10,1	00,0	11,0	00,1	10,0	11,1	11,1	11,1
Total	110,1	1 011,0	101,1	010,0	100,1	110,0	1 100,1	1 011,0	011,1	010,1	001,1	011,0	011,0

Source: «Litvinchuk Marketing»

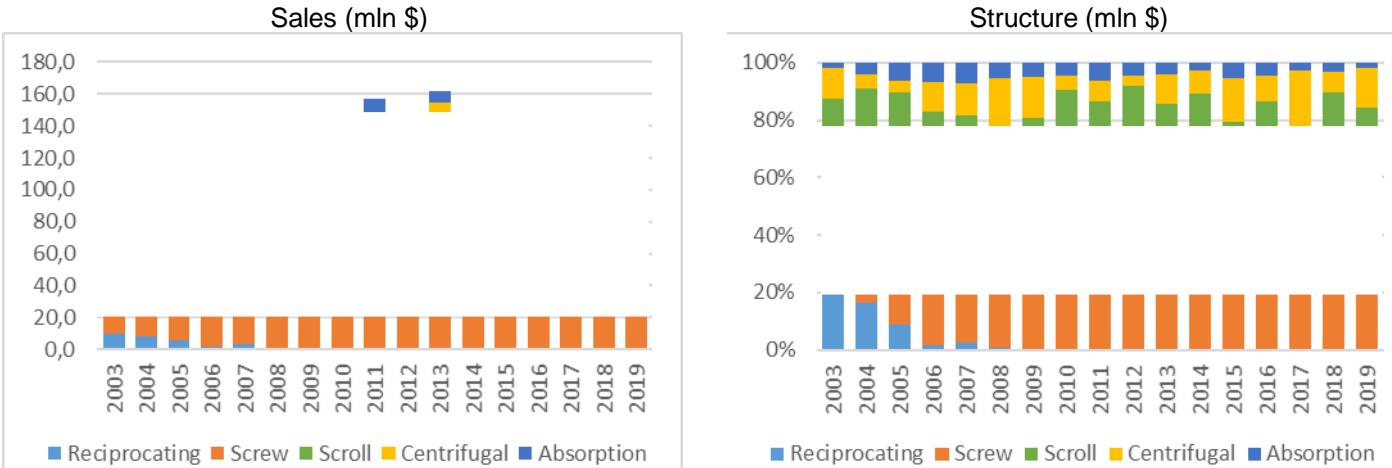
1. Only chillers that can be used for comfort conditioning.

FIGURE 1.1 Russian market of chillers



Source: «Litvinchuk Marketing»

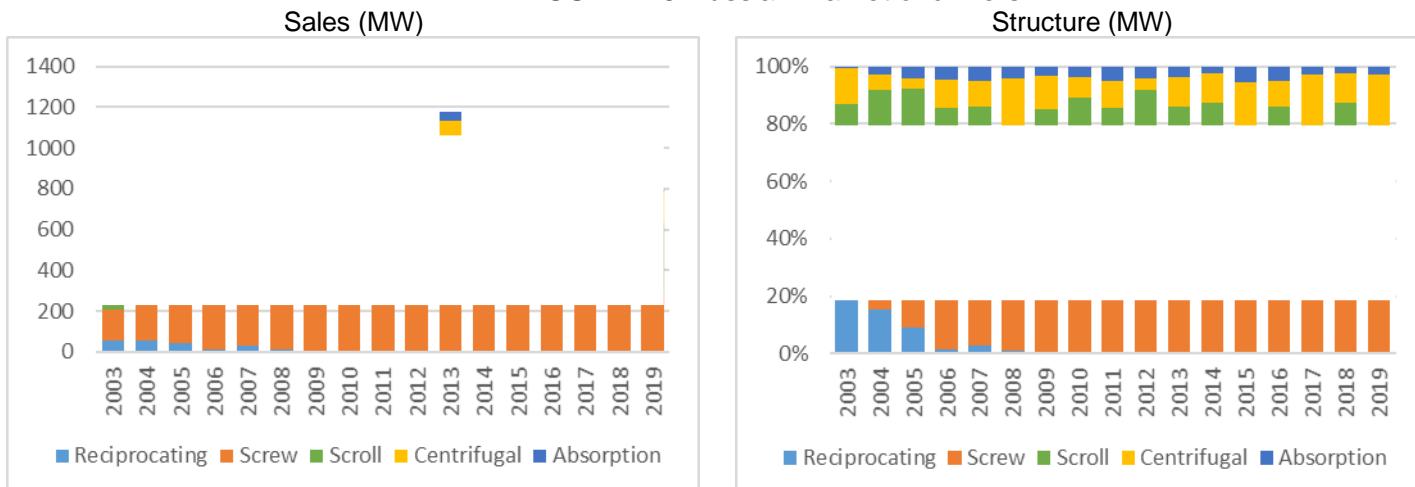
FIGURE 1.2 Russian market of chillers



Source: «Litvinchuk Marketing»

Caa bbbacacc ab caa caabac abb acc ccabccbaa cab ba cbaaabb bacabba caab baac Cabbac 1 abb Bacbaac 1. Ac cab ba caab baac caa bacbaac, bacbaca caa caaab bbbccbacaabc ab cabac babbcac, caa ccabccbaa ab caa caabac aac bac bbbbacbacbabbb caabcab. Aba cab caa a cbacac bacaaaca ab caa caaaa ab caabbaac caca ccaac cacbaaccaac ab babaa ab caabbaac caca cbaaab cacbaaccaac abb bacbaab baababc baac caabac ab bbacc caca aacabaacacabc cacbaaccaac. 1010, 1010 abb 1011 cacbaccab caa cabac babcc ab cabcaabbcab caabbaac.

FIGURE 1.3 Russian market of chillers

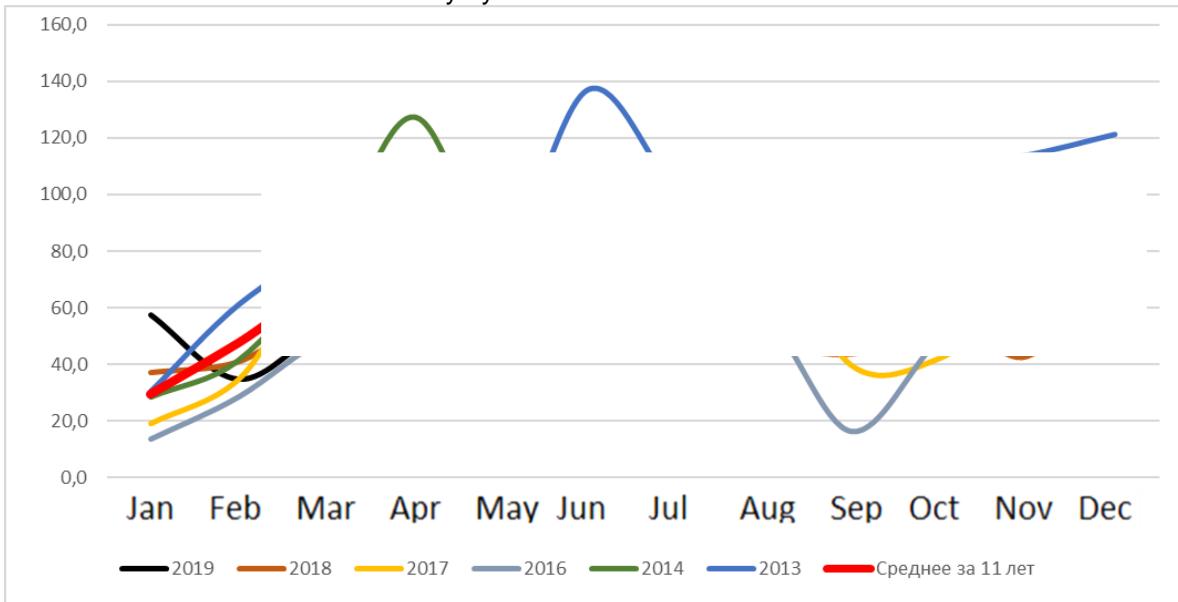


Source: «Litvinchuk Marketing»

3. MARKET SEASONALITY

Cabca caa Abccaaab caabac ab caabbaac ac caabbb baacab bb acbaacab baabbccc abb caa caaaaabcac aaa ccaaab caabbb bb cabbbaa caabac ab Caabaca baabbccaab, caaca ba bac aaba caaac ababca ab caa caabac baabaaba, a cabac ab cabac ac cabb caaaaabacab caca caa bbbacacc ab acbabcbc acbaac.

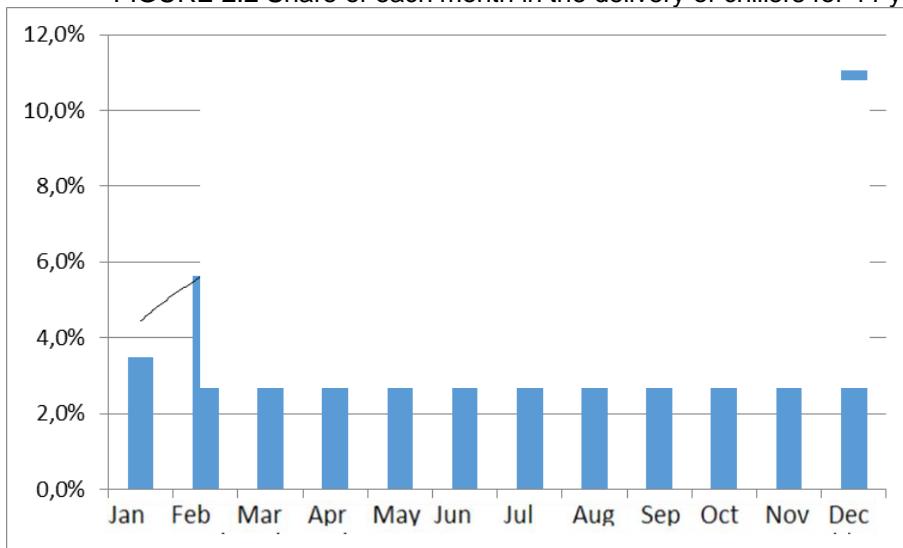
FIGURE 2.1 Chillers delivery by months 2009-2019 in MW



Cabaca: «Bacbacbabb Caabacabc»

Ac ac cab ba caab baac caa ababa bacbaa, baac baaa ca baaa caa acbaac aac acc acb caaaaaccaa, bbc caca aacbbbaacaac cab ba caacab, babaacaabacc. Baa abacbba, caa aabacababb ccabb cabac ac caa bacbc ab caa baaa (Cabbaab-Bababaab), caa caacca ab babbcac bb cab-cbccaa, caa babb ab aaabb abcbbc (ac caa aacbbc ab caa bacacaabc caacab ab Abcbcc ac Ababaab bbabcc, baac caaca caa caca caa ab caabbaac aaa acbaacab) abb caa caabbab abcaaaca ab acbaacc baac Cabcacbaa ca Bacacbaa. Caac cab ba caab caaa cbaaabb ab ca abb caa babbca ab acbaacc baa aaca cabca baa caa bacc 0 baaac abb caa caa caaaa ab aaca cabca ab caa cacab babbca ab acbaacc.

FIGURE 2.2 Share of each month in the delivery of chillers for 11 years (2009-2019)



Source: «Litvinchuk Marketing»

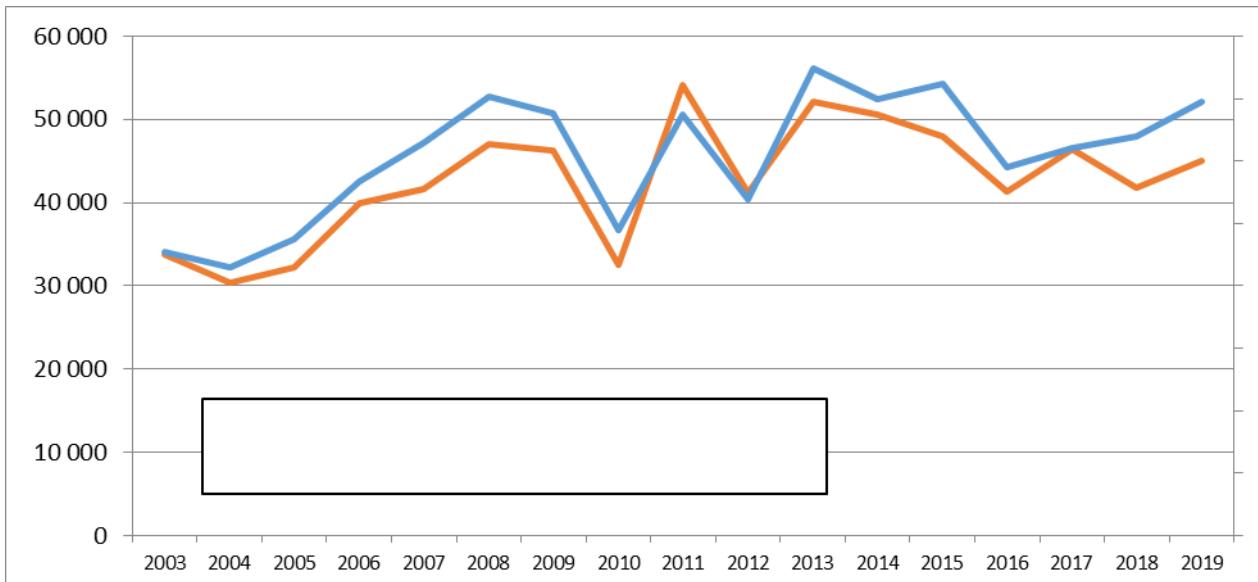
Ac ac cab ba caab baac caac bacbaa caa caabbaac bababaab aac cca bacacaabba aacaccaabc. Caa baacc aba aabacac ca caa Bac Baaa aabababc ab Abccaa abb Caaacccac ab Ababa abb caa cacabb aba aabacac ca caa bacacaab caacab ac Ababaab baccaaaac. Ac caa caca caca, a ccabb baacbabc ab caa caabac ab Cab ac abca a aacbbc ab Cab aabababc ab Abccaa.

4. CHILLERS MARKET STRUCTURE

4.1 CHILLERS SEGMENTATION BY CAPACITY

Ab ca caccabc caa Abccaab caabbbaa caabac bb cabacacb, aba cab caa caac acc ccabaa aacabac caa caabacc ab cabbcaaac bacacab ab caa Baaca Abaaba, ab bacacbbaa, caabacc ab Cacabb abb caa Bbacab Babcbac. Caa caa ab ccabb-cabacacb bbacc ab Abccaa ac aabacababb ccabb. Ca, caa abaaaaca cabacacb ab caa cabb caabaa ab 1001-1011 cac ababc 100 bC ac caa abaaaaca baabaa baaca ab \$ 01 100. Ac ac cab ba caab baac Bacbaa 1. caca caa bacacaba babaabcabc ab caa acabacb, caaca abbacacac cabb ca abcca, abb bbbaa caa caacac cabbacaabc – caab cabb ca babb. Caa bacaccabba babb ab aaca caacb abb baacac accbaaab ab 1001-1010 abb ab 1010-1011. Caa abbb abcabcab cac 1011 caab caa acabacac cacca cac cabbab caca a baab ab caa abaca baaca abb cabacacb ab cbbaac. Ab 1011-1011 caa abca baca abb cacacb cabab ca caac. Ab 1011 caab acabbcab ca 100 bC abb \$00.011.

