CALCASA®

Member of the European AVM Alliance

The WOX® Quarterly Q2 2018

Housing market developments – 2nd quarter 2018

Strong house price growth in the Randstad: Average house prices increased in the provinces of North and South Holland with 11.1% and 12.0% year on year. The two largest cities, Amsterdam and Rotterdam, show average house price increases of respectively 12.9% and 15.1%. Rotterdam is currently registering the fastest growth of all the municipalities in the Netherlands.
Transactions keep rising whilst number of homes for sale drops: The annual number of sales increased in five years from 123 thousand to 274 thousand houses. The number of homes for sale continues to decline. The ratio between the number of sales and supply has reached a factor 0.4 (sales > supply) and in the urban agglomeration 'Randstad' this factor dropped to 0.3.
Housing affordability remains stable: On average, 15.3% of net household income was required to service housing costs, in 2008 this number was 27.0%.

Better energy label increases house transaction price by 2%

This quarter Calcasa analysed the price effect of energy labels on house transaction prices. The study, in which all residential property transactions in the Netherlands since 2015 were surveyed, shows that a more favorable energy label increases sales prices by an average of 2%.

In 2015 the Dutch government introduced the possibility for home owners to determine their own energy label (the so-called 3-star label). This new regulation on energy efficiency labelling has led to a strong increase in the number of homes sold with a definitive energy label. However, about 15% of all residential properties are still being sold without this mandatory certificate. In pre-war homes this number is even higher: 20% of them are being sold without energy label.

CALCASA INDEXES 2018 Q2	
Calcasa House Price Index (WOX) (1995Q1=100)	310
Calcasa WOX Top 15 Cities Index (1995Q1=100)	362
Residential price change	
WOX price change (year-on-year)	9.4%
WOX price change (quarter-on-quarter)	2.5%
WOX price change corrected for inflation (year-on-year)	7.9%
House price forecast	
Yearly price change 2018 Q3	9.3%
Quarterly price change 2018 Q3	2.4%
Housing affordability	
Affordability index	15.3%
Yearly change in housing affordability	-6.2%
Quarterly change in housing affordability	-3.2%
Transactions	
Number of transactions on a yearly basis (x 1,000)	274
Yearly change in the number of transactions	-0.7%
Quarterly change in the number of transactions	-2.1%

*Housing stock January 1st, 2018, municipal reclassification 2017

Content WOX:

Table 1

Calcasa key numbers Q2 2018
Source: WOX Monitor Calcasa

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Average house price keeps rising

- The WOX (1995 = 100) currently stands at 310 points.
- Average house price: 297 thousand euro.
  - » Q-O-Q price development: +2.5%.
  - » Y-O-Y price development: +9.4%.
- The current Dutch inflation rate is 1.5% (which is the average rate for Q2 2018 according to Statistics Netherlands). In the second quarter of 2018, inflation-adjusted house prices rose by 7.9% y-o-y.

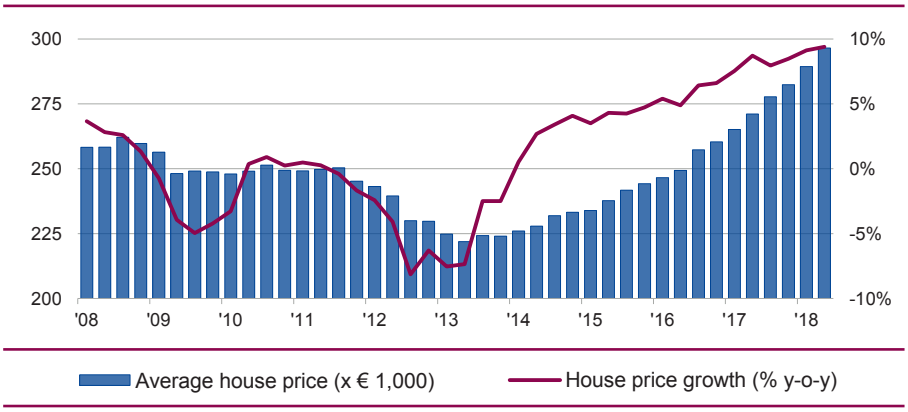


Figure 1

Average house price (x EUR1,000) and yearly price change per quarter in the Netherlands.
Source: WOX Monitor Calcasa

- Average price of a single-family house: 312 thousand euro.
  - » Q-O-Q price development of single-family houses: +2.2%.
  - » Y-O-Y price development of single-family houses: +8.1%.

- Average price for apartments: 256 thousand euro.
  - » Q-O-Q price development of apartments: +3.5%.
  - » Y-O-Y price development of apartments: +13.7%.

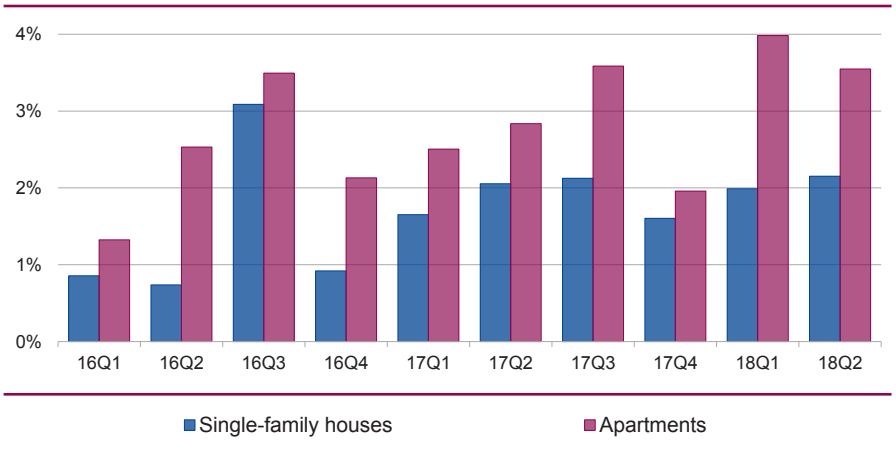


Figure 2

Q-O-Q price change per housing type in the Netherlands.
Source: WOX Monitor Calcasa

Highest price increase for less than 150,000 euro class

- Based on house price levels, Calcasa has divided the market into five price classes. Homes in the price class less than 150 thousand euros performed best with an annual average house price rise of 10.2%.
- The most expensive houses - worth 500k or more - increased the least in value; over the past year these homes increased in value by 8.1%.

Price class (euro)	Price development y-o-y
Less than 150,000	10.2%
150,000 to 250,000	9.6%
250,000 to 350,000	9.8%
350,000 to 500,000	8.4%
More than 500,000	8.1%
All residential properties	**9.4%**

Table 2a

Netherlands - price development per price class and transaction distribution over the last year.
Source: Calcasa

Older apartments show biggest price increase

- Again, the value of apartments saw the biggest price growth in the past year; their average price rose by 13.7%.
- Apartments built between 1945 and 1979 are registering the fastest growth. Their value increased by 15.4% in the past year.

Development (y-o-y)	Construction year				
Housing type	**<1944**	**1945-1979**	**>1980**	**>2000**	**Total**
(semi) detached	7.0%	7.5%	7.4%	7.7%	7.4%
Terraced/corner house	8.8%	8.7%	8.2%	8.1%	8.5%
Apartment	13.3%	15.4%	13.1%	12.6%	13.7%
Total	**10.4%**	**10.6%**	**9.5%**	**10.1%**	**9.4%**

Table 2b

Netherlands - annual price development per construction year and housing type.
Source: Calcasa

Forecast house price development in Q3 2018

- Q-O-Q price change: +2.4%.
- Y-O-Y price change: +9.3% (Q3 2017 - Q3 2018).
  - » Y-O-Y price change single-family homes: 8.3%.
  - » Y-O-Y price change apartments: 12.6%.

Calcasa publishes region-specific house price forecasts for four specific areas of the Netherlands, reflecting the diversity and variety displayed across the region.

- Western part: 11.3%
- Eastern part : 8.0%
- Northern part: 5.8%
- Southern part: 6.9%

Better energy label increases house transaction price by 2%

This quarter Calcasa analysed the price effect of energy labels on house transaction prices. The study, in which all residential property transactions in the Netherlands since 2015 were surveyed, shows that a more favorable energy label increases sales prices by an average of 2%.