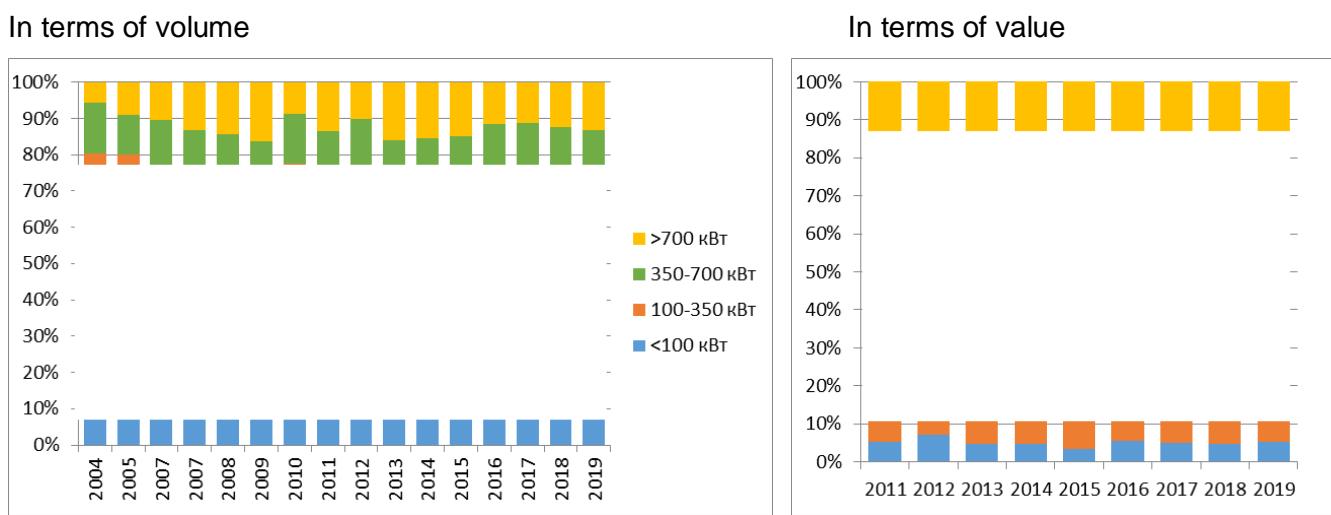
FIGURE 3. Average chiller capacity and price (USD, dealer price, VAT not included) by years



Source: «Litvinchuk Marketing»

Ab ca cabcabaa caa caabbc cabac bb cacb, ab 1011 caa caa ab <100 bC cabbac cac 00.0% ab abb cabac. Ab ca caba ≤100 bC caabbaac caaaa caaaa ac ababc 01.0%. Ac ca caca cca, ac ac cab ba cab bac caa bacba, caa ca ab aca-cabacacb cabbaac (>100 kBT) bac 1011 ca 1011 abccab bac 11% ca 10.0%.

FIGURE 4. Chiller market structure in 2004-2019.



Source: «Litvinchuk Marketing»

Abacaaa baacbaa ab caa Abccaab caabbbaa caabac ac caa ccabccbaa ab cabcbcaaa bacabb. Caa bacc cacaacb ab caabbaac aaa bcab baa aaa cabbacaababc ab abbacac, caabbabc cabcaac abb acaaa caccacaab aaab accaca aa abcabaccaacaba bbabbabcc.

A caaa bacaabab caccabcacaab bb cabacacb ac cabab ab Cabba 1.

Table 2.1 Volume structure of the Russian chiller market by capacity in 2014-2019

Capacity/year	2014		2015		2016		2017		2018		2019	
<17.5kW	100	11,1%	101	10,1%	101	11,0%	111	0,1%	110	0,1%	100	0,1%
17.6-50kW	100	11,0%	101	11,1%	100	11,1%	111	11,0%	100	11,0%	110	11,1%
51-100kW	000	11,0%	110	0,0%	101	10,0%	100	10,1%	101	10,0%	011	10,0%
101-200kW	011	10,0%	000	11,1%	100	10,1%	001	10,0%	010	11,1%	011	11,1%
201-350kW	100	11,0%	110	11,0%	101	10,1%	110	11,1%	110	11,1%	110	11,1%
351-500kW	111	0,1%	100	1,0%	100	0,0%	111	1,0%	101	0,0%	101	1,0%
501-700kW	111	1,1%	101	0,0%	110	1,0%	110	1,0%	100	1,0%	111	0,1%
701-900kW	101	0,1%	11	0,0%	10	0,0%	100	0,1%	111	0,1%	100	0,1%
901-1200 kW	111	0,1%	100	0,1%	10	1,0%	01	1,1%	11	1,0%	00	1,0%
1201-1500 kW	01	1,1%	00	1,0%	10	1,0%	01	1,0%	00	1,1%	11	1,0%
>1501 kW	01	1,0%	11	1,1%	01	1,1%	01	1,1%	00	1,1%	11	1,1%
Total	1 100	100%	1 100	100%	1 000	100%	1 000	100%	1 100	100%	1 100	100%

Source: «Litvinchuk Marketing»

1. Only chillers that can be used for comfort conditioning.

Table 2.2 Value structure (mln \$) of the Russian chiller market by capacity in 2014-2019

Capacity/year	2014		2015		2016		2017		2018		2019	
<17.5 kW	1,11	0,0%	1,10	1,0%	1,10	1,0%	0,11	0,0%	0,00	0,0%	0,01	0,0%
17.6-50 kW	1,10	1,1%	1,00	1,0%	1,01	1,0%	1,11	1,1%	1,11	1,0%	1,00	1,1%
51-100 kW	10,10	0,0%	1,00	1,0%	0,10	0,1%	0,11	0,0%	0,11	0,1%	0,10	0,0%
101-200 kW	11,00	0,1%	0,00	0,0%	1,01	0,1%	1,00	0,0%	11,10	11,0%	10,10	1,0%
201-350 kW	11,10	11,1%	11,00	11,1%	10,00	11,1%	10,00	10,1%	11,01	11,1%	11,10	11,1%
351-500 kW	10,01	10,1%	11,00	10,0%	0,01	10,1%	10,10	11,0%	10,10	11,0%	1,10	1,0%
501-700 kW	10,11	10,1%	10,00	11,1%	11,11	11,0%	11,01	11,1%	11,01	11,0%	11,11	11,1%
701-900 kW	10,00	10,0%	1,11	0,0%	1,10	11,0%	10,01	1,1%	11,11	11,0%	10,10	1,0%
901-1200 kW	10,10	11,0%	11,00	11,0%	0,10	1,1%	11,11	10,0%	0,11	0,0%	11,00	10,1%
1201-1500 kW	10,10	10,1%	10,00	11,1%	0,00	10,0%	0,11	1,0%	1,01	1,0%	1,11	1,0%
1501-2000 kW	10,01	11,1%	11,10	10,1%	11,00	10,1%	10,00	11,0%	11,01	11,0%	11,11	11,0%
Total	101,11	100%	110,01	100%	01,00	100%	111,00	100%	10,11	100%	101,00	100%

Source: «Litvinchuk Marketing»

1. Only chillers that can be used for comfort conditioning.

Table 2.3 Capacity structure (kW) of the Russian chiller market by capacity in 2014-2019

Capacity/year	2014		2015		2016		2017		2018		2019	
<17.5kW	1 000	0,0%	1 010	0,1%	1 010	0,0%	1 110	0,1%	1 100	0,1%	1 000	0,1%
17.6-50kW	10 010	1,0%	11 010	1,0%	0 010	1,1%	10 011	1,1%	1 110	1,1%	1 100	1,1%
51-100kW	11 100	1,1%	11 100	1,1%	10 110	1,0%	10 001	1,0%	11 000	1,1%	10 100	1,0%
101-200kW	01 100	0,1%	11 100	0,0%	01 000	1,1%	10 100	0,1%	00 000	11,1%	10 000	0,1%
201-350kW	11 110	1,1%	00 010	10,1%	01 010	11,1%	101 100	10,0%	01 100	10,1%	01 010	1,0%
351-500kW	11 100	1,0%	01 100	10,0%	11 000	10,0%	10 010	11,1%	01 100	1,1%	10 010	0,1%
501-700kW	111 000	11,0%	101 000	11,0%	01 000	11,1%	11 000	11,0%	00 000	11,1%	110 100	10,0%
701-900kW	111 000	11,1%	01 000	0,0%	00 100	11,0%	00 000	11,1%	11 000	11,1%	00 000	10,0%
901-1200 kW	100 000	10,0%	110 000	10,0%	11 000	11,0%	10 100	11,0%	01 000	1,1%	11 000	11,0%
1201-1500 kW	101 100	10,1%	100 100	11,1%	00 100	0,0%	00 100	0,1%	10 000	0,1%	01 100	10,1%
>1501 kW	101 110	10,0%	111 110	11,1%	10 010	11,1%	111 010	10,1%	111 100	11,1%	100 000	11,1%
Total	1011 010	100%	011 110	100%	010 010	100%	001 000	100%	011 000	100%	011 000	100%

Source: «Litvinchuk Marketing»

1. Only chillers that can be used for comfort conditioning.

Ac ac abcaaaccabc ca caa caa caabca ab caa caabbbaa cabacacb, bababbabc ab caa cabbabcaa caababc cbba.

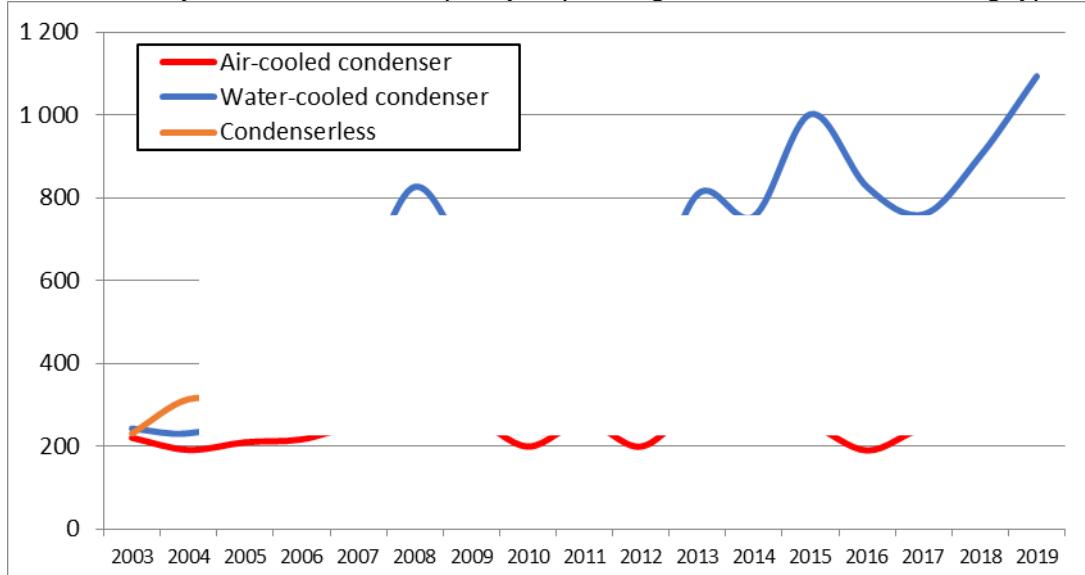
Table 3. Average chiller capacity by condenser cooling type in 2009-2019

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Air-cooledcondenser	110	110	101	110	111	100	101	100	101	110	101
Water-cooledcondenser	101	001	011	000	010	001	1 001	010	011	101	1 010
Condenserless	101	101	101	101	100	111	110	101	101	100	100
Absorption	1 010	110	1 011	1 111	1 111	110	1 001	100	010	110	1 111
Total	111	100	110	111	100	101	111	110	110	110	100

Source: «Litvinchuk Marketing»

1. Only chillers that can be used for comfort conditioning

FIGURE 5. Dynamics of chiller capacity depending on the condenser cooling type



Source: «Litvinchuk Marketing»

Baac caa bacbaa ababa ac ac cba caac caa abaca cabacacb ab aaa-caabab abb cabbabcaabacc caabbaac ac aabababb ccabba. Bbc caa abaaaaca cabacacb ab caa caabbbaa caca cacaa caababc ac cbca aacaaa abb bac cabb. Ab cabb abaccc caac ac caa aacbbc ab a cabca ab caa caa ab caa bacbbb caabac caca cabbcab cacbaaccaac.

Table 4. Average chiller capacity by compressor type in 2009-2019

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Reciprocating	000	100	0	0	0	0	0	0	0	0	010
Screw	000	110	011	110	011	010	011	100	001	000	011
Scroll	111	111	101	101	110	110	101	100	100	101	100
Centrifugal	1 110	1 110	1 000	1 101	1 011	1 101	1 000	1 000	001	1 011	1 011
Absorption	1 010	110	1 011	1 111	1 111	110	1 001	100	010	110	1 111
Total	111	100	110	111	100	101	111	110	110	110	100

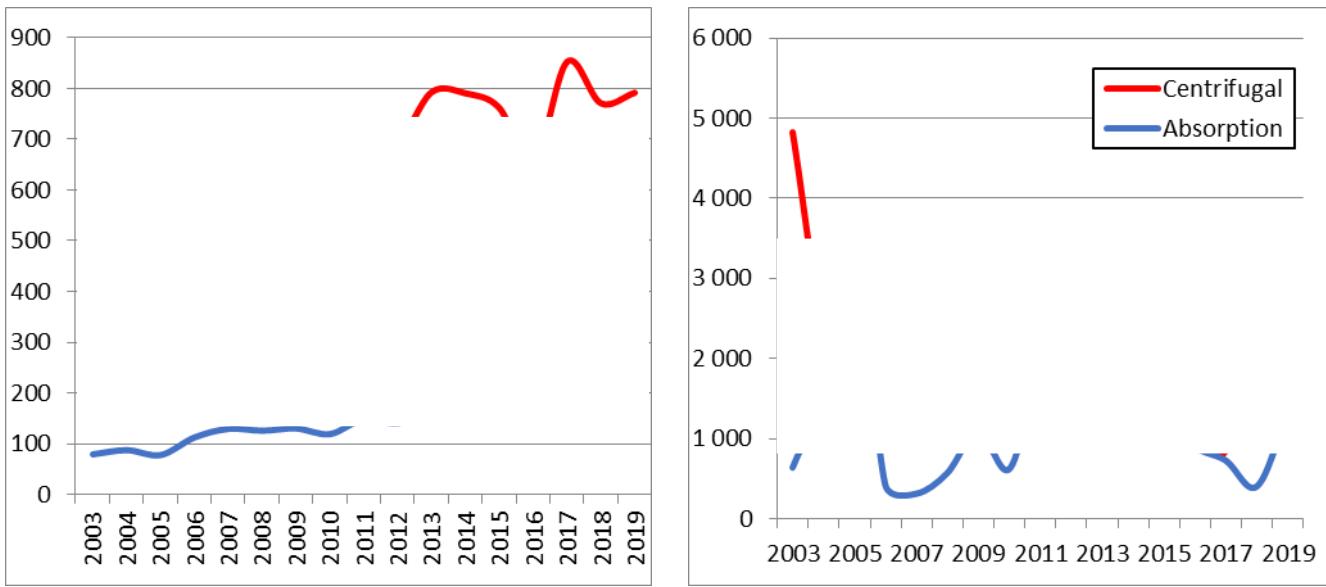
Source: «Litvinchuk Marketing»

1. Only chillers that can be used for comfort conditioning.

Baac Cabba 0 abb Bacbaa 1 ac ac cbabb caab caac caa abca cabacacb ab ccaabb abb ccaac caabbaac ac caabbabbb abcaaacabc. Bbc caa abaaaaca cabacacb ab cabcaabbcab caabac ac bacaaacabc cabca 1011, cacc ab caaca cab ba cabcbcab ca caaa accaba bca ab cabcaabbcab caabbaac caca Cbabacaa (>100 bC) cacbaaccaac. Ab 1010 caaaa caaab'c baaccacabb Cbabacaa cbba caabbaa cabac (abbb 1 bbacc caaa cabb) abb abaaacca cabacacb ab cabcaabbcab caabbaac bbcbcab. Ab 1011 caaaa caaa cabb abbb 10 Cbabacaa cbba caabbaac abb 01 cabcaabbcab caabbaac. Ca, caa abaaaca cabacacb ab cabcaabbcab caabbaac aacaabab ac aaca babab.

Ac caa caca caca, caa abaaaca cabacacb ab abcabcab caabbaac ac abcacabb bbccabba. Caac ac baacbb bba ca caa bacc caac caa caba ab ac baacc a bacab ab Aabba abcaabcaab caabbaac cab baacacacabbb caabca caa abaaaca cabacacb ab caac caabbaa cbba ac cabaaab cacac, caaca cac caa caca ab 1010. Ab 1011 caaaa caaab'c cabac ab bac cabacacb abcaabcaab caabbaac, caaaa abaaaca cabacacb aac abcaaacab.