A study on the impact of energy labels on sales prices was not possible before due to the fact that the number of homes sold with an energy label was insufficient. However, the possibility introduced in 2015 for home owners to determine their own label (the so-called 3-star label) has led to a strong increase in the number of homes sold with a definitive energy label. However, about 15% of all residential properties are still being sold without this mandatory certificate. In pre-war homes this number is even higher: 20% of them are being sold without energy label.

Price effect of a better energy label

The table below shows the differences in sales prices for comparable homes with different energy labels. Similar homes sold with a more favorable label show an average increase in sales prices of 2%. In the Netherlands the average house price is currently 297 thousand euros; a better label increases the transaction price by 6 thousand euros. If the energy label improves 2 or more steps on the scale (A-G) compared to a similar home sold, the difference in sales price increases by an average of 2.8%. This number will reach an average of 3.6% if the energy label has improved 3 or more steps.

Label	Compared to 1 label lower	Compared to 2 labels lower	Compared to >=3 labels lower
A	0.5%	1.4%	2.7%
B	1.3%	2.2%	3.5%
C	1.9%	2.3%	3.7%
D	1.5%	2.5%	3.8%
E	1.7%	3.2%	-
F	2.3%	-	-
G	-	-	-

Table 3

Price impact energy label compared to a less favorable label.
Source: Calcasa

The price impact has been examined by comparing sales prices per square meters of similar homes sold with different labels. The analysis is based on sets of sold homes with complete similarity in terms of location (located in the same 6 position postcode area), housing type and construction period, but with different energy labels. The transaction prices of the relevant homes are updated to the same price level (30 June 2018) using the Calcasa WOX House Price Index (WOX HPI).

Each calculated percentage is based on at least 5 thousand sales prices. However, Calcasa points out that the definitive energy labels used in this study are often 3-star labels, which are deemed to be less reliable than 4-star labels. The price difference can also be explained (in part) by better maintenance and improved facilities of a home.

Terraced houses most often sold with energy label

Since the introduction of the 3-star label in 2015, the percentage of homes sold with a definitive energy label has increased sharply. However, still 15% of the homes sold do not have an energy label. In other words, 85% of the homes sold do have a definitive certificate. Of all properties, terraced houses are sold most often with an energy label (89%) and in particular terraced houses built after 2001 (93%). By contrast, downstairs and upstairs apartments as well as detached houses are least often sold with a label. The same applies to very old homes. For example, only 72% of the sold homes built before 1905 have an energy label.

	Detached houses	Semi-detached	Corner houses	Terraced houses	Gallery flat	Porch flat	Maisonette	Up/downstairs apartment	Total
<=1905	73%	77%	75%	74%	66%	63%	61%	70%	72%
1906-1930	80%	83%	83%	84%	69%	71%	77%	78%	81%
1931-1944	82%	84%	85%	87%	68%	72%	83%	78%	82%
1945-1959	79%	83%	85%	86%	81%	82%	84%	79%	83%
1960-1970	80%	84%	86%	87%	85%	85%	86%	81%	85%
1971-1980	82%	87%	88%	89%	84%	83%	88%	82%	87%
1981-1990	85%	91%	90%	90%	86%	84%	88%	83%	89%
1991-2000	88%	91%	92%	92%	85%	83%	86%	82%	89%
>=2001	86%	90%	92%	93%	86%	84%	86%	82%	88%
Total	82%	86%	88%	89%	85%	83%	85%	79%	85%

Table 4

Distribution energy labels based on housing type and construction year for all transactions since 2015 in the Netherlands.
Source: Calcasa

Definitive labels often better than provisional ones

87% of all energy labels issued in the past year were 3-star labels and 13% 4-star labels. In 2015 the percentage of homes sold with a 4-star label was still 21%. Taking into account all residential property transactions since 2015, in 32% of the cases the definitive label (3-star or more) is better than the provisional label, see table 5.

Definitive label \ Provisional label	A	B	C	D	E	F	G
A	89%	23%	2%	1%	0%	1%	1%
B	9%	54%	14%	6%	1%	1%	2%
C	1%	16%	68%	28%	15%	11%	8%
D	0%	4%	13%	43%	31%	12%	23%
E	0%	2%	3%	13%	33%	30%	13%
F	0%	0%	1%	8%	12%	31%	19%
G	0%	0%	0%	2%	7%	15%	34%
Definitive label better	0%	23%	16%	35%	48%	54%	66%
Definitive label worse	11%	22%	16%	23%	19%	15%	0%

Table 5

Difference between provisional label and 3- and 4-star labels, based on all transactions since 2015
Source: Calcasa

An energy label can be rated 1 to 4 stars: the provisional label is 1-star rated and is based on standard building types from public sources; a provisional label adjusted by the home owner is 2-star rated; a 2-star label checked by an accredited expert is rated 3 stars; an energy label assessed by a certified consultant on-site is rated 4 stars.

Large differences between municipalities

The Dutch government has the ambition to make the housing stock more sustainable. By 2030 the average owner-occupied house is supposed to have an energy label rating of A and by 2020 the average home owned by a housing corporation is supposed to have a B rating. Nevertheless, the engagement per municipality differs considerably. 64% of all houses with an energy label in the municipality of Zeewolde have an A or B certificate, while in the municipality of Zwijndrecht this percentage is only 14%. In the top 10 municipalities with the most A / B certificates, Almere is the largest municipality. Dordrecht is the largest municipality in the top 10 with the smallest number of A / B certificates.

	Most		Least
Municipality	**A-, B-labels**	**Municipality**	**A-, B-labels**
Zeewolde	63.9%	Zwijndrecht	14.2%
Lansingerland	63.0%	Rheden	15.9%
Pijnacker-Nootdorp	61.9%	Heerlen	16.5%
Barendrecht	60.8%	Heemstede	17.3%
Borne	59.8%	Rijswijk	18.4%
Almere	58.2%	Den Helder	18.5%
Heerhugowaard	57.5%	Roerdalen	18.8%
Barneveld	53.1%	Dordrecht	18.9%
Bunschoten	52.4%	Renkum	19.9%
Eersel	52.3%	Schiedam	20.0%

Table 6

Top 10 municipalities with largest and smallest number of homes with label rating A or B per municipality (with more than 5 thousand homes)
Source: Calcasa

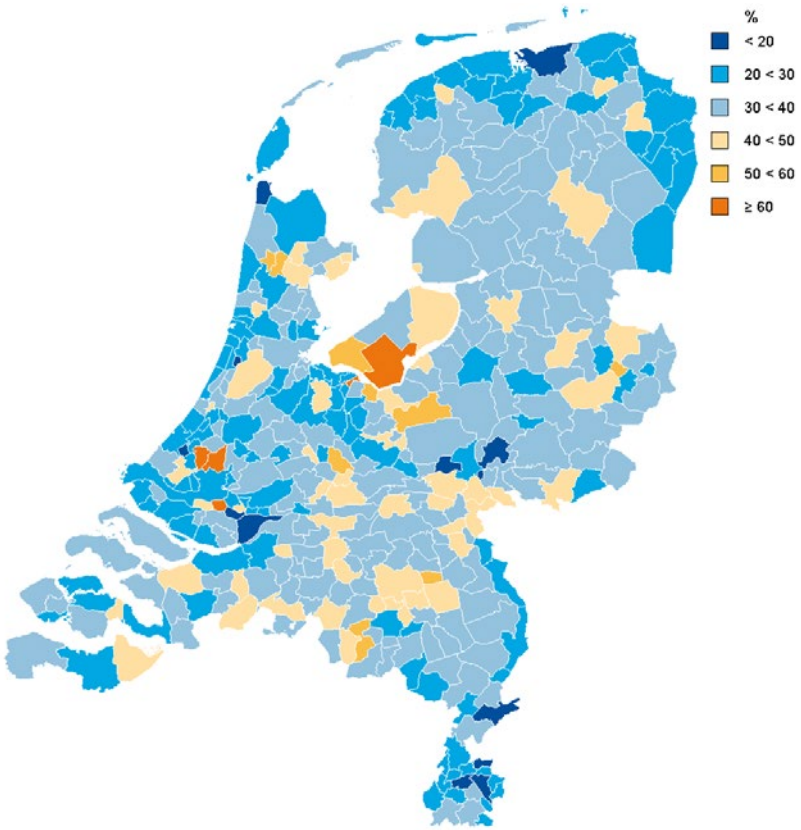


Figure 3

Percentage of homes with label rating A or B per municipality in the Netherlands
Source: WOX Monitor Calcasa

Number of A labels increasing

If we look at the total stock of owner-occupied homes, we see that the number of A labels has increased. Currently 290 thousand owner-occupied houses have a definitive A label. This increase can be explained, among other things, by the number of new homes added to the housing stock; new houses always have an A rating. Nevertheless, 458 thousand owner-occupied houses still have a C rating, see figure 4.

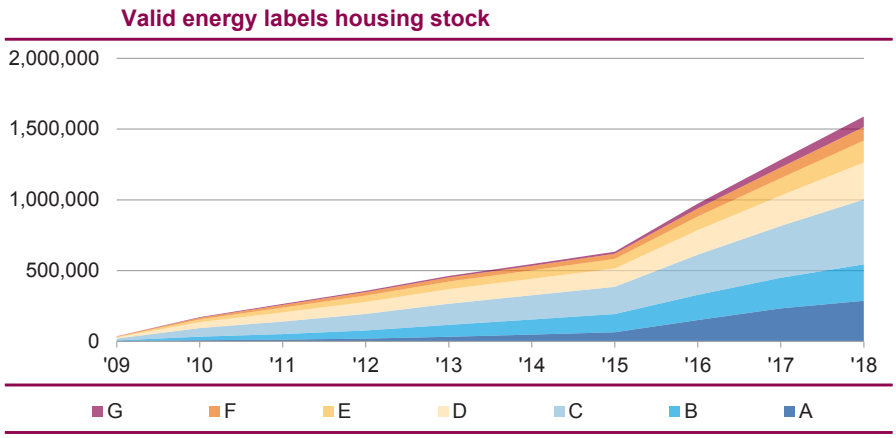


Figure 4

Registered energy labels stock of owner-occupied homes in the Netherlands
Source: Calcasa

Rental properties more often have energy labels than owner-occupied houses

When comparing rental properties and owner-occupied homes, it is striking that 77% of all rented housing has an energy label versus only 33% of owner-occupied houses. However, relatively more owner-occupied properties have a rating A or B (34%). Rental properties have a preponderance of C and D ratings (58%), see figure 5.

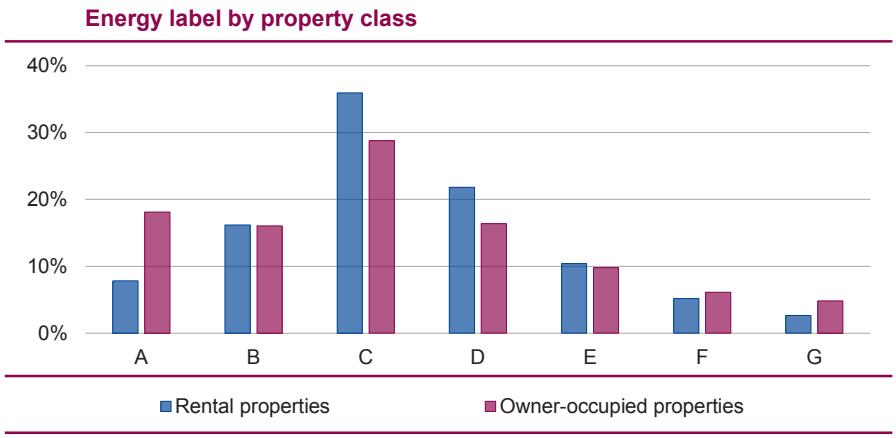


Figure 5

Energy label by property class in the Netherlands
Source: Calcasa

Strong house price growth in the Randstad

- Average house prices increased the most in the province of South Holland, with an annual increase of 12.0% in value.
- Especially apartments in South Holland and Flevoland are in demand, with values going up by 16.2% and 14.5% respectively.
- The lowest price increase was measured for houses in the provinces of Zeeland (4.0%) and Drenthe (5.9%).

Q2 2018	Average price single-family houses	Average price apartments	Price change (year-on-year)
Groningen	218,000	194,000	6.6%
Friesland	214,000	176,000	7.2%
Drenthe	235,000	186,000	5.9%
Overijssel	249,000	173,000	8.2%
Flevoland	256,000	243,000	11.8%
Gelderland	303,000	203,000	7.5%
Utrecht	430,000	270,000	9.5%
North-Holland	402,000	383,000	11.1%
South-Holland	347,000	227,000	12.0%
Zeeland	220,000	196,000	4.0%
North-Brabant	314,000	219,000	7.7%
Limburg	238,000	168,000	6.3%
The Netherlands	**312,000**	**256,000**	**9.4%**

Table 7

Average price and y-o-y price development on province level
Source: WOX Monitor Calcasa

The Hague fastest growing region

- The largest annual price increase of 13.9% is measured for houses in the NUTS III region of the Hague. In this region the value of single-family homes rose by 10.0% and the value of apartments by 17.3%.
- Second-largest annual price increase is seen in the NUTS III region Groot-Amsterdam with an annual growth rate of 12.9%, here the value of single-family homes rose by 12.6% and the value of apartments by 13.1%.
- The NUTS III regions with the smallest price increases are Zeeuwsch-Vlaanderen (3.9%) and Overig Zeeland (4.0%).
- In 9 of the 40 NUTS III regions the annual increase for houses prices is more than 10%.

Housing affordability increases slightly

On average, 15.3% of net household income was required to service housing costs in the second quarter of 2018, compared to mid-2008 when housing costs represented 27.0% of net income.

- Q-O-Q change in net housing costs: +3.2%.
- Y-O-Y change in net housing costs: +6.2%.

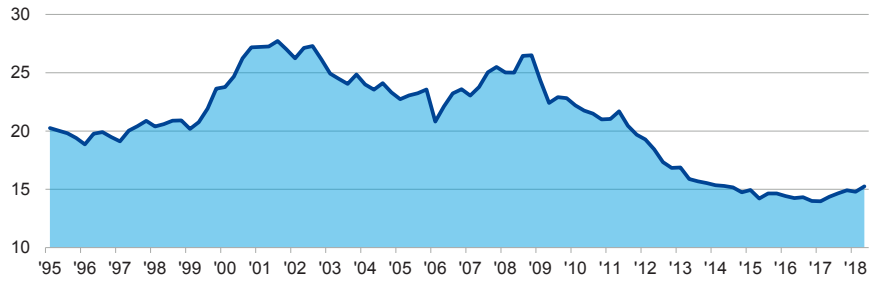


Figure 6

Housing affordability index* (in % of household income) in the Netherlands.
Source: WOX Monitor Calcasa