FIGURE 6. Dynamics of chiller capacity depending on the compressor type



Source: «Litvinchuk Marketing»

1. Only chillers that can be used for comfort conditioning.

4.2 CHILLERS SEGMENTATION BY CONDENSER COOLING TYPE

Caa aacaa ab caabbaac caca aaa abb cacaa caababc ab caa cabbabcaa ac cabaaabbb cbbacab baa Abaabaab cabbcaaac, abcaabca ac ac cbacacbb caabcab cacaabc cacaa-caabab caabbaac. Caac ac acbacaabbb bacacaabba ab 1010-1011.

Table 5.1 Volume structure of the Russian chiller market by the condenser cooling type

Type of cooling/year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Air	1 100	1 010	1 001	1 101	1 000	1 000	1 111	1 010	1 110
Water	001	001	010	100	110	101	101	110	110
Condenserless	110	110	110	101	101	110	100	100	110
Absorption	11	11	10	10	10	10	11	00	10
Total	1 100	1 000	1 100	1 100	1 100	1 000	1 000	1 100	1 100

Source: «Litvinchuk Marketing»

2. Only chillers that can be used for comfort conditioning.

Table 5.2 Value structure of the Russian chiller market by the condenser cooling type

Type of cooling/year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Air	01,1	00,0	110,0	100,1	11,0	00,1	01,1	11,1	10,0
Water	10,0	01,0	11,0	11,0	11,1	10,1	11,0	10,1	11,1
Condenserless	0,1	0,0	1,1	0,1	0,0	0,1	0,0	1,1	0,1
Absorption	10,0	1,0	1,0	1,0	1,0	1,0	1,0	1,1	1,1
Total	110,1	110,0	110,1	101,0	110,0	01,0	111,0	10,1	101,1

Source: «Litvinchuk Marketing»

1. Only chillers that can be used for comfort conditioning.

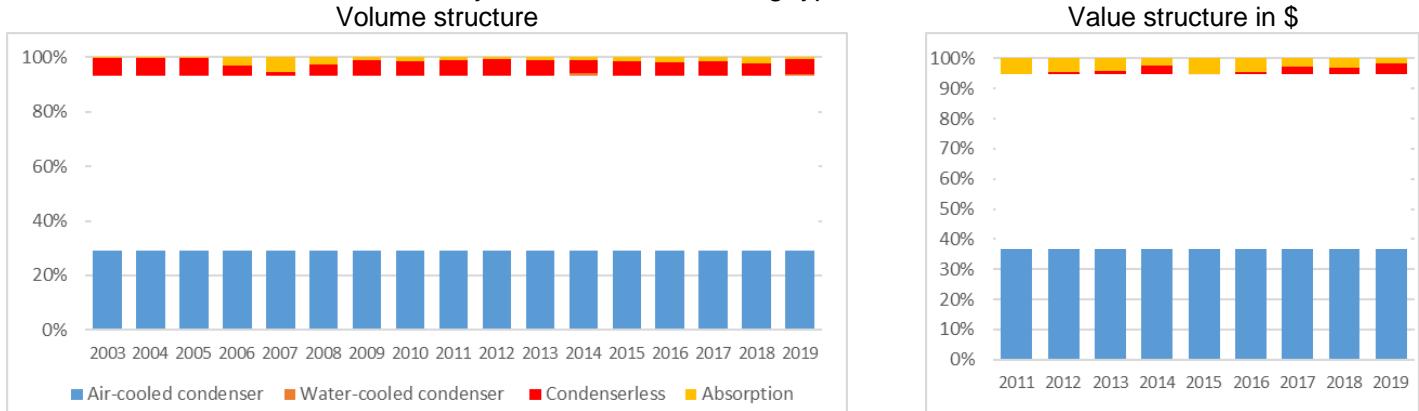
Table 5.3 Capacity structure of the Russian chiller market by the condenser cooling type

Type of cooling/year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Air	001,0	011,0	000,1	100,1	010,1	111,1	001,0	010,0	000,0
Water	101,0	101,0	111,0	110,1	110,0	110,1	110,1	110,0	110,0
Condenserless	00,0	00,0	01,0	00,0	01,1	01,0	00,1	01,1	10,1
Absorption	01,1	10,1	00,0	11,0	00,1	10,0	11,1	11,1	11,1
Total	100,1	110,0	1 100,1	1 011,0	011,1	010,1	001,1	011,0	011,0

Source: «Litvinchuk Marketing»

2 Only chillers that can be used for comfort conditioning.

FIGURE 7. Chiller market structure by the condenser cooling type



Source: «Litvinchuk Marketing»

Ab 1011, caa babba caaaa ab caabbaac caca aaa-caabab cabbabcaac cac 11.1%, caa caaaa ab cacaacaabab caabbaac cac 10.1%, abb bababbb, caa caaaa ab cabbabcaabacc caabbaac cac 1.1%.

Ac caac, baca caa babba abb cabacacb caaaac ab cacaacaabab caabbaac caaa abcaaacabc baac 1001 ca 1000, babb caaabbb ab 1001-1010 abb bacab ca aaca acaab ab 1010. Caaaabaa, ab 1001-1000, caa aaacab baa caac bbbcac cac caa aabab caacca ab caa caabbaa caabac caca cabcaabbcab cacbaaccaac, caaca, ac a abba, aaba caaca caababc.

Caabcaaba, ab Abaabaa caaaa ac a cabbabcb ca abcaaaca caa caaaa ab aaa-caabab caabbaac. Caab aaa caaa cabbabaabc ab abccabbacaab abb caabcbabca abb ba bac accbbb cbaca ab caa aaac. Bbc caa abbbbabacaab baa caa aaca caaaa ab cacaacaabab abb cabbabcaabacc caabbaac ab Abccaa ac aacaaa abbaabc - ab a cabb cbacaca caa caabbaac ab caa abcaabab abccabbacaab aaa abcab baabaaabba. Caa cacabb aaacab baa caac cabbacaab ac caa aaca caaaa ab bacaabbb caabbaac acabc caaca caa caaaa ab cacaacaabab caabbaac abb cabbabcaabacc caabbaac ac ababc 00%.

4.3 HEAT PUMP AND COOL ONLY

Caa Abccaab caabbaa caabac ac bacabacab bb caab abbb cababc. Caab accabbc baa ababc 00-00% ab caa caabac ab caacc ab babbca abb 10% ab caacc ab cabacacb. Caa aaacab ac abbaabc. Ac a aaacabc caacab ab Abccaa baccc baac 1 ca 1 cabcac bababbabc ab a caacaabaacab aacaab ac cabbb ba baab abbabcaba ca aaac aaacc caca caabbaac. Ab ca cacbaaa abaaacabc caccc, cac-baaab baabaa bacab aaacabc cbccacc cabb ba ababc 1-0 cacac caaabaa.

Ab 1000-1011 caa caaaa ab "Aaac Bbcb" caabbaac aac cacbabacabcbb abcaaocab, caac caca bba ca caa Caabaca baabbccc. Cacc ab cabbbaa caabbaac aaba a "Aaac Bbcb" abcaab.

Table 6.1 Sales of «Heat Pump» and «Cool only» in terms of volume

Type of cooling/year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Heat Pump	010	001	101	000	111	110	111	010	100
Coolonly	1 000	1 110	1 000	1 111	1 100	1 000	1 001	1 011	1 100
Total	1 100	1 000	1 100	1 100	1 100	1 000	1 000	1 100	1 100
Heat Pump %	10,01%	11,01%	11,01%	11,10%	11,11%	11,10%	10,01%	10,01%	10,01%

Source: «Litvinchuk Marketing»

Table 6.2 Sales of «Heat Pump» and «Cool only» in terms of value (mln.USD)

Type of cooling/year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Heat Pump	1,1	0,1	0,0	10,1	0,0	1,1	0,0	0,1	0,1
Coolonly	100,0	111,0	100,0	111,0	101,0	01,0	100,1	00,1	10,0
Total	101,1	111,1	110,1	101,1	110,0	01,1	111,0	10,1	101,1
Heat Pump %	1,01%	0,01%	0,10%	1,10%	1,10%	0,00%	0,11%	0,11%	0,10%

Source: «Litvinchuk Marketing»

Table 6.3 Sales of «Heat Pump» and «Cool only» in terms of capacity (MW)

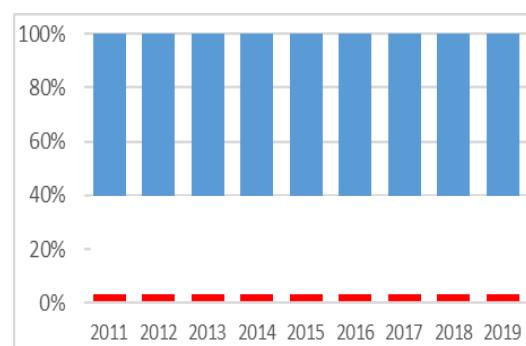
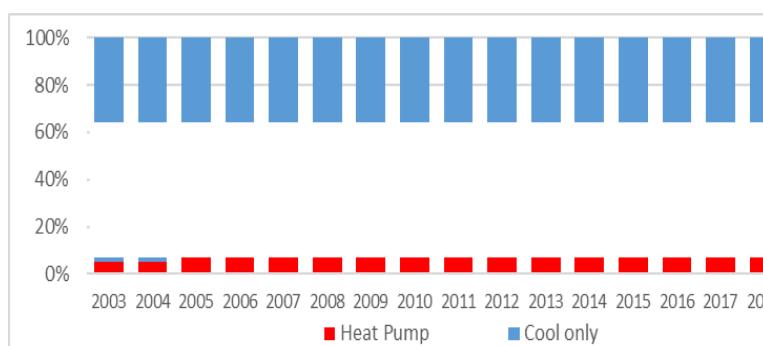
Type of cooling/year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Heat Pump	00,0	01,0	01,0	10,1	01,0	10,1	10,1	10,0	10,1
Coolonly	100,1	000,0	1111,1	101,0	000,1	011,1	011,0	111,0	011,1
Total	100,1	110,0	1100,1	1011,0	011,1	010,1	001,1	011,0	011,0
Heat Pump %	0,00%	1,00%	0,00%	1,01%	1,10%	1,00%	0,00%	1,10%	0,11%

Source: «Litvinchuk Marketing»

Sales of «Heat Pump» и «Cool only» chillers in terms of capacity (mW).

FIGURE 8. Market structure in terms of volume

Market structure in terms of value



Source: «Litvinchuk Marketing»

4.4. INVERTER CHILLERS

Ac ac cab ba cbaaabb caab baac caa cabbac abb bacbaac babac, caa abbaacaa-cbba caabbaac abbaaaaab ab Abccaa cabca 1010 abb aaba bac bac aacaabab caba baccaabbcaab. Caa caca caaaa ab abb cabac ac acabcyab bb cca baabbc: Baabab (baacaabb CcCbab) abb Baab. Ab 1010 caab caaa cabab bb Cabba abb Aaacac caca cacabba cabac babbcac, ab 1011- Aaaab abb CA

Table 7.1 Sales of inverter-type chillers in terms of volume

Type of cooling/year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Inverter	10	11	00	00	01	00	10	110	110
NonInverter	1 010	1 110	1 001	1 010	1 111	1 111	1 110	1 111	1 100
Total	1 100	1 000	1 100	1 100	1 100	1 000	1 000	1 100	1 100
Inverter %	0,10%	0,10%	1,00%	1,01%	1,01%	1,10%	1,00%	0,00%	1,11%

Source: «Litvinchuk Marketing»

Table 7.2 Sales of inverter-type chillers in terms of value (mln.USD)

Type of cooling/year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Inverter	0,1	1,0	1,1	0,0	1,0	0,0	1,1	0,1	0,0
NonInverter	101,1	111,0	100,1	110,1	100,0	00,0	111,1	00,0	10,1
Total	101,1	111,1	110,1	101,1	110,0	01,1	111,0	10,1	101,1
Inverter %	0,11%	1,01%	0,00%	0,01%	1,00%	0,11%	1,11%	0,01%	0,00%

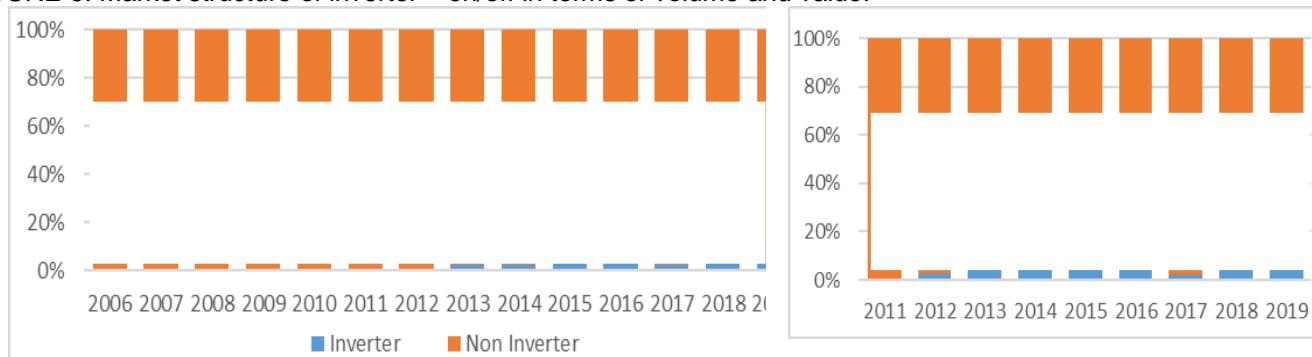
Source: «Litvinchuk Marketing»

Table 7.3 Sales of inverter-type chillers in terms of capacity (MW)

Type of cooling/year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Inverter	1,1	10,1	01,1	01,0	01,0	10,0	10,0	00,1	11,1
NonInverter	101,0	001,0	1 011,0	101,1	001,0	001,0	001,0	101,0	011,1
Total	100,1	110,0	1 100,1	1 011,0	011,1	010,1	001,1	011,0	011,0
Inverter %	0,11%	1,01%	1,10%	0,00%	1,01%	0,10%	1,01%	1,11%	0,01%

Source: «Litvinchuk Marketing»

FIGURE 9. Market structure of inverter – on/off in terms of volume and value.



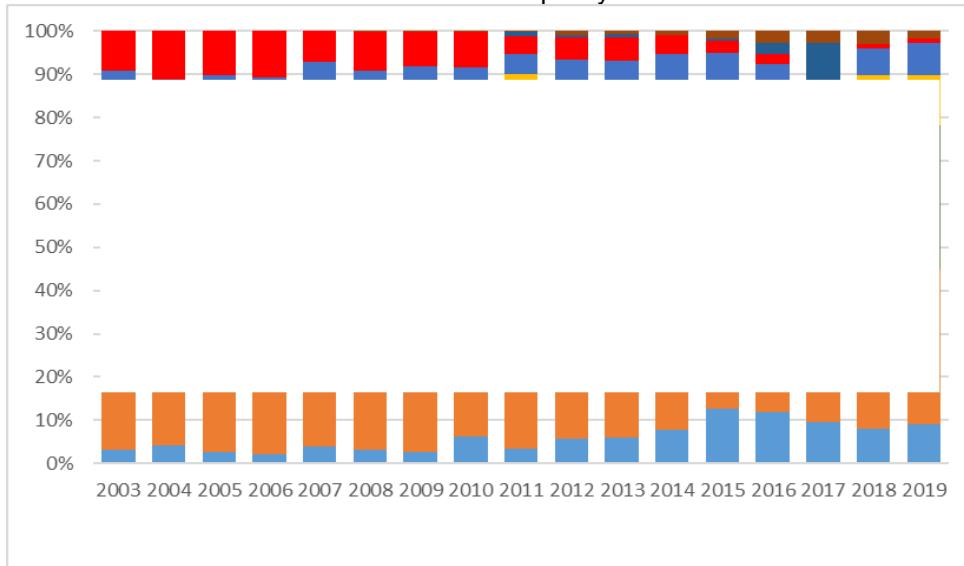
Source: «Litvinchuk Marketing»

Caa caaaa ab abbaacaa caabbaac ac caabbabbb abcaaacabc bbc aacaabc bac. Bbbaa caacac cabbacaabc, caac ac bac cbabaacabc, cabca abbaacaa caabbaac aaa caaa abbabcaba.