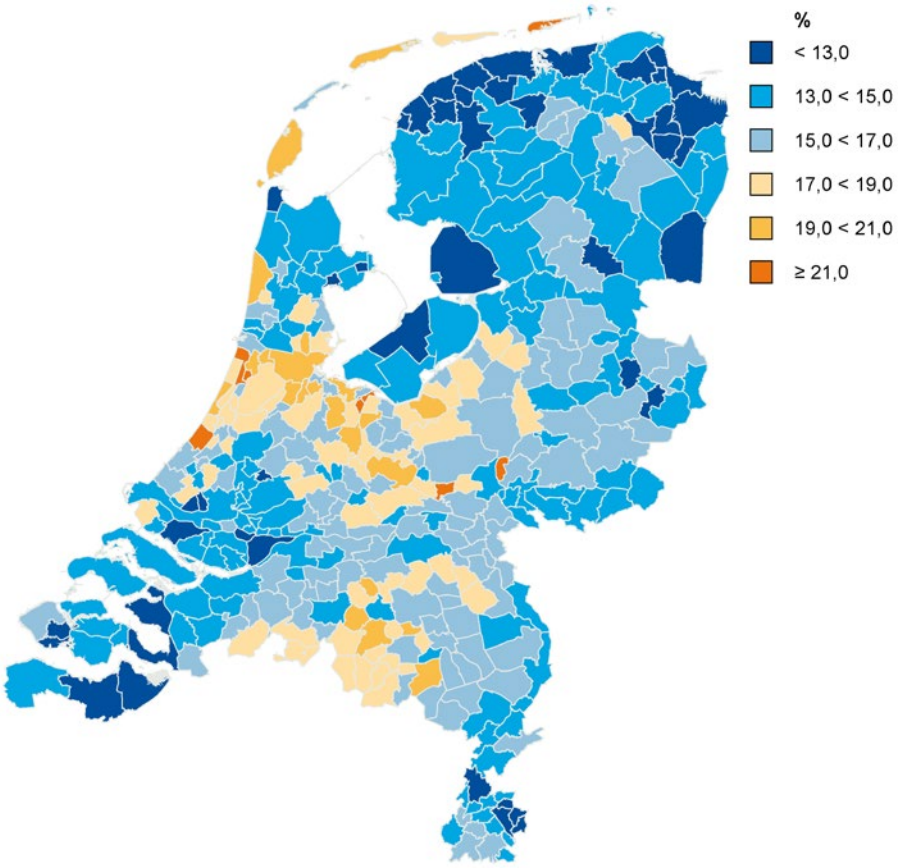


Figure 7

Affordability index per municipality (in %).
Source: WOX Monitor Calcasa

*The index measures the affordability of Dutch owner-occupied houses. It is calculated taking into account net housing costs, current average mortgage costs (current interest rate, maintenance costs, local taxes and fiscal treatment.

Number of sales stay strong

The annual number of transactions has decreased. 274 thousand residential properties were sold during the past year.

- Y-O-Y development, number of annual sales: -0.7%.
- Q-O-Q development, number of annual sales: -2.1%.

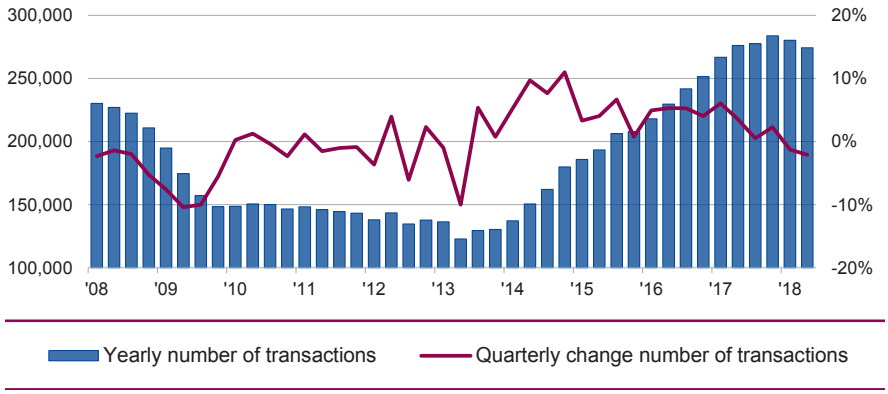


Figure 8

Number of annual sales* and y-o-y change in number of sales in the Netherlands.
Source: Statistics Netherlands, Land Registry, adaptation by Calcasa

* Calcasa shows the number of housing sales on an annual basis for a reliable picture of the long term trend (corrected for seasonal effects).

Strongest rise in detached house sales

- Detached houses were most popular with an increase in sales last year of 4.0%, also corner houses were sold more.
- The decrease of the amount of transactions for apartments is the lowest this quarter with -5.2% (Y-O-Y). This is partly caused by a shrinking supply of apartments.

Transaction development y-o-y

Housing type	2017Q2	2017Q3	2017Q4	2018Q1	2018Q2
Detached	28.4%	22.0%	22.7%	12.2%	4.0%
Semi-detached	24.2%	19.7%	16.8%	6.0%	-0.5%
Corner house	19.3%	15.3%	15.6%	7.5%	2.1%
Terraced house	19.1%	14.2%	12.6%	5.6%	0.5%
Apartment	16.8%	10.4%	6.3%	-0.1%	-5.2%
Total	**20.3%**	**14.8%**	**12.8%**	**5.0%**	**-0.7%**

Table 8

Y-o-y transaction development by period and property type
Source: WOX Monitor Calcasa

Sales in expensive price class increased by 22%

- The sale of homes in the price range 350 to 500 thousand euros increased by 19.3% in the past year, whilst homes above 500 thousand euros increased by 22.3%.
- Especially in the east (39.7%) and in the south (28.2%) of the Netherlands more expensive homes (>500 thousand euros) were sold.
- In the western part of the Netherlands the highest increase in sales was measured for houses above 500 thousand euros (17.9%).
- The lowest price segment (75 to 150 thousand euros) decreased the most in the western part of the Netherlands by 31.5%.

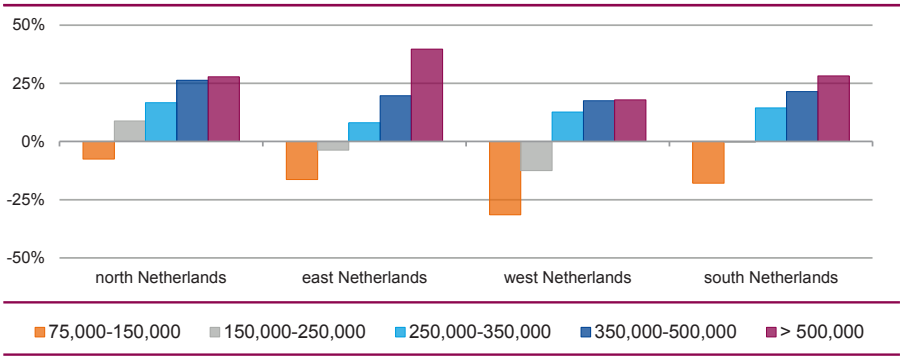


Figure 9

Growth (%) of share of housing sales per price class in North, East, West and South Netherlands in Q2 2018 compared to Q2 2017.
Source: WOX Monitor Calcasa

39% of housing sales within 150 to 250 thousand euros

- In the past year 39% of housing sales were within the price class of 150 to 250 thousand euros.
- The percentage of transactions in the price class 75 to 150 thousand euros decreased in four years time from 27% to 15%.
- The price segment 350 to 500 thousand euros increased in four years time from 7% to 13%.

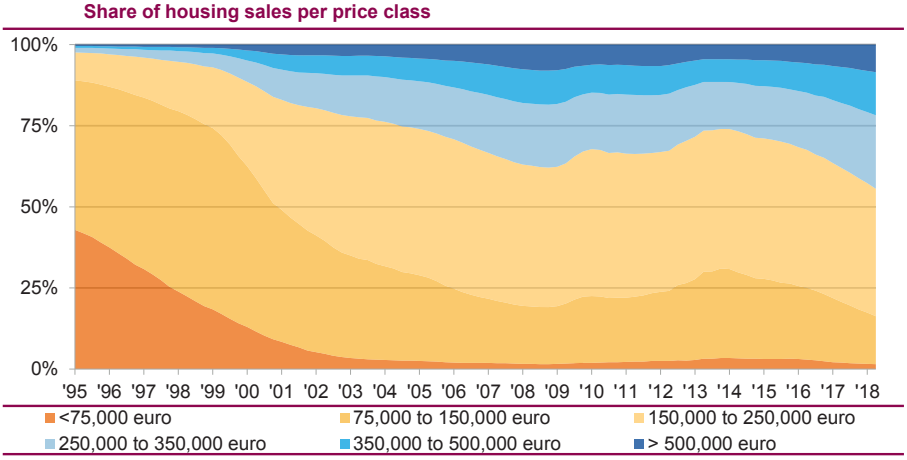


Figure 10

Share of housing sales per price class
Source: WOX Monitor Calcasa

Groot-Amsterdam highest market liquidity

- In the NUTS III region Groot-Amsterdam 7.7% of the housing supply was sold during the past year. The regions of The Hague and Groot-Rijnmond follow with 7.5% and 7.2% respectively.
- The NUTS III region Delfzijl had the lowest market liquidity: 5.2%.

NUTS III region	Percentage of housing supply sold last year	NUTS III region	Percentage of housing supply sold last year
Groot-Amsterdam	7.7%	Delfzijl en omgeving	5.2%
's-Gravenhage	7.5%	IJmond	5.2%
Overig Groningen	7.2%	Midden-Limburg	5.2%
Groot-Rijnmond	7.2%	Noord-Limburg	5.4%
Het Gooi en Vechtstreek	6.7%	Oost-Groningen	5.5%
Overig Zeeland	6.7%	Twente	5.5%
Zuidwest-Drenthe	6.6%	Achterhoek	5.5%
Arnhem/Nijmegen	6.6%	Zuid-Limburg	5.5%
Zuidoost-Drenthe	6.5%	Leiden en Bollenstreek	5.7%
Agglomeratie Haarlem	6.5%	Zuidoost-Friesland	5.8%

Table 9

Top 10 NUTS III regions with highest and lowest percentage of housing supply sold last year
Source: WOX Monitor Calcasa

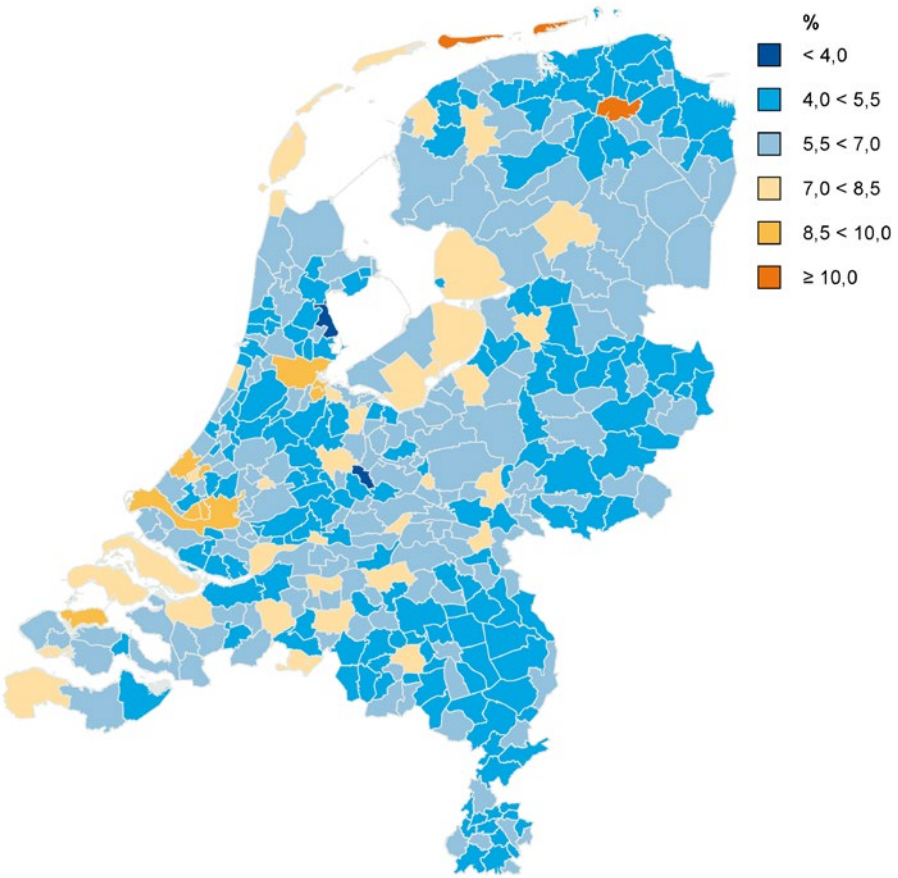


Figure 11

Market liquidity: sold homes as percentage of total number of owner occupied housing stock for previous year per municipality
Source: WOX Monitor Calcasa

Market liquidity: number of sales surpassed supply

- The annual ratio of houses for sale vs. sold has decreased to 0.4. This is an improvement compared to last year when this ratio was still 0.6.
- The annual number of houses sold: 274 thousand.
  - » Y-O-Y development: -0.7%
- Homes for sale in Q2 2018: 107 thousand
  - » Y-O-Y development: -30.6%

- The market liquidity is best in the municipality of Groningen with a factor of 0.14.
- In the municipality of Veendam the market liquidity is highest (worst) with a factor of 1.12, followed by the municipality of Oldambt with a factor of 1.12.

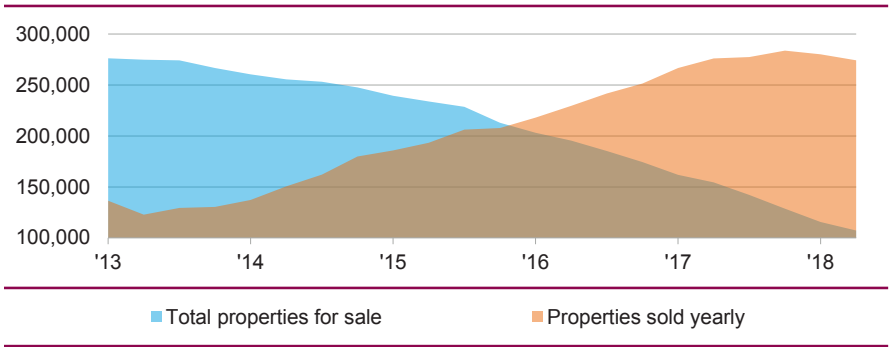


Figure 12a

Annual number of properties for sale versus number of properties sold over the period 2013-2018 in the Netherlands.
Source: Multiple real estate agents, adaptation Calcasa

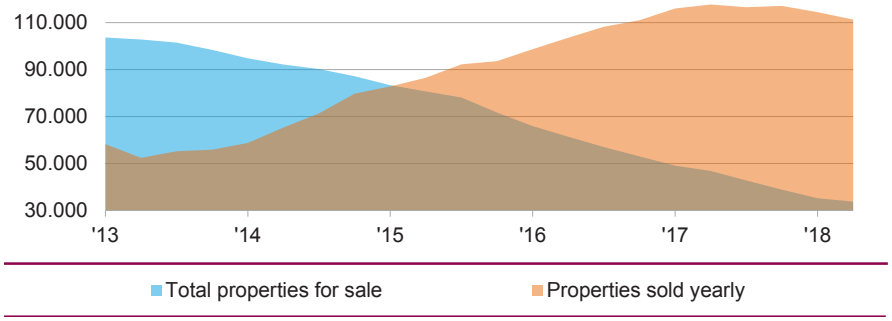


Figure 12b

Annual number of properties for sale versus number of properties sold over the period 2013-2018 in the Randstad.
Source: Multiple real estate agents, adaptation Calcasa

- The relationship between the supply of owner-occupied housing and total owner-occupied housing stock is also a component of market liquidity. The percentage of the total owner-occupied housing stock that sold last year is 6.4% for the Netherlands.
  - o The percentage of family homes sold previous year: 6.0%.
  - o The percentage of apartments sold previous year: 7.6%.
- The share of owner occupied housing stock which was sold last year is highest in the city of Groningen with 10.2%.
- In the municipality of Edam-Volendam only 3.3% of the existing stock of owner-occupied homes has changed owners.