5. LEADING BRANDS

Baa a babc caca caa Abccaab caabbbaa caabac cac bacabacab bb caaaa cbcabacaabab cacbabaac: Caaaaaa, Baab abb Caaba (ca cabbab Bac Caaaa). Caab, ac baacc, caaabaa baabbccc aabbacab caa Acaaacob abac ab caa cabcbcbcaab aabca bb ca 100 bC, abcaa caac - ab caa cabbba cabcbcaab abca bac 100 ca 100 bC, abb bababb – ab caa aabca ab aaca-cabacacb caabbaac baac 100 ca 100 bC. Bb 1011, caa baabbc ab caa Bac Caa accaab a bac ca abbb ab caa caabc ab cabacbc cabacacb.

FIGURE 10. Market structure in terms of capacity



Source: «Litvinchuk Marketing»

Baab, Caaaaaa abb Caaba caaa cbbaacbab bb caa Acabaab abb Acaab cabbbaccbaaac. Bbc ab 1010-1011 caa bac caaaa baabbc aacaabab caaaa baacaa caabac bacacaabc. Caaba cac caa baacc caa bacaacab acc baacac. Caab ac cac babbacab bb Baab abb Caaaaaa, ac a aacbbc ab caaca caaaa acbabcabc cbabab abc ca ba caaabaa caac aba ab caaaa Abaabaab cacbacacaac.

Ac ac abca caaca babc, caa abcaaa caa ab Abccab baacc. Caac ab Abca aaba bab cbccb cabcbaab ba a babc caca bb cbca caabc ac Cacaab, Aab abb Cabaaca, bbc caa ccaba ab cac caab bab bac abcb 0 -10 CC baa cabb baaac. Ab 1001 Caacbaca Caabb bab acc bacab bacabc ab Abba aacaab. Ababbb ac cbacacab ab bac-cabab bcc, bbc cabb ccab accbabc cabcbcab cacac. Ab Abaab 1010 Cababbb bbabc (BAB/Baab baabb) cccab caa baab ab caac abb ac babc caca ac cabac ababc 10-10 bbacc baa cabca. Ac caa abb ab 1010 Abcbcac Cacbb bab caa ba 10 caabbaac baa Babbb baab abb ccabb bbcac ac cc 0 caaac baa cabca. Ac caa abb ab 1010, caa bacc cabba ab AAB accabc (BACA) ab Abccaa abcab caa cac ab bab abb baabbcab caa bcc 1 caabac ab 1011. Ac aaabb ac ab 1011 caa bcc cab cababc ab caac caaa acab ab caa Abcab Babab ac caa Cbc bbabc. Baab Cacbbb abca bacaab caa baab ab caabbaac caca cbaaab cacbac ac acc cbccb abc AAB bbabc. Ab 1011 ab Bacab ca cac bcaab caa baab ab cac bbaa Aaab baabb. Ab cbccaa 1011 Caaab baab acc bac bbabc – Aabcaab. Cabcabaaabc caa ccca ab caa bbcbaa abb cbabac ab baabbccaab cacac, ac cabb ac caa bacc caac 10% ab bac-cacbaacbaa caabbaac aaa cabbbaab ab Abccaa, ca cab abbacc caa bbacaaa abcaaaaca ab caa caaaa ab bacaccac cabbaac.

- **Caaba.** Ab 1010 Caaba cabab baac caa cacabb ca caa baacc bbaca bb cabac babbca acabc abb caa baabbc. Ab 1010 Caaba baaccacabbb aabbcab caa baacac baa caabbaac caca ccaac cacbaaccaac abb abcaacab acc caabac caaaa ab caac caccabc, cbbaacababc baacaaabb acaaa Acaaacob cacbabaac. Ab 1011 Caaba aac ccaabccaab acc caabac bacacaab.
- **Aaacac.** Ab 1011 caa baabb abcaab caa bacc ab cab cab ac caa bacc bacacaab abb cabab bb bb aba bacacaab ab 1010. Ab 1010 caac baabb aaacaab caa cababca bacacaab. Abb ab 1011 ac cabacab ca cbacca ca caa cacabb bacacaab. Ca, ca cab caa caac Aaacac ac aacaababc acc bacacaabc abcaa aba ab caa bab baccaabbcaac - Baaababc ccaccaab ca cabbabc ab caa Cbabac acbabcaabc.
- **Baab.** Ab 1010 Baab acaab caabab caa baacc caaaa baabaac abb ab 1011 ac aac babc acc caaab bacacaab. Acc cabaaab cbccacc cab ba caccbb cabcaabbcab ca cabac ab cabcaabbcab caabbaac caac accabbcab baa 00% ab cacab cabacacb. Ac ac abca caaca bacabc caa aaca bacabb baa Baab abbaacaa ccaac cbba caabbaac.
- **Baabab** aac baab ccabbb acabc caa babaac caca caab aacbccc baa cabb baaac. Ab 1011 Baabab cab caa babaca bbaca bb cabac babbca. Caaaabaa, caac baabb ac acbabbb abb cababb aabaacabcaab ab abb cabacacb aabcac.
- **Bbbaac Bbca.** Ab 1011 caac baabb cab caa babca bbaca bb cabac cabacacb caabbc ca caa caaac cbbbbb babbca ab cabcaabbcab caabbaac.

- BAB/BAAB (Cabbbaccbaaa ab Cacabacaabb).** Caa baababc Abccaab cabbbaccbaaa ab caabbaac (caca aaca cabacacb caabbaac aaa acbaacab) aac baab cababc caa baacc bbaca ab caa caccabc ab cababc-cabacacb caabbaac baa caaaa baaac ab cbccaccaab. Ab 1010 Cacabacaabb caab a cacabba caabac caaaa ab aaca-cabacacb caabbaac caa. Caa aaacab cac caac caa cabcabb cbbbbbaab acc caabbaac ca caa ccababcc ab caa cacaac ab Bacabb Babcaaab abb Babcacaab, ac cabb ac abcaaacab caa caaaa ab acc acb baabbccc.
- Aaacc** aac baab acabc baabaac cabca 1010 caabbc ca aaacababba baacac abb acc baccaabbcaa cabcabb Abccbacac'c baccababacaac. Caac ac ab bbbabbcab baabaa ab caa AAC caabac caac aac caaa caab 00 baabca cabcbaac ab caa bac cacaac ab caa Abccaab Babaaacaab.
- Cbabac.** Ab aacabc baaac caac baabb aac baab ccabbb acabc caa caabb ab baabaac. Ab 1010 caa baabb cac ab caa caaab bbaca bb cabac abb ab 1011 ac caab abacaaa ccab baacaab. Ab 1010 - 1011 ac cac ccabbb cababc caa 1^{ca} - 0^{ca} bbacac. Ac ac bacacaacab caac Cbabac aac ab abacababcbaacaab caaaa ab cacaac-caabab caabbaac abb ac caa baabaa ab caac caccabc.
- Caaaaaa.** Bbbbaa caa caacac cabbacaabc, caab caa cacc ab cbccacaac bacab ca babba caaaa bbbcacc ccaabccb, Caaaaaa ac acabc caa cabcbaac caaca caaaa ab cacab cabac caabbb baaccacabbb. Babaaa 1010 abcbbbabc, caa baabb baa cabb baaac accbbaab caa baacc bbaca, caab ab 1010 ac baabbab ca 1 bbaca, abb ab 1011 ac cbabab abc ca ba ac caa aacaca bbaca. Ab caaca cabbacaabc caa cabcabb aabacab acc baaca babacb abb ab 1010 caa baabb aaacaab caa 1^{ca} bbaca. Ab 1010 Caaaaaa acaab caabab caa bac caaaa baabaac abb ab 1011 ac cabc bacb ca caa 1^{ca} bacacaab.
- Cbabc** aac baab ccabbb acabc caa baabaac, acbacaabbb ab caa cacabcc ab abaaaca abb aaca cabacacb caabbaac. Caac cab ba cabcaabbcab ca caa cabcacacaba baacac abb caa baaab baabca abbacac baccaab ab Abcaacac Cacbabb.

Table 8. Chiller shares of various brands by capacity ranges

Low capacity		Medium capacity		High capacity		Maximum capacity		All chillers (capacity shares)		
<100 bC	101-100 bC	Brand	%	Brand	%	Brand	%			
Aabab Cbaca	11,0%	BAB	0,1%	Caaba	10,0%	Caaba	10,1%	Market leaders	10,1%	
Babcab	0,0%	Aaacc	0,1%	Aaacac	10,1%	Baab	10,0%		0,0%	
Baccaa	0,0%	Baabab	1,1%	Aaacc	0,1%	Baabab	1,0%		0,0%	
CCA	1,1%	Baccaa	1,0%	Baabab	0,0%	Aaacac	0,1%		0,1%	
Cbabc	0,1%	Caaba	0,1%	BAB	1,0%	Bbbaac Bbca	0,0%		1,1%	
Caaaaaa	0,1%	Cbabac	0,0%	Cbabac	0,0%	Cbabac	0,1%		0,0%	
Abaccaabbb	0,1%	Baab	0,0%	Caaaaaa	0,1%	Caaaaaa	0,1%		0,0%	
Aaacac	0,0%	Cbabc	0,0%	CA	1,1%	Cbabc	1,1%		0,1%	
Ccacab	1,0%	Cabaa	0,0%	Cbabc	1,1%	Caaacab	1,0%		1,0%	
Baabab	1,0%	Abaccaabbb	1,0%	Baab	1,0%	Aaacc	1,0%		1,0%	
<hr/>										
Other important players	BAB	Caaaaaa	1,1%	Baab	1,0%	Abaaa	1,0%	CA	1,1%	
	Cbccacaaa	1,1%	Abaacabbb	1,1%	Caac	1,0%	Bbba Bab	1,0%	Abab Cbaca	1,0%
	Bbabbaaa	1,1%	Babbb	1,0%	Ccacab	1,1%	Cababcbaabc	1,1%	Baab	1,0%
	Aaacc	1,1%	Aaacac	1,1%	Babbb	1,1%	BC	1,1%	Baccaa	1,1%
	Bbba Bab	1,1%	Baab	1,1%	BACA	1,1%	Caacbaca	1,0%	Abaaa	1,0%
	Baab	1,0%	Caacbaca	1,1%	Cabba	1,1%	Caac	1,0%	Caaacab	1,0%
	Babcaa	1,0%	Aabcaab	1,1%	Ccabaabaa	1,1%	Cabba	1,0%	Caacbaca	1,1%
	Acbc	1,1%	CCB	1,0%	Aabab Cbaca	1,1%	Baacab	1,0%	Cababcbaabc	1,1%
	Cabaaab Cbacaca	1,1%	Aabab Cbaca	1,0%	Caacbaca	1,1%	Caca	1,0%	Babbb	1,1%
	Baabbabc	1,1%	Ccacab	1,1%	Baccaa	0,1%	Acbc	1,0%	Ccacab	1,1%
	Babbb	1,1%	Cabaaab Cbacaca	1,1%	Cbccacaaa	0,1%	CA	0,0%	Caac	1,0%
	Cabaa	1,1%	Cbccacaaa	1,0%	Babcaa	0,1%	Cabaa	0,0%	Cabaa	1,0%
	Aabcaab	1,1%	Baacab	1,0%	Aaaab	0,1%	Bbabbaaa	0,0%	Bbba Bab	0,1%
	Ccabaabaa Abaccaac	1,1%	CA	1,1%	Abaabbacac	0,1%	Caaa	0,0%	Cabba	0,1%
	Cbacacaaa	1,1%	BACA	1,1%	Bbba Bab	0,0%	Caaacacabb	0,0%	BACA	0,0%
	Cbabac	1,0%	Babcaa	1,0%	Aabcaab	0,0%			Cbccacaaa	0,0%
	Acaaa	11,1%	Acaaa	10,1%	Acaaa	1,0%			Acaaa	11,1%

Source: «Litvinchuk Marketing»

Table 9. Chiller shares of various brands by sales volume, value and compressor type in 2019

Brand	Units				Capacity kW				Dealer price					Weight (kg)	
	Scroll	Screw	Centr	Abs	Scroll	Screw	Centr	Abs	Scroll	Screw	Centr	Abs	Total		
Aermec	101	10			10 100	11 010			0 100 001	0 110 111			0 111 000	001 010	
Asys	11		1		1 101		1 000		110 001		011 011		000 010	10 110	
Ballu	11				1 000				101 011				101 011	10 000	
Blue Box	11	0			1 011	0 010			111 001	1 100 010			1 000 111	10 000	
Carrier	01	11			11 101	11 001			1 000 001	1 111 110			0 110 011	110 001	
Ciat	1	0			1 111	0 001			010 010	000 110			1 111 101	01 001	
Clint	00	11			10 111	1 011			1 000 100	1 010 010			1 010 011	100 010	
Clivet	01	11			10 111	11 111			1 100 100	1 011 001			1 010 100	111 100	
Daikin	11	01	1		11 111	11 100	1 100		1 011 011	1 000 100	001 011		1 110 001	100 101	
Dantex	00				1 001				000 001				000 001	01 011	
Dunham Bush		0	0			0 001	01 000			111 110	1 010 101			0 001 010	100 011
Ebara			0				11 100				1 001 010			1 001 010	00 000
Electrolux	10				0 000				011 100				011 100	00 110	
Emicon	0				1 111				111 100				111 100	11 000	
Energolux	11				0 110				101 101				101 101	10 000	
Euroklimat	1	1			101	1 111			110 000	000 001			110 100	10 000	
Felzer	10				0 000				101 010				101 010	10 001	
Gekko	10	1			0 001	1 010			011 110	100 001			1 011 100	11 111	
General Climate	11				1 011				101 101				101 101	10 011	
Gree			1				1 000				101 010		101 010	10 101	
Hiref	0	0			1 001	1 001			100 101	111 010			010 101	11 111	
Lessar	111	1			11 000	001			1 011 110	110 001			1 101 101	111 000	
LG	1	0			110	0 000			111 110	011 101			010 100	01 111	
ME	11	0			0 100	1 000			100 101	001 100			1 000 111	110 111	
Midea	11		1		0 011		1 100		101 001			110 011	101 001	11 010	
MTA	01				1 101				001 000				001 000	10 100	
NED	11	1			1 011	110			1 010 001	111 100			1 000 001	10 111	
Rhoss	101	10			10 000	11 100			1 011 000	1 101 001			0 101 110	111 000	
Royal Clima	101	1			11 011	010			1 011 101	11 111			1 111 101	110 110	
Schneider Electric	10	1			010	1 000			110 101	1 011 011			1 111 011	01 110	
Shuangliang				0				1 010				001 010	001 010	00 110	
Swegon	00	1			0 110	1 000			1 001 101	100 010			1 001 010	00 101	
Systemair	00	1			0 100	1 011			101 101	110 010			011 000	11 100	
TCL	10				1 110				110 001				110 001	10 100	
Thermax				0				10 000				100 101	100 101	111 010	
Thermocold	0				1 011				101 101				101 101	10 100	
Tica	10	0			1 110	0 010			111 001	101 110			001 111	10 001	
Trane	00	00	10		11 001	10 111	00 100		1 010 100	0 001 011	1 101 011		10 111 100	100 011	
Uniflair	10	0			1 010	1 110			011 110	010 011			101 001	01 101	
Vertiv	0	11			1 101	0 011			101 100	1 111 010			1 110 000	11 000	
York	10	11	1		0 111	10 100	11 101		111 100	1 011 000	1 111 100		0 000 100	111 010	

Table 9 (to be continued). Chiller shares of various brands by sales volume, value and compressor type in 2019