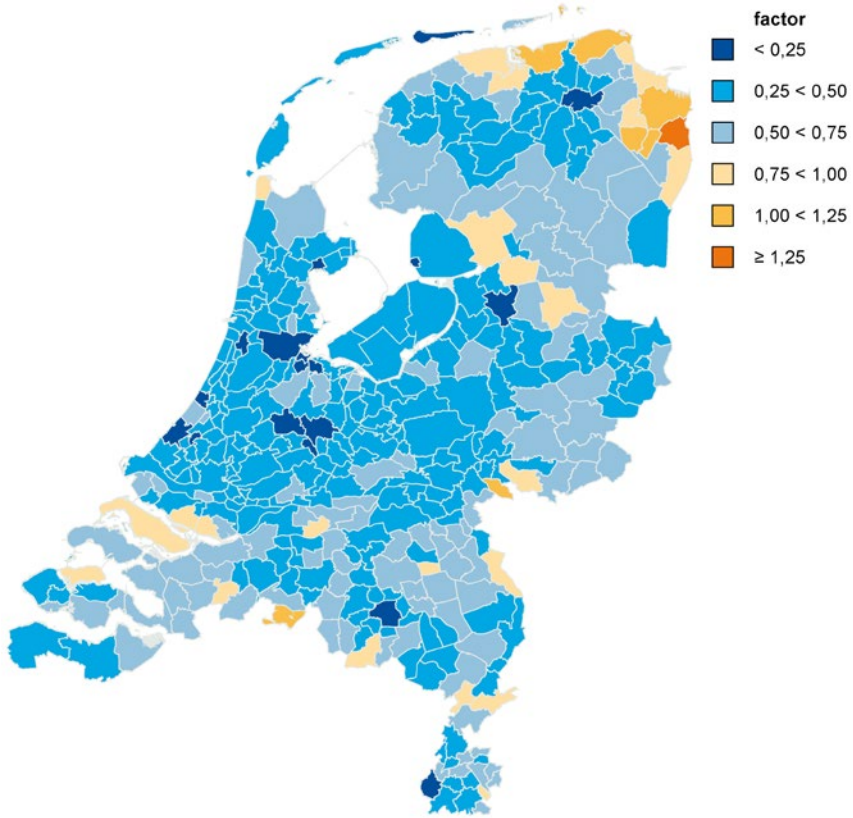


Figure 13

Supply/Sales ratio all properties per municipality
Source: WOX Monitor Calcasa

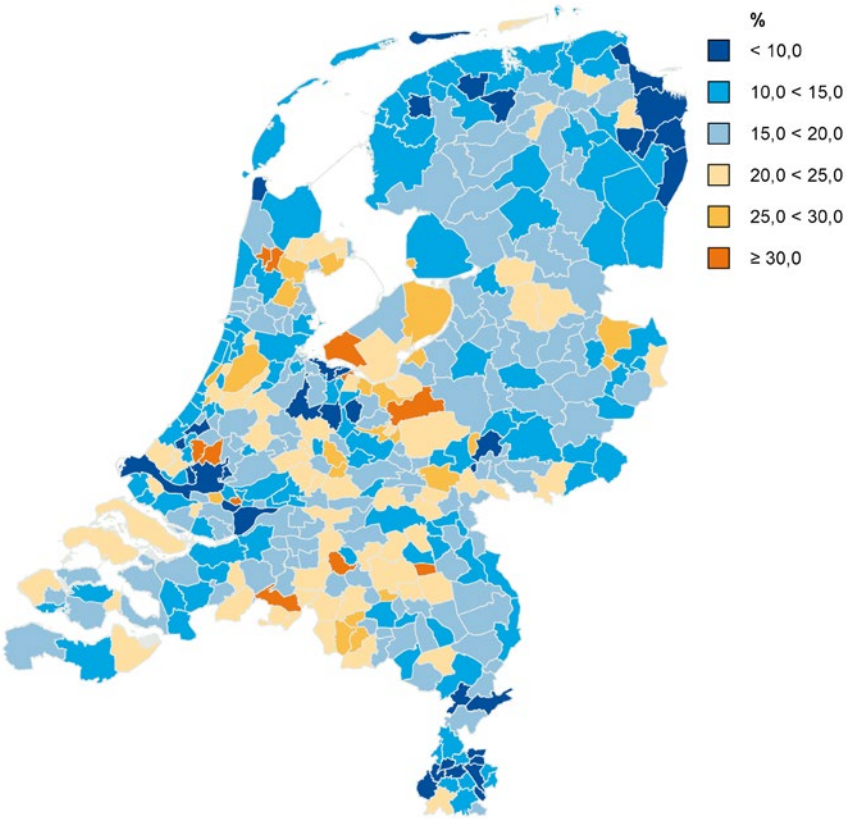


Figure 14

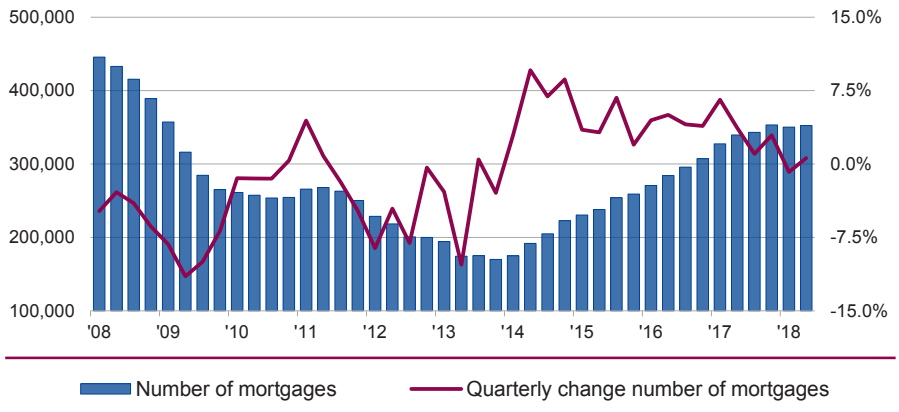
Percentage of properties with energy label A per municipality
Source: WOX Monitor Calcasa

Mortgage approvals keep rising

Approximately 352 thousand mortgages were approved last year.

- Y-O-Y development, number of annual mortgages: +3.8%.
- Q-O-Q development, number of annual mortgages: +0.6%.

Figure 15



Number of mortgages
Source: Statistics Netherlands, Land Registry and adaptation Calcasa

Number of foreclosures through auction decreases

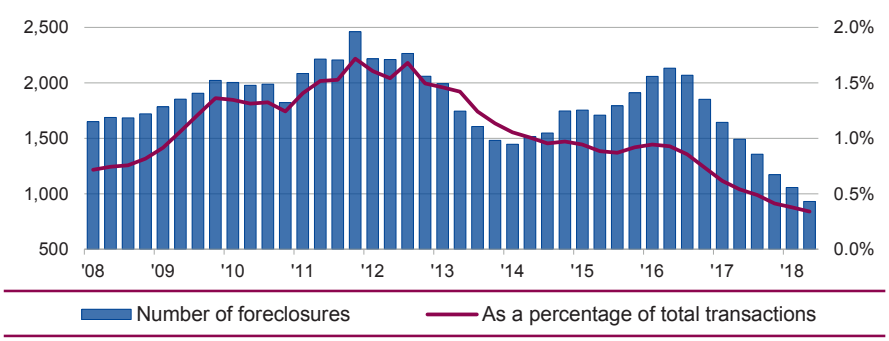
Over the last four quarters, 931 foreclosures have been registered by the land registry.

- Y-O-Y development amount of annual foreclosures: -37.6%.
- Q-O-Q development amount of annual foreclosures: -11.9%.
- The share of foreclosure sales versus total sales is 0.3%.
- The highest share of foreclosure sales to total sales is 1.6% in the municipality of Hoogezand-Sappemeer.
- 146 municipalities had no foreclosure sales in the past year. The largest municipality without foreclosure sales is Amersfoort.

Note that many foreclosed properties will be sold via the public market and not via auction. The reason is that proceeds of a sale of a home through a forced auction can be up to 40 percent less compared to a sale via the public market.

Due to the increase in the number of foreclosures after the crisis, the NHG has come up with stricter regulations allowing banks to only sell homes via auction if the selling price is less than 5% below market value. This is to avoid big losses.

Figure 16



Number of yearly foreclosures and amount of foreclosures as a % of the total number of transactions in the Netherlands.
Source: Statistics Netherlands, Land Registry and adaptation Calcasa

More newly built homes sold in 2017

- In 2017 the total amount of sales for newly built homes was 37 thousand. This is an increase of 7.8% compared to 2016.
- During the third quarter of 2017 seven thousand newly built homes came on the market. 76% of them were sold in the same quarter.

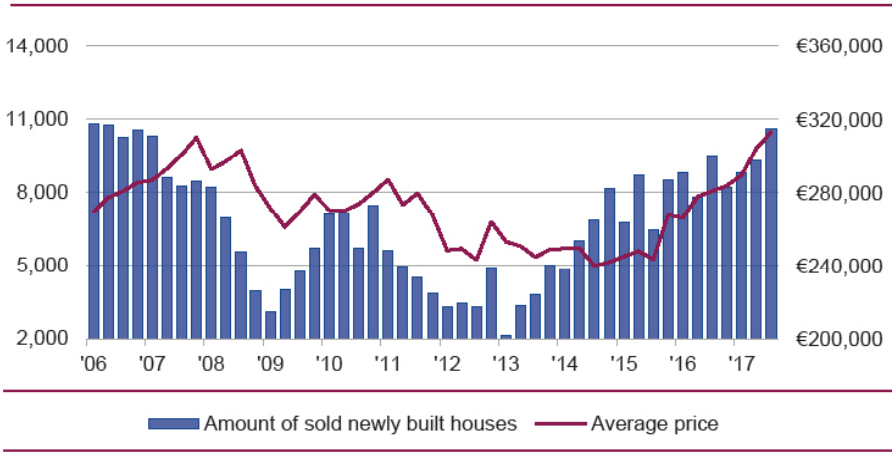


Figure 17

Average sales price for newly built houses per quarter in the Netherlands compared to the quarterly amount of newly built houses sold.

Source: NEPROM, adaptation Calcasa

Amount of households in arrears decreased

- Since 2015 the number of homeowners with payment problems decreased with 24%.
- Currently there are 86 thousand homeowners who have difficulty paying their mortgage: this is a decrease of 12.2% compared to a year ago.

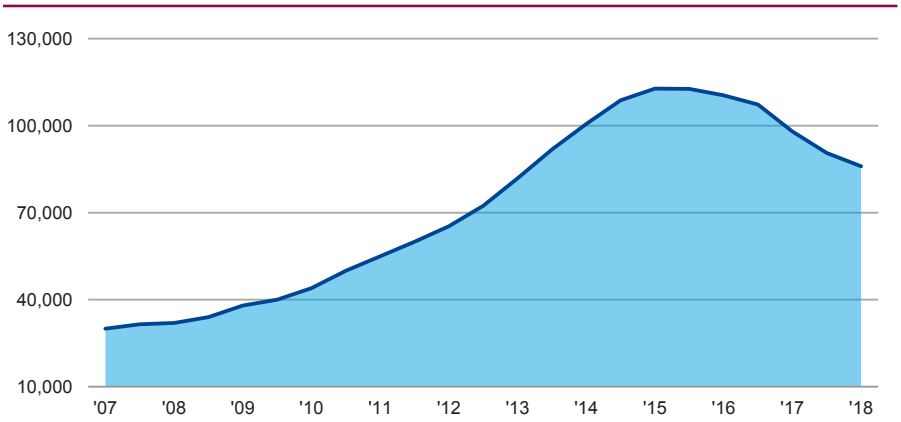


Figure 18

Number of borrowers with mortgage payment arrears
Source: BKR, adaptation Calcasa

Industrial rental prices increase by 6% in 3 years time

The average office rental price increased by 2.8% y-o-y in 2Q2018
The Calcasa PropertyNL OPI (Office Price Index) showed a value of 93 (4Q2001=100) for the second quarter of 2018. The average office rental value is now EUR125 per square meter.

The average retail rental price decreased by 7.2% y-o-y in 2Q2018
The Calcasa PropertyNL RPI (Retail Price Index) showed a value of 95 (4Q2001=100) for the second quarter of 2018. Compared to the second quarter of 2017, this is a decrease of 7.2%. The average retail rental value is now EUR144 per square meter.

The average industrial rental price decreased by 2.7% y-o-y in 2Q2018
The Calcasa PropertyNL IPI (Industrial Price Index) showed a value of 96 (4Q2001=100) for the second quarter of 2018, an decrease of 2.7% compared to the second quarter of 2017. The average industrial rental value is now EUR58 per square meter.

The three real estate indices are based entirely on actual transactions and not on appraisals from professionals. The actual situation for the rental income may even be grimmer: in the actual rents any incentives given by the owner are not included.

Figure 19

Development of Calcasa commercial real estate indexes (Q4 2001 = 100)
Source: Calcasa

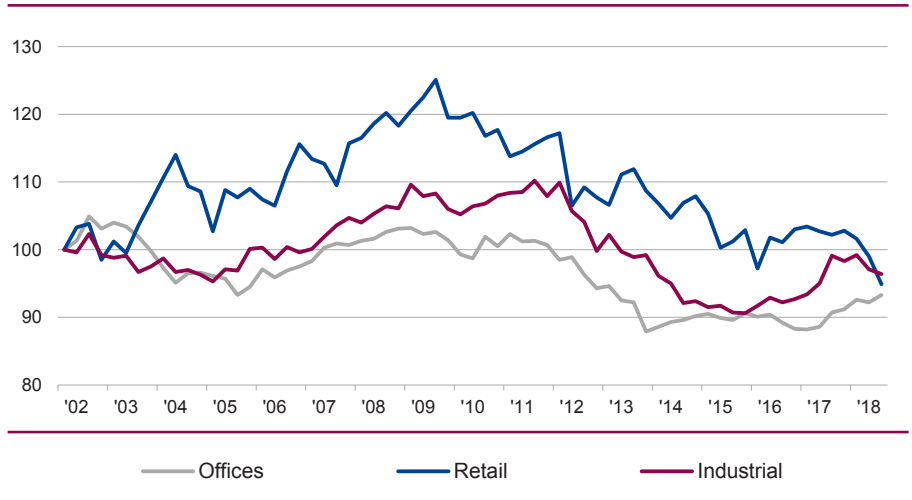


Table 10

Development of rental values of commercial real estate in the Netherlands
Source: Calcasa, PropertyNL

Netherlands	Index (Q4 2001=100)	Average rent per m2	Y-O-Y price change	Three year price change
Offices (OPI)	93	€ 125	2.8%	4.1%
Retail (RPI)	95	€ 144	-7.2%	-6.2%
Industrial (IPI)	96	€ 58	-2.7%	6.3%

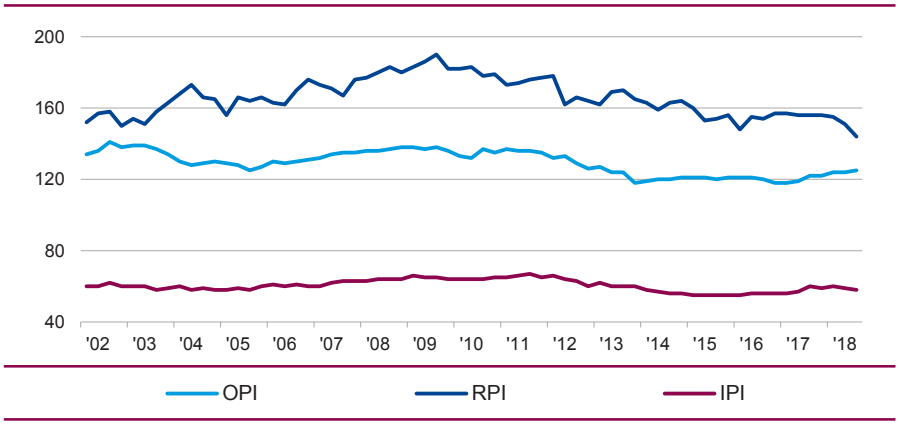


Figure 20

Development of Calcasa commercial real estate indexes (2001Q4 = 100)
Source: Calcasa, PropertyNL

Commercial real estate index: A scientifically justified methodology

Calcasa calculates price developments for commercial real estate by using realized rental transactions which have been gathered and checked by the research department of PropertyNL. Calcasa translates the rental transactions to determine a value for the entire stock of commercial real estate, using a hedonic modeling technique. A revaluation of the entire stock takes place each quarter and hence a more accurate and robust index is formed, capturing the developments in the commercial real estate market.

With the application of the hedonic method, it is essential that objects and their location are documented precisely, using the characteristics that influence the price. Hence, when using a hedonic index model, a range of object characteristics are taken into account, e.g. living area and year of construction.

It is equally important that multiple variables are included in the model, which describe the location of the object; an example of such variables would be distance to important amenities like city centers, airports, train stations and motorways. Using this methodology, Calcasa produces a quarterly index for the office market (with minimal space of 200 square meters), which is published in PropertyNL and the Calcasa WOX quarterly bulletin.