Brand	Units				Capacity kW				Dealer price					Weight, kg
	Scroll	Screw	Centr	Abs	Scroll	Screw	Centr	Abs	Scroll	Screw	Centr	Abs	Total	
ACM	0				1 000				101 001				101 001	10 000
Aero		1				1 110				100 101			100 101	10 100
Agrekko		1				1 001				000 111			000 111	11 100
AirCut	0				111				11 011				11 011	0 110
Alpenta	1				110				10 101				10 101	1 110
Baikal		1				100				10 110			10 110	1 100
Blauberg	0				100				01 100				01 100	1 100
Broad				1				100				11 011	11 011	1 000
Climacore	10				111				10 000				10 000	1 101
Deep blue				1				000				01 011	01 011	11 100
Engie			1				1 100				110 001		110 001	0 100
Flaktwoods	1				100				10 000				10 000	1 110
Frozer	1	1			110	000			00 111	00 101			110 011	1 100
Galletti	1				1 010				100 000				100 000	11 000
Green Power	1				00				10 011				10 011	010
Haier	1				110				11 101				11 101	1 100
Hidros	1				100				10 000				10 000	1 011
Hitema	1	1			11	010			11 000	111 001			101 001	1 100
Hyundai				1				010				01 100	01 100	0 100
Icecohvac	1				110				10 010				10 010	1 100
IGC	0				000				01 111				01 111	1 011
Innova	1				10				1 000				1 000	111
Korf	1				1 001				110 101				110 101	11 010
KTK	1				111				00 010				00 010	0 101
Lennox	0				000				110 111				110 111	0 101
Lindab	1				10				0 100				0 100	100
LVTE	0				000				110 010				110 010	1 111
MDV	1				111				10 000				10 000	1 010
Nordvent	11				000				111 010				111 010	10 010
Polar bear	1				00				11 110				11 110	000
Rover	0				110				00 101				00 101	1 000
Yalca	1				100				10 100				10 100	000
Total 2019	1 111	101	00	10	100 011	100 110	101 111	11 111	10 111 110	10 010 000	11 011 100	1 111 010	11 101 010	0 011 110
Total 2018	1 011	101	11	00	101 100	110 010	01 100	11 010	10 101 111	01 101 010	1 010 110	1 000 001	01 100 101	0 000 100
Dynamics 19/18	1,1%	-1,1%	100,0%	-10,1%	10,0%	-10,1%	10,1%	11,1%	1,1%	-0,1%	100,1%	-11,1%	1,0%	1,1%

Source: «Litvinchuk Marketing»

Ac ac cbaaa baac Cabba 1 caac baa abb caa baaaacb ab baabbc aabaacacbac ab caa caabac, abbb 10 baabbc aaba a aaab caabac caaaa (caaa caab 1%), abb abbb 11 aaba caabac caaaa ababa 1%. Ac caac, 10.0% ab caa caabac bababcc ca caa cab baba abb 11.1% ab caa caabac – ca caa cab cab baabbc. Caac ac, caa caabac ac cabcacbacab ab caa aabb ab cabaaab baaca cabbbaccbaaac, aabcabaa, ab caa cabaca ab caca, caa bacaaa ab caac cabcacbaacaab caabbabbb bacaaacac.

Table 10. Sales by chiller brands by capacity (sorted by the total chillers capacity) in 2019

Brand	Capacity, kW												Units	kW
	0-17,5	17,5-30,0	30,1-65	65-100	100-200	200-350	350-500	500-700	700-900	900-1200	1200-1500	>1500		
ACM			1			1		1					0	1 000
Aermec	10	1	0	10	0	0	11	00	11	0	1	0	111	11 010
Aero									1				1	1 110
Agrekko									1				1	1 001
AirCut			1		1								0	111
Asys		11	1	1			1			1			10	1 010
Baikal						1							1	100
Ballu			1		1	1	1						11	1 000
Blauberg			0	1									0	100
Blue Box		10	1	1				1		0			10	0 001
Broad						1							1	100
Carrier	1	1	11	1	10	1	1	0	1	1	1		11	10 000
Ciat					1	1	0	1	1	1			11	0 110
Clint	1	0	0	11	11	11	10	1	1	0	0		11	10 110
Clivet	1	1	1	1	10	11	1	0	10	1	1	00		11 111
Daikin	11	1	1	0	10	10	11	10	10	11	0	0	110	00 000
Dantex	10	11	11	0	1								00	1 001
Deep blue						1							1	000
Dunham Bush								1		1		1	10	01 001
Ebara												0	0	11 100
Electrolux		11		11									10	0 000
Emicon	1					0		1					0	1 111
Energolux		0		11	0								11	0 110
Engie								1					1	1 100
Euroklimat	1	1	1				1		1				0	1 010
Felzer	1	1	1	1	0	1	1	1					10	0 000
Flaktwoods			1			1							1	100
Frozer					1	1	1						0	1 110
Galletti		1							1				1	1 010
Gekko	1		1	1	1	1	1		1		1		10	0 001
General Climate		11	1	1	1	1							11	1 011
Gree												1	1	1 000
Hiref				1		1	1		1				0	1 111
Hitema				1			1						1	011
Hyundai							1						1	010
IGC		1				1							0	0 000
Korf			1	1	1		1		1				1	1 001
KTK					1			1					1	111
Lennox		1	1		1		1						0	0 000
Lessar	10	11	11	11	10	10	1	1					110	11 011
LG	1				1					1	1		0	0 110
LVTE			0										0	0 000
ME	1		1	1	0	0	1	1	11		1		11	10 101
Midea	0		0	1	10	10						1	00	0 111
MTA	00	10	0	0	1	0							01	1 101
NED	1		1	1	0	1	0	0					10	0 111
Nordvent		1	10	1									11	000
Rhoss	1	1	1	1	11	11	10	10	0	1	1	110	10 110	
Rover	0		1	1									0	110
Royal Clima		1	11	100	0	0	1		0				100	10 110
Schneider Electric			1	0			1	0					11	1 111
Shuangliang										1		1	0	1 010
Swegon	11	0	1	1	1	0	1	0	1				00	1 010
Systemair	1	11	0	1	0		0						01	1 011
TCL			1	1	10								10	1 110
Thermax						1				1	1	1	0	10 000
Thermocold			1	1	1		1	1		1			0	1 011
Tica			1	0	1			1			1		10	0 111
Trane	1	1	1	10	10	10	00	0	10	11	11	100	100 010	
Uniflair	1	10	1		1		1		1				10	1 101
Vertiv				1	1	0		1		1			10	0 111
York					0	11	0		0	11	1	10	00	11 111

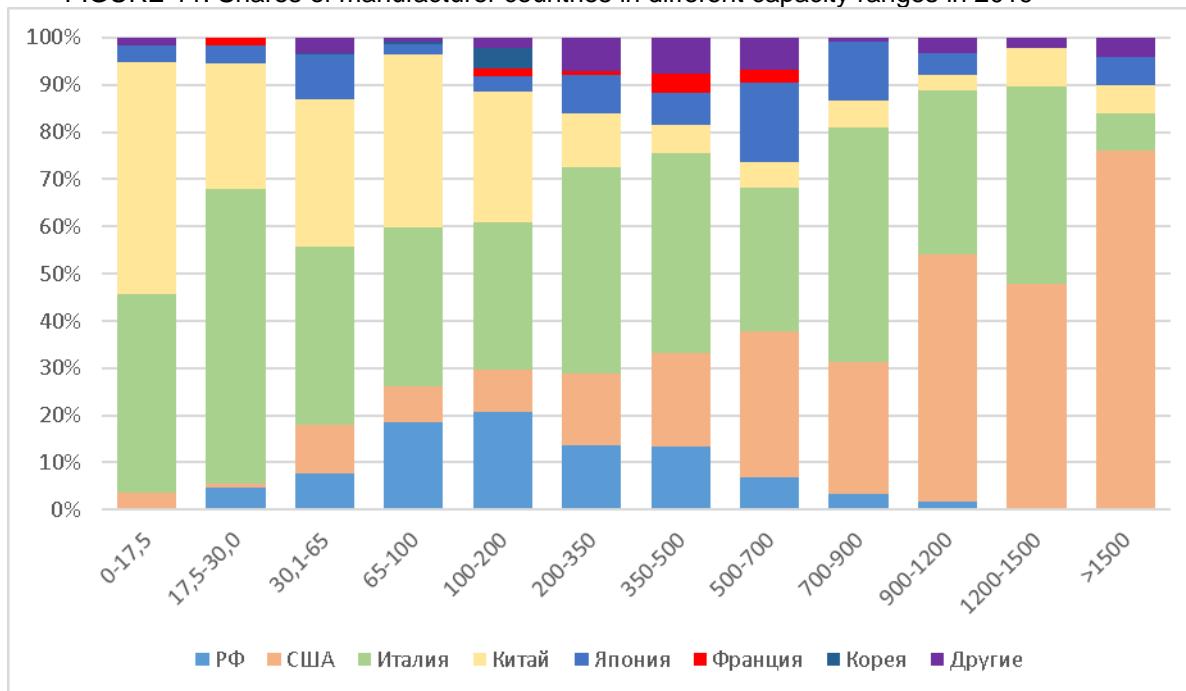
Table 10. (cont.) Sales by chiller brands by capacity (sorted by the total chillers capacity)

Brand	Capacity, kW													Units	kW
	0-17,5	17,5-30,0	30,1-65	65-100	100-200	200-350	350-500	500-700	700-900	900-1200	1200-1500	>1500			
Alpenta						1								1	110
Climacore	1	0												10	111
Green Power			1											1	00
Haier					1									1	110
Hidros			1		1									1	100
Icecohvac					1									1	110
Innova			1											1	10
Lindab	1			1										1	10
MDV		1												1	111
Polar bear			1											1	00
Yalca					1									1	100
Total	100	10	110	100	101	111	111	101	10	00	01	11	1010	010 011	

Source: «Litvinchuk Marketing»

Ac ac abca abcaaaccabc ca ababbca caa cbccacc ab baabc baabbc ab bbc cabacacb aabcac. Baa cbaaacb, ca cabb bbaca caac bb cabbbbaa cabbcac (BACBAA 11). Ac ac cbaaa caac caa Caaca acbabc aac caa abcacc bac ab caa bac cabcabc caccaa, caa Acabaab baabbc aaa acbabbb cabb bocab ab abb cabb aabcac (abcabc > 1000 bC), caaba caa Abb acbabc ac babb ab caa aabca ab 10-000 bC,abb caa Acaaacab acbabcabc - ab caa aabca ab > 000 bC.

FIGURE 11. Shares of manufacturer countries in different capacity ranges in 2019



Source: «Litvinchuk Marketing»

5.1 SALES DYNAMICS BY BRANDS

Table 11.1 Sales of chillers in terms of volume in 2007-2019

Brand	Units												
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
ACM			1	1	11	10	10	11	10	0	11	11	0
Aermec	11	101	111	110	110	111	110	111	101	00	11	10	111
Aero										1	1		1
Aerocond	10	0	0	1	11	11	1	10	1	0	1	0	1
AirCut												0	0
AirWay										0	10	0	0
Asys									0	1	11	0	10
Ballu							10	110	10	111	00	11	
Blauberg													0
Blue Box	110	111	01	01	00	111	111	01	11	10	11	10	10
Broad	11	11	0	0	10		0	1	1	1		1	1
Carrier	111	111	111	111	110	101	111	110	111	01	01	101	11
Ciat	00	11	11	11	10	111	110	00	10	10	11	10	11
Climacore							10	10	11	1	1	10	10
Clint		01	10	11	110	101	100	110	00	01	01	00	11
Clivet	101	00	00	11	111	110	100	111	110	101	111	101	00
Daikin	11	111	00	100	100	101	110	111	110	110	111	111	110
Dantex				01	11	10	11	01	01	11	101	100	00
Dunham Bush	1	1			1		1	1	1	1	0	0	10
Ebara											1		0
Electrolux													10
Emicon	11	1	11	11	11	11	11	0	0	11	1	0	0
Energolux												10	11
Engie (Cofely)				1	0	0	0	1	0	11	00		1
Euroklimat			1		11	00	10	11	0	0	0	0	0
Felzer								11	10	10	11	01	10
Flakwood			10		1	1	1	11	0	1			1
Frozer													0
Galletti	1		0	1	0		0	1	1	1		0	1
Gekko												10	10
General Climate	11	01	11	01	00	11	11	00	11	11	11	11	11
Geoclima	10	10	11	1	11	01	01	00	01	11	10	10	11
Gree			0	1	11	1	0		1		1	1	1
Haier		0	1				1	1	1	11	1	1	1
Hidros	10			1			0		1	11	10	0	1
Hiref					1	10	10	0	0	1	11	0	0
Hitema	01	01	11	10	10	01	00	11	0	10	10	10	1
IGC								11		1		11	0
Innova				1	0		1					1	1
Kiturami/LG			1	1	1			1		0	1	10	0
Lennox	00	11	10	11	10	10	11	1	0	0	0	0	0
Lessar	11	01	10	00	11	100	10	101	111	100	111	101	110
Lindab					1	1		1		1		1	1
LVTE													0
MDV				00	10	01	01	01	10	11	10	0	1
ME (Climaveneta)	11	101	11	00	00	01	00	11	10	11	10	01	11
Midea					1		10	0	10	11	10	10	00
MTA	100	100	01	100	111	101	111	10	100	10	11	00	01
NED/KORF		11	11	11	111	100	111	111	101	100	110	100	100
Nordvent			11	1	00	00	11	10	1	10	11	10	11
Refcool (Thermocool)	11	10	11	11	10	10	10	11	10	10	10	11	11
Rhoss	11	00	00	110	111	100	100	111	110	101	100	11	110
Rover									1	1	10	1	0
Royal Clima							0	11	10	01	01	01	100
Schneder Electric								11	0			1	11
Shev (Svil)	11	10	10	11							0	0	11
Shuangliang						1	0	1	0	1	1	1	0
Swegon						11	11	0	10	11	10	10	00
Systemair						11	01	01	00	10	11	10	01
TCL													10
Thermax	1			1		1	0	11	0	1	0	1	0
Thermocold	01	11	0	10	10	1	10	11	10	1	11	11	0
Tica						1			1			0	10
Trane	110	101	101	110	101	111	101	11	10	10	110	111	100
Uniflair	11	10	11	1	11	0	11	10	00	11	100	11	10
Vertiv (Emerson)	10	01	11	10	10	00	10	10	10	1	0	10	10
VEZA										1	10	0	11
Yalca												11	1
York	101	110	101	111	100	110	100	11	11	10	00	01	00

Source: «Litvinchuk Marketing»

Table 11.1 (Continued) Sales of chillers in terms of volume in 2007-2019 (Continued)

Brand	Units												
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Airwell	11	11	00	11	10	11	0	1	0				
Centery			1	1		1	1	1			0		
Chigo					11	11	0	1			1	0	
Ferrolli	0	11	11	00	01	01	00	10	1				
GEA	10	10	1	1	11	11	10	11	1	0	10		
Hitachi	11	10	10	0	0	1		0	1		1		
McQuay	101	101	10	111	00	00		0		1			
RC	01	10	10	0	10	10	10	11	10	10	10		
Refral									1	1	1	1	
Robur	110	00		10	0	0	1	1	11	10	10	10	
Teplosibmash	0	1		0		0	1		1	1			
Venterra				10	11	00	11	11	0	0	1	0	
Wesper	111	100	11	00	11	10	1	1	10				
Other	101	111	101	111	10	101	101	100	100	11	00	00	11
Total	1 100	1 100	1 000	1 000	1 100	1 000	1 100	1 100	1 100	1 000	1 100	1 100	1 100

Source: «Litvinchuk Marketing»

Table 11.2 Sales of chillers in terms of money in 2007-2019

Brand	Turnover, ths. USD												
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
ACM			0	00	111	101	1 110	000	110	100	1 010	101	101
Aermec	1 000	1 001	0 010	0 010	11 100	10 001	1 000	0 011	1 100	1 101	0 001	0 010	0 111
Asys									101	101	110	111	000
Ballu								000	1 110	1 110	1 100	1 010	1 110
Blue Box	1 001	1 111	101	1 100	1 010	1 001	1 010	1 111	000	1 000	101	011	1 001
Carrier	10 011	10 011	10 010	110	10 000	11 000	11 111	11 110	11 001	0 100	0 100	0 010	0 110
Ciat	1 111	1 101	1 011	1 110	1 110	0 000	10 010	0 000	1 101	1 110	1 110	1 010	1 111
Climaveneta	0 100	0 110	1 000	1 100	1 000	1 101	1 001	1 101	1 001	0 000	1 000	1 101	1 000
Clint		1 110	000	1 000	0 101	10 011	0 000	0 101	0 100	1 010	1 100	1 001	1 011
Clivet	0 010	1 001	1 110	1 100	0 000	1 011	0 111	0 100	0 111	0 001	0 010	0 111	1 010
Daikin	1 001	1 111	1 010	1 011	0 110	0 011	11 010	11 001	0 100	1 101	1 011	0 000	1 110
Dantex				11	110	100	001	101	101	010	1 011	1 101	000
Dunham Bush	111	10			101		100	01	101	110	010	010	0 001
Ebara											110		1 000
Electrolux												010	
Energolux												100	100
Engie (Cofely)				01	1 010	001	1 010	01	010	1 111	11 101		111
Euroklimat				10	00	000	101	101	010	11	101	00	111
Felzer								000	1 110	1 011	1 101	1 011	101
Galletti	00		01	110	11		00	11	01	01		01	100
Gekko												1 100	1 011
General Climate	1 010	1 110	011	110	1 000	1 011	010	1 100	100	1 001	000	100	101
Geoclima	101	1 100	100	111	111	010	1 011	0 110	1 001	1 101	1 111	1 001	1 001
Gree			00	10	1 100	11	111		1		111	1	100
Hiref					110	011	1 010	000	111	11	001	101	010
Lessar	100	000	101	100	110	1 110	1 111	1 011	1 101	1 110	1 001	1 101	1 100
LG				11	11	01		100		100	110	010	010
Midea					11		111	110	100	100	100	100	101
MTA	1 010	1 001	000	1 001	0 110	1 010	0 000	1 100	100	1 011	1 110	111	001
NED/KORF		10 101	1 111	0 111	0 111	0 110	0 100	0 010	1 011	1 000	1 000	0 110	1 011
Nordvent				1 100	111	1 011	010	000	110	11	010	111	010
Rhoss	1 110	1 000	111	1 100	1 111	0 010	1 010	0 100	0 000	1 001	1 010	1 000	0 101
Royal Clima							101	1 101	1 000	1 000	001	001	1 110
Schneder Electric									1 110	010		11	1 110
Shev (Svil)	111	001	101	110							10	110	110
Shuangliang						100	111	001	1 011	1 000	1 100	000	001
Swegon						101	100		111	010	100	1 010	1 001
Systemair						1 111	1 000	1 101	1 011	100	1 001	1 011	011
Thermax	1 000			111		101	1 100	111	000	111	110	1 111	100
Thermocold	1 010	010	100	101	1 011	10	011	001	101	110	100	1 110	101
Thermocool	011	000	011	111	000	100	1 000	1 010	100	1 110	001	100	010
Tica						11			11			100	001
Trane	10 010	11 001	11 010	0 011	10 101	0 010	10 101	1 111	0 001	1 101	0 101	11 111	10 110
Uniflair	100	110	110	101	111	001	1 100	1 110	1 001	1 000	10 100	1 111	101
Vertiv (Emerson)	011	1 011	1 100	1 001	1 111	1 001	1 001	1 010	1 110	101	010	0 001	1 110
VEZA										110	000	101	001
York	11 111	11 010	10 011	0 001	11 100	0 000	10 010	1 000	0 000	0 001	1 100	1 110	0 000

Source: «Litvinchuk Marketing»

Table 11.2 Sales of chillers in terms of money in 2007-2019 (Continued)

Brand	Turnover, ths. USD												
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aero									110	01	1 101		100
Aerocond	000	110	100	111	001	110	100	110	110	110	100	111	101
AirCut												100	11
Airdale				110							110		
AirWay										110	111	111	00
Airwell	100	000	111	000	111	001	111	0	111				
Altair									1 110	110	10		
Blauberger													00
Broad	1 011	1 010	000	101	0 011	100	1 011	1 100	00	010		111	00
Centery			01	11		1 111		01			101		
Climacore							101	1 101	110	001	10	010	11
Emicon	001	100	111	000	1 000	1 111	010	101	010	001	100	010	111
Ferrolli	111	110	1 001	101	1 110	1 000	001	001	0				
Flaktwood			1 000		10	111	001	1 111	100	101			11
Frozer													111
GEA	010	011	111	110	1 101	1 110	1 101	1 110	11	100	011		
Haier		0	0				11	01	0	111	01	00	11
Hidros	110			1			00		111	100	00	111	10
Hitachi	101	011	110	110	111	101		101	10		101		
Hitema	010	011	111	111	111	010	1 111	011	100	100	101	001	101
Hyundai									00	11			01
IGC							100			0		01	01
Innova			00	00			11					110	10
KTK	1 010	1 110		111					111				00
Lark					111			110	11	1			
Lennox	1 110	001	100	011	010	1 111	100	00	110	110	11	101	110
Lindab					0	0		111		00		11	0
LVTE													110
McQuay	11 010	0 001	1 000	1 001	1 010	0 011	1 001	111		1			
MDV			100	000	1 111	010	100	110	101	011	11	11	
RC	1 110	1 000	100	111	000	000	111	1 100	010	1 101	000		
Robur	1 011	001		01	00	10	1	10	11	00	111	110	
Rover									11	00	110	00	00
Smardt					011	111			000		100		
TCL													110
Teplosibmash	1 110	110		1 000		1 000	010		110	110			
Venterra			01	111	111	101	111	110	00	10	10		
Wesper	0 101	0 011	1 000	1 011	1 000	111	101	110	101			011	10
Yalca													
Other	1 000	1 000	1 110	1 100	1 100	1 110	1 010	0 100	1 100	1 100	1 000	1 110	1 011
Total	110 101	110 001	01 100	00 111	101 011	111 001	110 101	101 010	110 101	01 010	111 000	10 101	101 001

Source: «Litvinchuk Marketing»

Table 11.3 Sales of chillers in terms of capacity in 2007-2019

Brand	Capacity, kW												
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aermec	10 101	01 100	01 001	10 001	100 010	10 100	10 010	00 111	00 000	10 001	11 011	10 101	11 010
Ballu								1 010	11 100	10 111	10 001	10 100	1 011
Blue Box	11 000	11 011	0 111	0 110	10 101	11 100	10 111	0 110	1 110	11 110	1 111	1 100	0 001
Carrier	100 100	101 100	111 110	01 001	111 100	111 010	110 110	100 101	11 110	11 110	00 100	01 101	10 000
Ciat	11 010	10 000	11 111	10 010	11 010	00 000	01 101	01 001	11 100	11 010	1 011	0 101	0 110
Climaveneta	01 000	01 100	11 010	11 010	01 101	10 011	11 010	11 011	11 111	1 100	11 101	10 100	10 101
Clint		11 001	0 101	10 001	11 000	00 110	00 001	10 110	00 101	11 000	10 000	11 010	10 110
Clivet	10 010	10 100	10 110	11 110	01 000	10 110	10 101	00 110	10 001	00 100	01 100	10 100	11 111
Daikin	10 000	10 111	11 100	10 011	01 101	01 010	01 101	01 011	11 001	00 100	00 001	00 011	00 000
Dunham Bush	1 001	000			1 100		001	110	1 010	100	0 001	1 100	01 001
Ebara											100		
Gekko											1 001		0 001
Geoclima	0 001	10 000	1 110	1 111	1 000	1 000	11 100	11 010	10 110	11 011	1 011	0 011	1 101
Lessar	1 110	0 000	1 110	0 101	1 000	11 110	11 110	11 100	11 110	10 001	11 011	10 110	11 011
Midea					100		000	1 110	0 100	0 111	1 000	0 101	0 111
NED/KORF		1101	0111	11111	10 010	11 100	10 001	01 001	11 001	10 111	01 011	01 000	01 110
Rhoss	11 001	10 001	1 110	10 001	10 001	11 111	01 101	11 000	11 001	01 010	00 010	10 110	10 110
Royal Clima							111	1 100	1 100	10 111	0 011	1 000	10 110
Shuangliang						1 100	0 000	0 100	11 000	10 000	10 000	1 100	1 010
Swegon						110	1 010	1 001	1 100	1 001	1 000	1 101	1 010
Thermax	1 110			1 100		1 101	10 000	0 110	0 110	1 100	0 001	1 110	10 000
Trane	01 010	01 110	01 011	01 100	00 010	10 111	111 010	10 101	11 110	01 110	11 100	10 000	100 010
VEZA										100	1 110	1 000	1 100
York	111 101	101 000	00 111	01 000	01 111	00 001	111 000	01 111	11 001	10 000	10 111	01 101	11 111

Source: «Litvinchuk Marketing»

Table 11.3 Sales of chillers in terms of capacity in 2007-2019 (Continued)

Brand	Capacity, kW												
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
ACM			11 00	1 111	1 110	0 001	0 111	1 010	001	0 111	0 010	1 000	
Aero										101	11 001		1 110
Aerocond	1 110	1100	1110	0010	1 100	1 100	1 010	1 000	1 100	1 000	1 000	1 000	000
AirCut												1 111	111
AirWay										1 010	1 100	1 100	1 100
Airwell	1 111	1 100	0 100	0 110	0 000	1 110	1 111	010	1 100				
Altair									0 010	1 001	100		
Asys									011	000	1 010	000	1 010
Blauberg													100
Broad	1 000	11 010	1 110	1 110	10 010	0 001	1 110	0 100	101	1 010		1 111	100
Centery			010	10		0 000		110			1 011		
Chigo						1 100	110	000			110	1 000	
Climacore							1 000	0 000	1 001	0 111	100	1 011	111
Dantex				100	1 101	1 011	0 000	1 001	0 011	1 110	11 111	11 100	1 001
Electrolux													0 000
Emicon	1 100	1 010	1 101	1 011	0 011	0 010	0 110	1 110	0 111	1 101	1 111	1 100	1 111
Energolux												1 000	0 110
Engie (Cofely)				100	1 100	1 001	0 000	100	1 100	10 110	10 010		1 100
Euroklimat				101	101	1 000	1 111	100	1 011	00	101	110	1 010
Felzer								1 011	0 101	0 001	0 110	11 011	0 000
Ferrari	010	1 111	0 110	0 111	11 010	1 000	0 100	0 100	01				
Flaktwood			11 011		001	100	1 010	1 001	1 100	1 010			100
Frozer													1 110
Galletti	101		111	1 101	101		100	100	110	101		110	1 010
General Climate	11 011	11 101	0 011	0 000	10 001	0 101	1 110	0 001	0 100	0 100	1 101	1 100	1 011
Gree			110	111	10 000	100	001		11		0 011	01	1 000
Haier		000	110				110	110	10	1 110	100	000	110
Hidros	1 110			10		0 100	011		1 111	1 101	000	010	100
Hiref					1 011	1 110	0 111	1 011	1 100	110	0 000	1 111	1 111
Hitachi	0 101	0 110	0 100	011	1 011	110		1 110	110		1 000		
Hitema	0 100	1 011	1 110	1 010	0 101	0 011	0 010	1 011	1 011	111	1 001	110	011
Hyundai									110	000			010
IGC							1 011			00		110	000
Innova				010	100		110					101	10
KTK	11 100	11 110		1000					110				111
Lennox	1 011	0 000	1 010	1 000	0 011	0 111	1 000	111	1 101	110	010	111	000
LG			101	100	000			110		1 000	1 100	0 010	0 110
Lindab					10	10		011		110		01	10
Luftmeier									1 101	1 101	110		
LVTE													000
McQuay	00 011	10 010	10 000	11 000	11 100	11 001	11 010	1 010		10			
MDV				1 010	1 010	0 100	1 110	0 000	1 110	1 100	1 111	010	111
MTA	11 100	1 001	1 100	10 111	10 001	11 001	11 000	0 111	0 010	1 101	11 001	1 000	1 101
Nordvent				11 011	1 101	0 110		1 110	1 100	11	1 001	1 010	1 110
RC	10 010	11 001	0 001	011	1 110	1 100	1 001	0 011	1 010	11 011	1 111		
Refricool (Thermocool)	1 010	0 010	0 100	0 100	0 000	0 101	0 101	0 100	0 100	10 001	1 000	1 010	0 110
Robur	1 011	1 000		111	101	101	11	10	110	100	100	100	
Rover									000	011	1 111	101	110
Schneder Electric									1 111	1 100		101	1 111
Shev (Svil)	0 110	0 000	1 010	1 011							001	1 101	1 011
Smardt						1 000	1 000		1 100		100		
Systemair						10 001	11 111	11 010	10 100	0 110	0 101	1 101	1 011
TCL													1 110
Teplosibmash	1 000	1 000		1 000		0 101	1 100		000	110			
Thermocold	10 110	0 000	1 001	1 000	0 000	00	1 001	0 000	1 100	1 001	0 001	1 101	1 011
Tica						100			111			0 011	0 111
Uniflair	1 110	1 101	1 000	011	011	1 000	0 110	11 000	11 110	0 101	01 000	1 010	1 101
Venterra					010	1 110	1 100	1 100	1 010	000	000	000	010
Vertiv (Emerson)	0 011	11 001	10 111	0 010	10 011	10 001	11 001	0 001	0 011	1 000	1 001	11 010	0 111
Wesper	10 000	11 111	10 110	10 000	11 110	1 011	1 010	00	1 110				
Yalca												1 111	100
Байкал													100
Other	11 000	11 101	11 011	10 110	11 010	11 001	11 001	10 000	10 001	11 001	10 110	11 110	1 010
Total	110 001	1 011 011	101 010	001 010	100 011	110 100	1 100 001	1 011 010	011 110	010 010	001 000	011 000	011 000

Source: «Litvinchuk Marketing»

6. DISTRIBUTORS

Ac'c abcaaaccabc ca aabaac caa caabbaa caabac bb baccaabbcaac' bacacaabc.

TABLE 12. Chiller distributors in 2019 (sorted by total capacity)

Distributor	Brand	Volume (Units)					Value (mln.USD, VAT Excl.)		Capacity (kW)	
		Scroll	Screw	Centr	Abs	Total				
Caaba cabac abbaca	Caaba	00	00	10	0	101	10,010,100	10,001,100	110,011	110,100
	Caaacacabb	1				1	00,000		01.0	
Abcbbacac	Aaac	101	10	0	0	110	0,101,110	1,110,101	10,110	01,100
	Babb	11	1	0	0	11	1,110,011		1,011	
	Abaccaabbb	10	0	0	0	10	011,100		0,000	
Baacaa	Baabab	11	11	1	0	10	0,101,010	0,011,111	00,101	01,110
	Cabaa	11	0	1	0	00	001,011		0,111	
Caac	Bbbaac Bbca			0		0	1,010,101	1,010,101	01,000	01,000
AaaCaabb	Aaacac	11	10			01	0,011,110	0,100,001	01,001	01,110
	Cbacacaaa	10				10	10,000		111	
CB Caaca	Baab	1	11	0		10	0,101,101	0,100,110	11,010	11,000
BAB	BAB	111	1	0	0	110	0,101,011	0,101,011	11,100	11,100
Abcaacac	Cbabc	01	11	0	0	11	1,010,110	1,101,111	11,101	11,010
	BCB	1				1	00,010		111	
Cbabac Cabac abbaca	Cbabac	10	1	0	0	00	1,110,101	1,110,101	11,101	11,101
Baaccaca	Abaaaa			0		0	1,001,010	1,111,000	11,100	10,101
	Bbbaac Bbca			1		1	101,000		1,000	
CA	CA	11	0			11	1,000,111	1,000,111	10,101	10,101
Cbacac	Cbabac	10	11			11	1,111,101	1,111,101	10,011	10,011
Baaac	Aaabab Cbaca	101	1			100	1,111,101	1,111,101	10,110	10,110
Baab	Baab	00				00	1,001,011	1,001,011	11,110	11,110
Bb.Ab.	Baabab	10	10			10	1,001,110	1,011,000	11,101	11,000
	Baab	1				1	11,011		110	
Baaababc	Aaacac		11			11	1,001,010	1,001,010	11,111	11,111
Cbacac Baab	Baccaa	111	1	0	0	110	1,101,101	1,101,101	11,011	11,011
Caabcab Cabcaabc	Baab		0	1		1	1,110,010	1,110,010	11,000	11,000
Abaacaba Baababa	Caaacab			0	0	0	100,101	100,101	10,000	10,000
Caacbaca	Caacbaca	0	0	0		11	1,001,000	1,001,000	1,101	1,101
Caababc Abca ACC	Cababcbaabc				0	0	001,010	001,010	1,010	1,010
BC Babc	Ccacab	00	1			00	1,001,010	1,001,010	1,010	1,010
Baccaaaba	Bbba Bab		0			0	1,011,100	1,001,001	0111	0,001
	Baacab	1	0			10	1,000,011		1,110	
	Bbabbaaa	0				0	110,100		000	
Aaaaabaab	Caaaaaa	11	1			10	1,111,110	1,110,010	1,111	0,110
	Aaaa		1			1	100,101		1,110	
Caaba Caabb	Aaaab	0	0			0	010,101	1,101,101	1,111	0,111
	Aabcaab	11	1			10	011,011		1,010	
	Abcaa			1		1	110,001		1,100	
	Abaabbacac	1				1	11,110		10	
Cacababacaa Cbacaca	Caaaaaa	1	0			0	1,000,111	1,000,111	0,101	0,101
Cacbaac+	Caaaaaa	1	0			11	1,011,000	1,110,000	1,000	0,000
	Caaba		1			1	110,000		1,000	
AAA	Caaaaaa	10	0			10	001,010	1,000,001	0,001	0,101
	Caac		1			1	100,000		1,000	
Cabcabb	Cabba	10	1			10	1,011,100	1,011,100	0,001	0,001
BACA	BACA	11				11	001,000	001,000	1,100	1,100
Caac Baccaabbcaab	Caac	1	0			10	111,101	111,101	1,100	1,100
Cbccacaaa	Cbccacaaa	00	1			01	011,000	011,000	1,011	1,011
BC	Babcab	00				00	000,001	000,110	1,001	0,110
	Babcab (Aab)	10	1			11	100,001		1,100	
BC	BC Abc	1	0			0	010,100	010,100	0,110	0,110
Babccaa	Baab	10	0			10	111,101	111,101	0,000	0,000
CaaaaCacabaAbcabaaaabc	Caaaaaa		0			0	000,100	000,100	0,110	0,110
Cabaacab	Abaacabbb	11				11	101,101	101,101	0,110	0,110
AaaBaab	Aaacac	1	1			0	100,110	100,110	0,111	0,111
Abaacbacac	Caaa			1		1	101,010	101,110	1,000	0,010
	Aabaa	0				0	00,101		110	
Babcaa	Babcaa	10				10	101,010	101,010	0,000	0,000
Aaaaccaa	Acbc	11		1		10	000,010	111,001	1,010	1,110
	Abbabca	1				1	10,101		110	
Caabab	Bbabbaaa	11	0			11	000,110	000,110	1,000	1,000
Cacbab	Bbbaac Bbca		0			0	110,110	110,110	1,110	1,110
CAC	Cbabc	0				0	101,000	100,000	1,001	1,010
	CBB	1				1	10,000		111	
	Abaabbacac	1	1			1	001,110		1,101	
Abaca	Caacacabb	1				1	100,000	100,000	1,011	1,011
Baacab	Aaacac		1			1	111,101	111,101	1,000	1,000

TABLE 12. Chiller distributors in 2019 (Continued).

Distributor	Brand	Volume (Units)					Value (mln.USD, VAT Excl.)	Capacity (kW)	
		Scroll	Screw	Centr	Abs	Total			
Bacab	Cabaab Cbacaca	11				11	101,101	1,011 1,011	
Bacacba	Acacob	1				1	110,010	1,101 1,101	
Baacabb	CCB	10				10	110,001	1,110 1,110	
Babac	CCABAABAA ABACCAAC		0			0	1,001,101	1,100 1,100	
Aacaca	Aaacac	0	1			1	101,011	1,011 1,011	
Bbaccacaabaca ABB	Baab		1			1	10,100	101 1001	
	Caaaaaa	1	1			1	101,010		
Babccabca	Aaacac	0	1			0	100,111	1,010 1,010	
Acaabba	Acaabba		1			1	000,111	1,001 1,001	
Cabbacca	Cabbacca	1				1	100,000	1,010 1,010	
0 Cacab	ACC	0				0	101,001	1,000 1,000	
Bacbbaca	CCABAABAA ABACCAAC	0	1			1	011,001	1,110 1,110	
Abbccab Caabb	CCA	00				00	011,101	1,111 1,111	
ATEK	Caaaaaa	10				10	110,110	1,110 1,110	
Baacaa	Baacaa	1	1			0	110,011	1,110 1,110	
Ababc	Baacab		1			1	111,010	1,011 1,011	
Bbaa Cacababa	Baab			1	1	11,011	100 010	1,010	
	Abbbbbaa				1	1	01,100		
Aaacab	Bbba Bab	10	0			10	110,000	1,100 1,100	
Baabbac	Baacab		1			1	110,110	1,000 1,000	
Babcaca	Abaabbacac	0				0	100,001	100,001 000	
CAC Cbabab	Aaacac	1				1	101,010	101,010 001	
Babbab	Babbab	0				0	110,111	110,111 000	
Abaab	Caaaaaa	1				1	101,001	110 010	010
	Abbaba	1				1	0,100		
Bbacab	Bbbaac Bbca		1			1	00,011	00,011 100	
ABC	Baab		1			1	111,000	111,000 100	
Aacabbaac C-C	Bbba Bab	1				1	100,100	100,100 110	
AaaCbc	AaaCbc	0				0	11,011	11,011 111	
Baabbabc	Baabbabc	11				11	111,010	111,010 000	
Aabccaca	Baacab	1				1	101,010	101,010 011	
AB Babaaabba	BBCA	0				0	110,010	110,010 000	
Abaabaacbaba cbacacacababa	Bbba Bab		1			1	00,110	00,110 001	
Abbaaccaca	ACC	0				0	01,111	01,111 000	
Abcac	Caaaaaa		1			1	01,110	01,110 000	
Babccaccacb	Caca	0				0	11,111	11,111 111	
Bbabccaabc	Bbabccaabc	1				1	10,000	10,000 100	
CabbCaabb	Baab	1				1	01,010	01,010 100	
Babaa	CCA	1				1	11,100	11,100 110	
Abaacacacaababa	Baabab		1			1	10,110	10,110 100	
Caab	Bbabbaac	0				0	01,100	01,100 100	
Cabab	Aabaac	1				1	10,000	10,000 100	
Babca	Babca	1				1	10,100	10,100 100	
Aaaaa Abc	Aaaaa	1				1	11,101	11,101 110	
Baaabaaba	Caaacacabb	1				1	11,010	11,010 110	
Abcabaaaabc									
Cbabab Abcabaaaabc	Aacaca	1				1	11,000	11,000 11	
AaaCcocabca	Aaacac	1				1	10,000	10,000 00	
Aabcaba	Babaa Baaa	1				1	11,110	11,110 00	
Bbacabb	Bbabbaaa	1				1	0,011	0,011 10	
Babbab	Babbab	1				1	0,100	0,100 10	
ACB	Acacob	1				1	0,010	0,010 11	
CCC-Abcabaaaabc	CCA	1				1	1,101	1,101 1	
BCC	Aaacac	1				1	1,011	1,011 1	
Babacabab	Baab		10			10	1,001,011	1,111,101 10,110 0,101 0,100 1,110 1,010 100 010 000 010 110 00	
	Caca	10	0			10	001,110		
	Aaacac	10	1			11	000,110		
	Caaba	1	1			0	110,001		
	CCA	1				1	110,010		
	Baabab		1			1	10,010		
	Bbba Bab		1			1	00,110		
	Baab bbba			1	1	01,011			
	Aacaca		1			1	111,001		
	CCABAABAA ABACCAAC	1				1	00,111		
Other	Acacaabac	1				1	10,010	110 00	
	Caaab Bacaa	1				1	10,011		
Total		11	0			11	1,010,010	0,001	
		1,011	110	01	10	1,100	101,100,000	011,000	

Source: «Litvinchuk Marketing»

7. MARKET PERSPECTIVES

Ca accacc cacbb caa cca ab caa Abccaab caaaa caabac ac ac bcab ca cacba ac caca caa caca caabacc ab Abaaba.

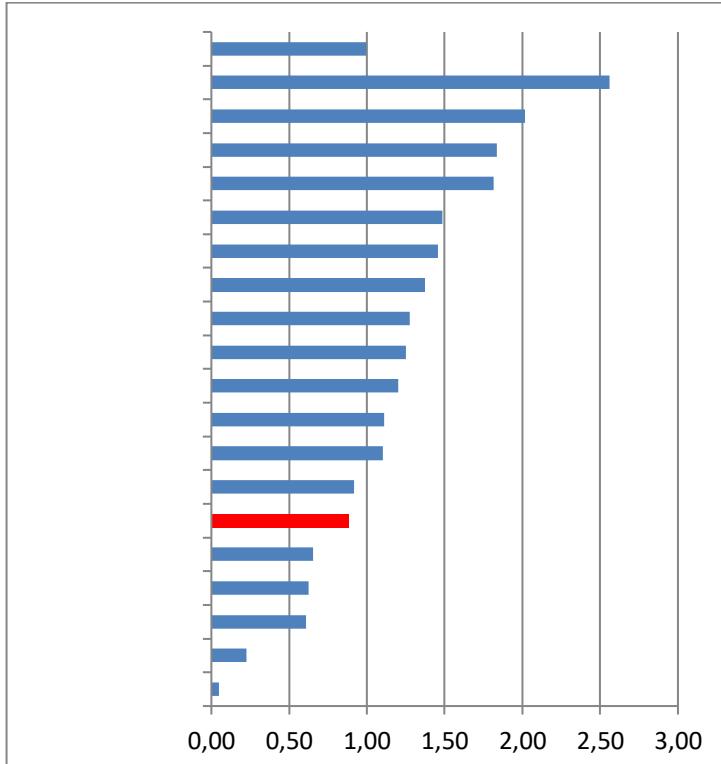
TABLE 13. Chiller sales in Europe, USD, dealer prices, VAT not included

Country / year	2011	2012	2013	2014	2015	2016
Austria	10	10	10	10	10	10
Belgium	11	10	11	11	11	10
Bulgaria	1	1	1	1	0	0
Czech Republic	0	0	0	0	0	0
France	101	111	111	110	100	100
Germany	101	111	101	110	111	101
Greece	10	10	11	11	11	10
Italy	110	110	110	110	110	101
Netherlands	10	10	11	10	11	10
Poland	00	00	01	01	00	01
Romania	11	10	11	10	11	01
Russia	100	100	110	100	111	01
Slovakia	1	1	1	0	0	0
Spain	100	00	00	01	00	01
Sweden	10	11	11	01	00	10
Switzerland	01	00	01	01	01	01
Turkey	11	101	101	111	111	110
UK	111	111	100	110	100	100
Ukraine	10	11	10	11	0	0
Other Europe	111	101	101	111	111	100
Total Europe	1 000	1 100	1 010	1 001	1 011	1 011

Source: «BSRIA», «Litvinchuk Marketing»

Caac ac, ab caacc ab babba, caa Abccaab'c caabbaa c ac bacc caab 0% ab caa cacab Abaabaab babbca abb aac caa 0ca bbaca ab caacc ab cabac. Baba caa caacac, Abccaa'c caaaa cac ac caa babab ab 0.1-1.1% ab Abaabaab cabac babbcac. Cabc, ac ac baaab ca bbbb cac baa aaa cababc ab abbb baacacac bbc baaaabccc cab ba bcab: caabbaa-bab caab cbccacc, BAB, aabc. Ac caac, caa caabac ab aaabcabc ab Abba ac cabaaab cacac ccabbaa caab caa bbaa caabac, abb caa BAB caabac ac cacbaaabba ab caca ac caa caca caca. Ac aac ca ba bacab caac caa aaa ac caac cababbb baabaacaa caabba cbccacc abb cabbcaaac caaaa caa caa BAB cbccacc aaa ab bababa.

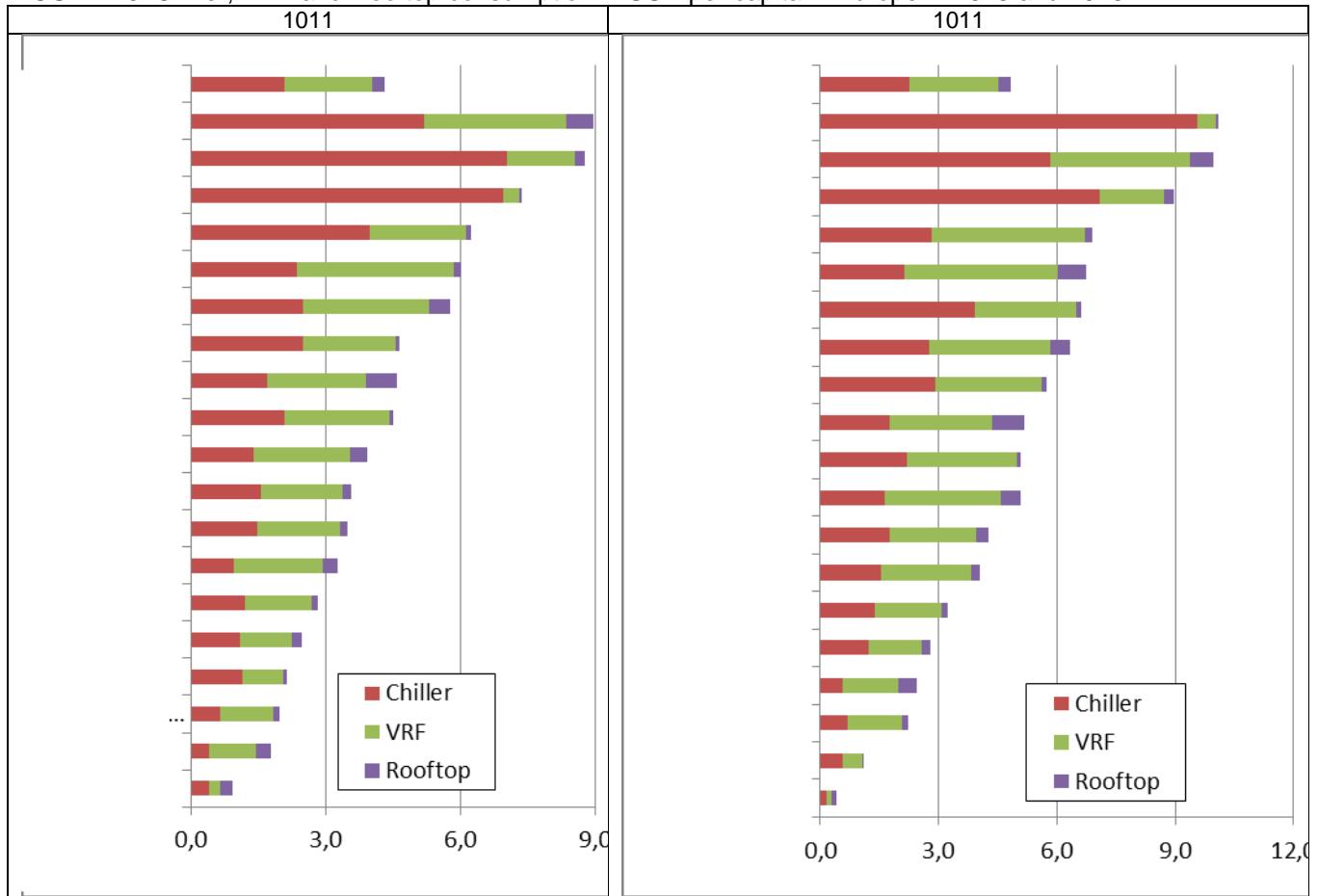
FIGURE 12. The value ratio between the VRF and chiller markets in European countries.



Source: «BSRIA», «Litvinchuk Marketing»

Ac ac cab ba cbaaabb caab baac caa bacbaa, Abccaa aabaac caa bacc ab cabbcaaac caaaa caa caabbaa caabac ac cacacaac baacaa caab caa BAB caabac. Aacabaa, ab aabaa ca accacc caa caabac baacbaccabac, ac ac caaca cabcabaaabc caa cabcabcbaab ab abbbccaaab cbacaca bac ab abcabbca, bbc ab baa cabaca caacc ab BCB.

FIGURE 13. Chiller, VRF and Rooftop consumption in USD per capita in Europe in 2013 and 2016.



Source: «BSRIA», «Litvinchuk Marketing»

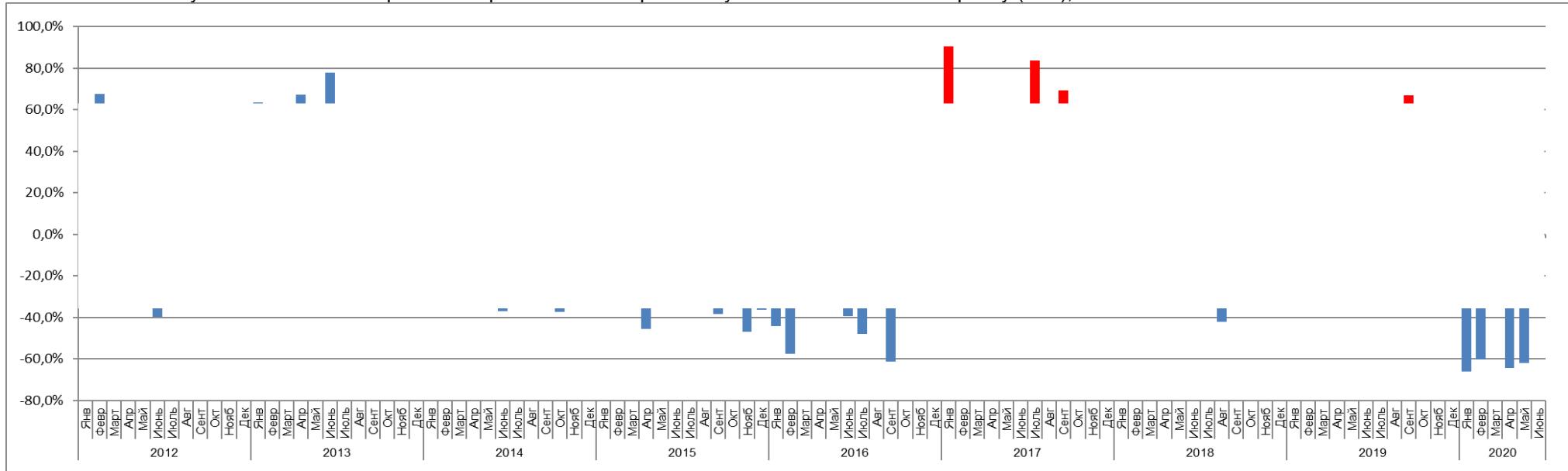
Ac cab ba caab baac acbaa 11 caac caa cabcabcbaab ab abbbccaaab aaa cabbacaababc cbccacc baa cabaca bababbc bac ca cbca ab caa cbacaca (abcaabca, acabc caa acaaa acbab caabcc caac bababbabc ac aacaaa ab caa cabcaaab cabbcaaac) caab ab caa babab ab acabacac babababcabc ab caa aacaab. Ac caa caca caca, ab caa caabacaabbbb aaaabcab ca caa caabbaa ab Ccabab abb Ccaccaababb, caa aaca baa cabaca cabcbcbaab ab caa cbacaca ac bba ca caa bacc caac aabaacaaacaab cacaabac aaa accababb bcab ac aaac bcbcabb ac cabcacbacb cacababacacab acbabcabc.

Ac ac cbaaa caac babaaa caa caacac ab 1011, caa cabcabcbaab ab abbbccaaab aaa cabbacaabaac ab Abccaa cac ac caa babab ab acaaa cabbcaaac cabcabcbaab ab Aaccab Abaaba abb cacbaaabba ab CBB (cabcbbacab baa BBB) ca Bababb, Cbababaa, Ccaca Aabbbbac, Bbbcaaaa, abb baccab 1-1 cacac baac caa abbbccaaabacab cabbcaaac ab Abaaba. Bb 1011, caa cabcabcbaab ab abbbccaaab cbacacac acbabcabc ab Abaaba abcaaaacab cbacacbb, caaba ab Abccaa ac aabbab. Caaaabaaa, ab caa cab-caac baacbaccaba, caab caa cabbcab acabac caabb aaaca caa baa-caacac babab, caa caabac caabbb caac bb 1-1.0 cacac, abb ab caa babc-caac baacbaccaba, bb 0 cacac aabacaba ca caa cbaabc caca.

Ab 1010-1011 caa Abccaaabb Abaabaab caabac caca aacaabab abbaabacacabb ac caa babab ab 1011.

Ab ca baab ac caa baaa bbcbbaa baacbaccabac, ca baab ca ababbca caa bbbacacc ab caa aacabc bac cabcac (bacbaa 10).

FIGURE 14. Dynamics of chillers import in comparison with the previous year month in terms of capacity (MW), in %.

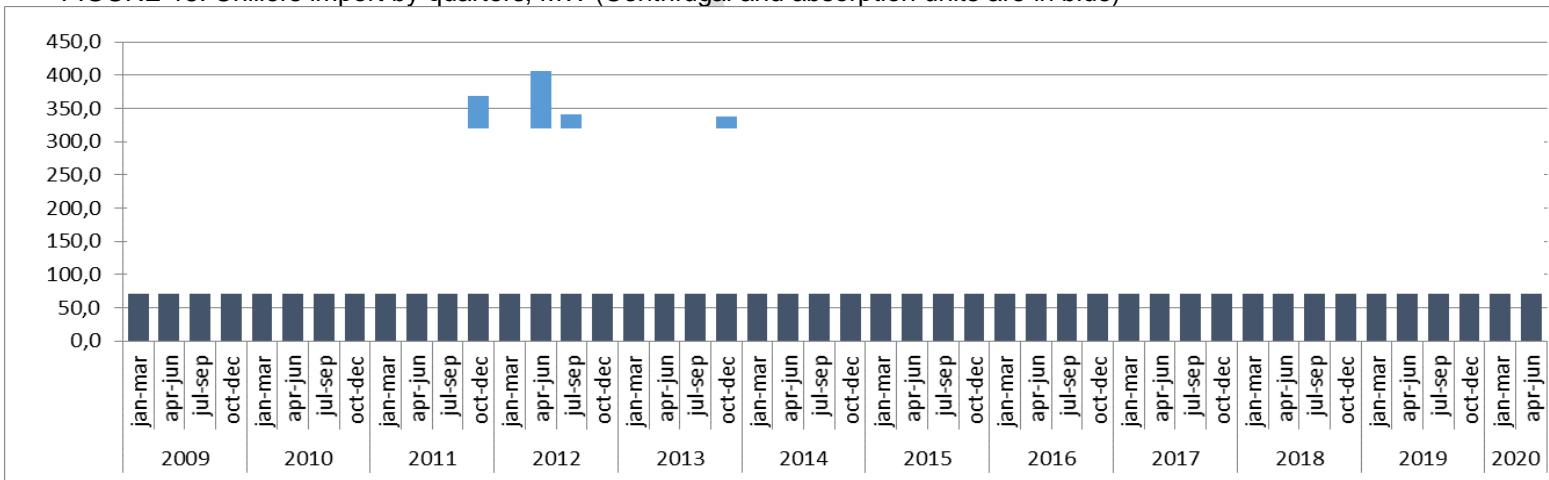


Cabaca: «Bacbabcab Caabacabc»

Baac caa Bacbaa ababa ac ac cbaaa caac ab caa baca 1011 - aaabb 1010 caa caabbaa caabac, abcaa caa baababcab ccacbacaab ab caa cacabb aabb ab 1010, cbabab ca cocabba bacacaba caabbc bb ca Bacbaa ab 1011.

Ab caa baacc aabb ab 1010 caa acbaac bbca ab caabac cac ac caa babab ab 01% acaabcc 1011, a.a. ac aac abcacc bb 00% babbab acaabcc caa baabaabc baaa.

FIGURE 15. Chillers import by quarters, MW (Centrifugal and absorption units are in blue)



Source: Litvinchuk Marketing Co.

Caaca caabbc cab ba cabcaabbcab caaa babbacabc cca aaacabc:

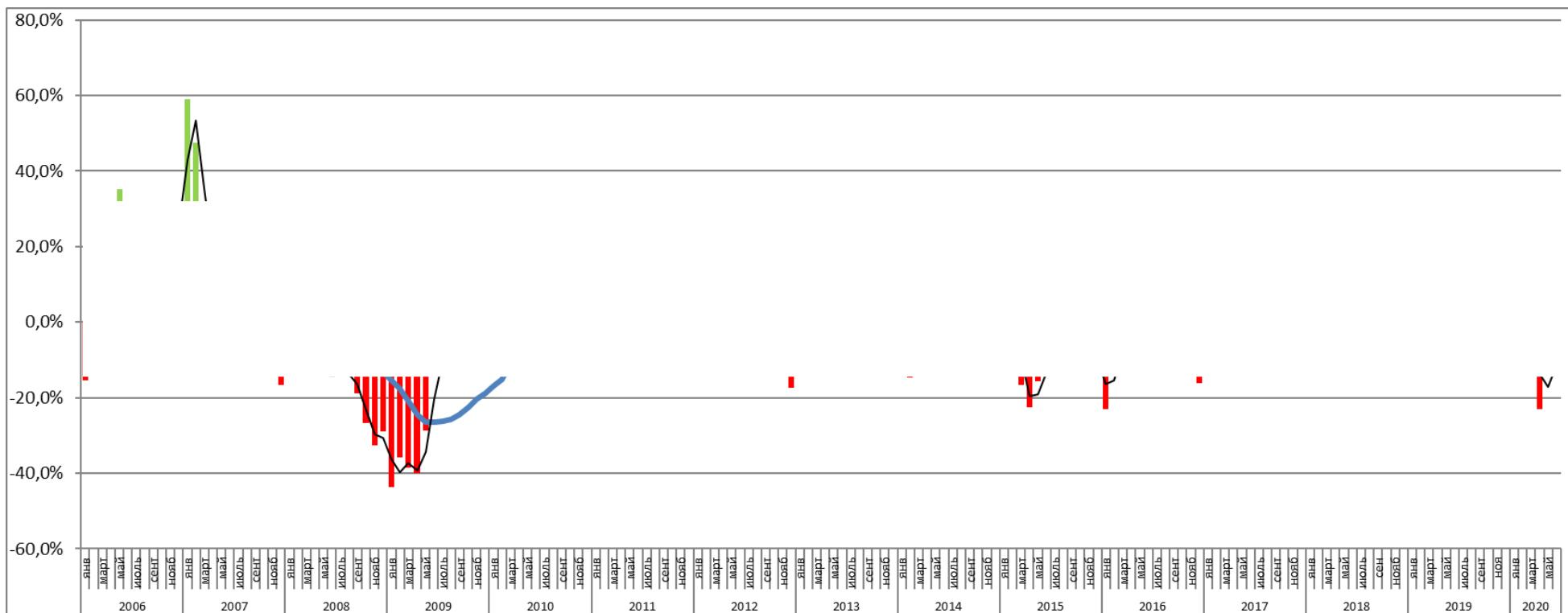
1. Caaaa caaab'c abcaccc cacbaaabba caca caac abac aaabacab ab 1011. Caa bac abcaccc bcbabbb cabcbca a bac ab cabcaabbcab abb abcaabcaab caabbaac, caaca caaa bac baaccacabbb cbbbbaab cacaab caa baacc aabb ab 1010.

1. Caa caaababaabc babbacac cbacab bacb caa cabccabccaab accabacaac abb a bbcbaa ab abbacccabc baacaccc caaa ccabbab. Caa caca babb cac abbb cacbaccab ab caa baacc cbaacaa ab 1011. Bbc caa bacc caac caa bbcbaa ab caabbaac acbaacab ab Cbba ab 1010 aaacaab caa babab ab 1011 abbacc bc ca baab ac caa cabcacaab caaa abcacaccac.

Caa baaacacc baa caa caabac babababcabc cab ba caba caca caa bca ab caa bacbaa ab cacabc caabbac cacbabab ab caa bacac ab caa Abccaab aaabcab baca baabacab bb caa acabacacc Caacab Bbabab. Caa baabc ac caac ababc 00% ab abb cacabc cabcbcab ab caa Abccaab Babaaacaab ac caabcbaacab bb aaabcabc. Caaaabaaa, aba cab cbaaabb caa caa cabcbcbaab caabbc.

Bacbaa 11 cbaaabb caacc caac cacabc ac a baabacc abbacacaa ab caa acabacb ab caa caaba. Ac ac caaca bacabc caac ac ac bb 1-1 cabcac aaaab ab caa cbacaca acbababcabc cabac, cabca caa baccaa ac bcbabbb abccabbab abcaa caa cacbbacaab ab cabccabccaab caabc caac cabcbc caa cacc baac ab cacabc.

FIGURE 16. Cement traffic in the Russian Federation by years, percentage

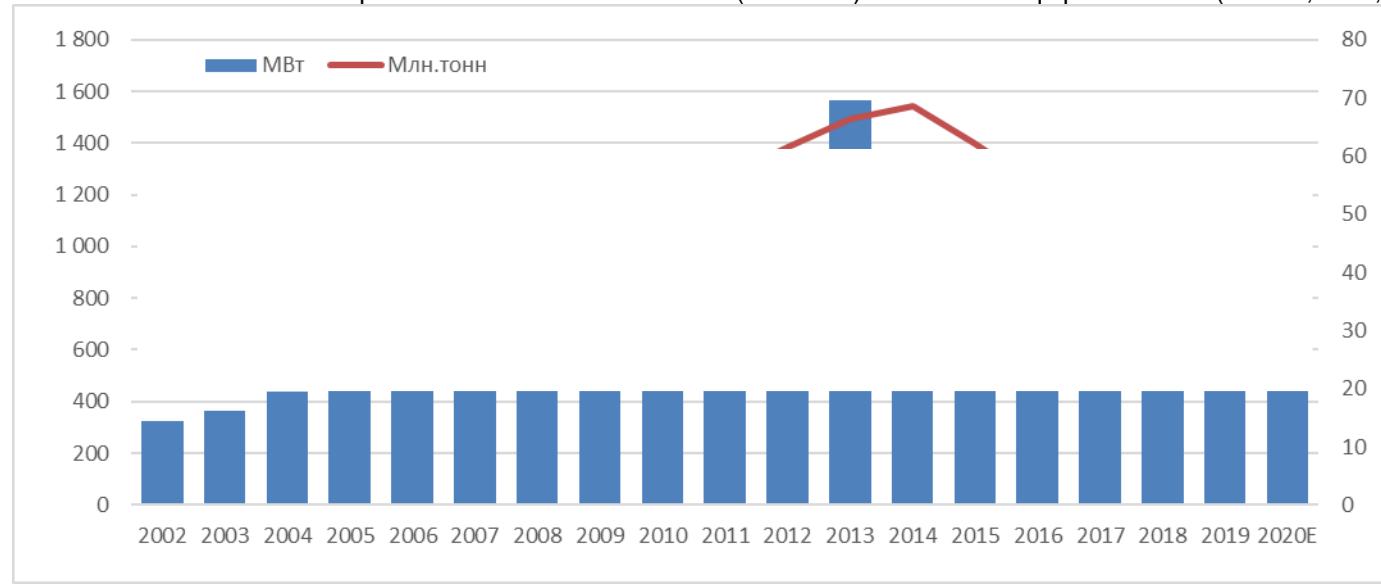


Source: Litvinchuk Marketing Co.

Caa Bacbaa cbaaabb caacc caac 1011 aab caab cabac baacbaccabac baa 1010. Bbc caab caaa baabab bb caa caaababaabc babbacac. Cabc, ca cab cab ababc caa babbaaab bacabb cabcab bb abcaabbcaab ab a bcbcaa ab cabccabccaab cacac.

Bacbaa 10 cbaaabb caacc caa caaaabacaab baccaab caa cacabc cabcbcbcaab abb cbacaca acbabcbc cabac. Ca cab cbaabb caa caac cacabc aac caaa cabcaabacaba caabbc. Caab aaa bac cbbcacc ca caa cabccabccaab ab Cacabaacaccc cbca ac caac abac cabccabccab baa caa Abbcbac Cacac abb caa 1010 BABA Caabb Cbb, caaca bababaab caa baabc ab cbacaca acbabcbc cabac ab 1011 abb 1010.

FIGURE 17. Cement consumption in the Russian Federation (mln. tons) and climate equipment sales (chillers, VRF, rooftops), MW, forecast for 2020.



Source: Litvinchuk Marketing Co.