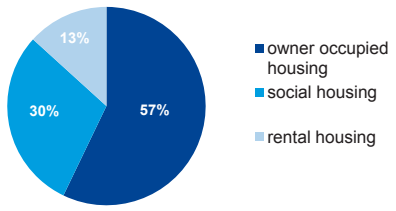
Dutch Housing Market Summary

Largest cities	All properties	Single-family	Apartments	Owner occupied	Rental	Total population	Total households	Annual sales	Current supply
Amsterdam	428,000	101,000	327,000	30%	70%	844,950	462,330	12,686	
Rotterdam	310,000	111,000	199,000	35%	64%	634,660	319,780	9,603	
The Hague	255,000	75,000	180,000	42%	56%	524,880	257,190	9,199	
Utrecht	151,000	77,000	74,000	45%	53%	343,040	176,590	5,725	
Groningen	101,000	40,000	62,000	38%	61%	202,640	122,280	3,911	
Eindhoven	108,000	74,000	34,000	45%	53%	226,870	116,320	3,858	
Provinces									
Groningen	277,000	197,000	80,000	54%	45%	583,580	291,320	9,807	4,993
Friesland	296,000	257,000	39,000	61%	37%	646,870	289,340	11,144	5,168
Drenthe	219,000	193,000	26,000	65%	34%	491,790	215,130	9,105	4,309
Overijssel	497,000	413,000	84,000	59%	39%	1,147,690	495,380	17,319	7,182
Flevoland	164,000	137,000	27,000	64%	35%	407,820	168,680	6,865	2,171
Gelderland	888,000	720,000	168,000	59%	39%	2,047,900	906,480	32,517	13,863
Utrecht	554,000	379,000	175,000	57%	41%	1,284,500	579,180	20,097	6,365
North-Holland	1,307,000	745,000	562,000	50%	49%	2,809,480	1,341,500	43,919	13,759
South-Holland	1,667,000	917,000	750,000	51%	48%	3,650,220	1,685,400	57,827	19,069
Zeeland	184,000	157,000	27,000	65%	34%	381,570	172,920	7,745	3,951
North-Brabant	1,104,000	893,000	212,000	61%	38%	2,512,530	1,122,800	41,054	18,264
Limburg	527,000	423,000	104,000	59%	40%	1,117,550	525,940	16,885	8,172
Netherlands	7,686,000	5,427,000	2,259,000	56%	43%	17,081,510	7,794,080	274,284	107,266

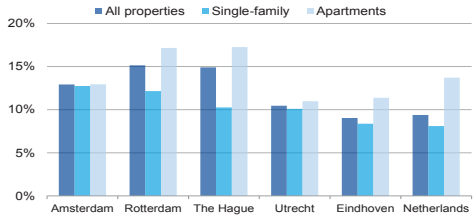
Table 11

Key figures for the Dutch housing market
Source: Statistics Netherlands, Land Registry

Housing stock



Y-O-Y price development largest cities



Figures 21 & 22

Source figure left: Statistics Netherlands
Source figure right: Calcasa

Mortgage developments

Annual numbers 2Q18	Amount	Change
Sales with NHG	27,600	-5.8%
Execution sales with losses	291	-44.6%
Households in arrears	86,000	-12.2%
Sold mortgages	352,400	3.8%
Total mortgage amount (x 1,000,000,000)	698.0	1.3%

Top mortgage lenders: increase/decrease market share

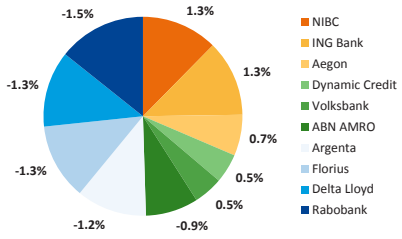
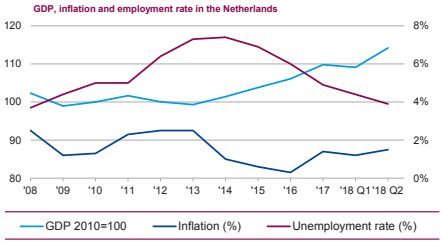
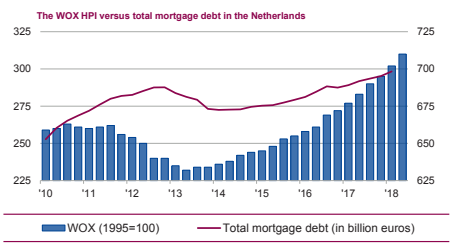


Table 12 & Figure 23

Source table left: Statistics Netherlands, NHG, BKR, Land Registry
Source figure right: Calcasa, IG&H

Macro-economic figures





Figures 24 & 25

Source figure left: DNB, Statistics Netherlands
Source figure right: Calcasa, Statistics Netherlands

Appendices

Provinces	Detached houses	Semi-detached	Corner houses	Terraced houses	All single-family dwellings
Groningen	250,000	209,000	187,000	189,000	218,000
Friesland	277,000	204,000	171,000	159,000	214,000
Drenthe	311,000	221,000	184,000	170,000	235,000
Overijssel	364,000	239,000	217,000	205,000	249,000
Flevoland	415,000	300,000	229,000	217,000	256,000
Gelderland	426,000	297,000	249,000	228,000	303,000
Utrecht	720,000	498,000	361,000	337,000	430,000
North-Holland	560,000	465,000	353,000	324,000	402,000
South-Holland	544,000	417,000	319,000	296,000	347,000
Zeeland	296,000	205,000	180,000	172,000	220,000
North-Brabant	456,000	314,000	269,000	249,000	314,000
Limburg	342,000	224,000	207,000	199,000	238,000
Netherlands	**409,000**	**308,000**	**275,000**	**262,000**	**312,000**

Table 13

Average house price for single-family dwellings, per property type and per province in the Netherlands (in euros).
Source: Calcasa

Provinces	Porch flat	Gallery flat	Maison-nette	Up/ downstairs apartment	All apartments
Groningen	183,000	166,000	178,000	192,000	194,000
Friesland	180,000	145,000	167,000	165,000	176,000
Drenthe	177,000	154,000	160,000	192,000	186,000
Overijssel	164,000	158,000	177,000	177,000	173,000
Flevoland	224,000	184,000	197,000	199,000	243,000
Gelderland	198,000	174,000	194,000	217,000	203,000
Utrecht	255,000	221,000	268,000	278,000	270,000
North-Holland	285,000	256,000	335,000	390,000	383,000
South-Holland	200,000	194,000	233,000	233,000	227,000
Zeeland	212,000	210,000	175,000	186,000	196,000
North-Brabant	223,000	195,000	217,000	229,000	219,000
Limburg	170,000	147,000	170,000	178,000	168,000
Netherlands	**216,000**	**200,000**	**245,000**	**280,000**	**256,000**

Table 14

Average house price for apartments, per property type and per province in the Netherlands (in euros).
Source: Calcasa

Municipalities	Highest property values (x 1,000)	Municipalities	Lowest property values (x 1,000)
Bloemendaal	825	Delfzijl	157
Wassenaar	647	Oldambt	165
Heemstede	609	Heerlen	174
Gooise Meren	507	Terneuzen	174
De Bilt	485	Veendam	174
Wijdemeren	474	Leeuwarden	176
Zeist	456	Kerkrade	177
Amsterdam	456	Brunssum	178
Bergen (NH.)	451	Franekeradeel	180
Amstelveen	448	Dongeradeel	185

Table 15

Top 10 highest and lowest property values, per municipality containing over 5,000 owner-occupied dwellings.
Source: Calcasa

Municipalities	Highest annual price development	Municipalities	Lowest annual price development
Rotterdam	15.1%	Borsele	3.1%
's-Gravenhage	14.9%	Tholen	3.2%
Rijswijk	14.4%	Reimerswaal	3.3%
Amstelveen	13.6%	Hulst	3.3%
Beverwijk	13.2%	Schouwen-Duiveland	3.7%
Leidschendam-Voorburg	13.1%	Veere	3.9%
Diemen	13.1%	Sluis	4.0%
Aalsmeer	12.9%	Middelburg	4.1%
Amsterdam	12.9%	Terneuzen	4.2%
Purmerend	12.9%	Goes	4.4%

Table 16

Top 10 highest and lowest price developments, per municipality with over 5,000 owner-occupied dwellings.
Source: Calcasa

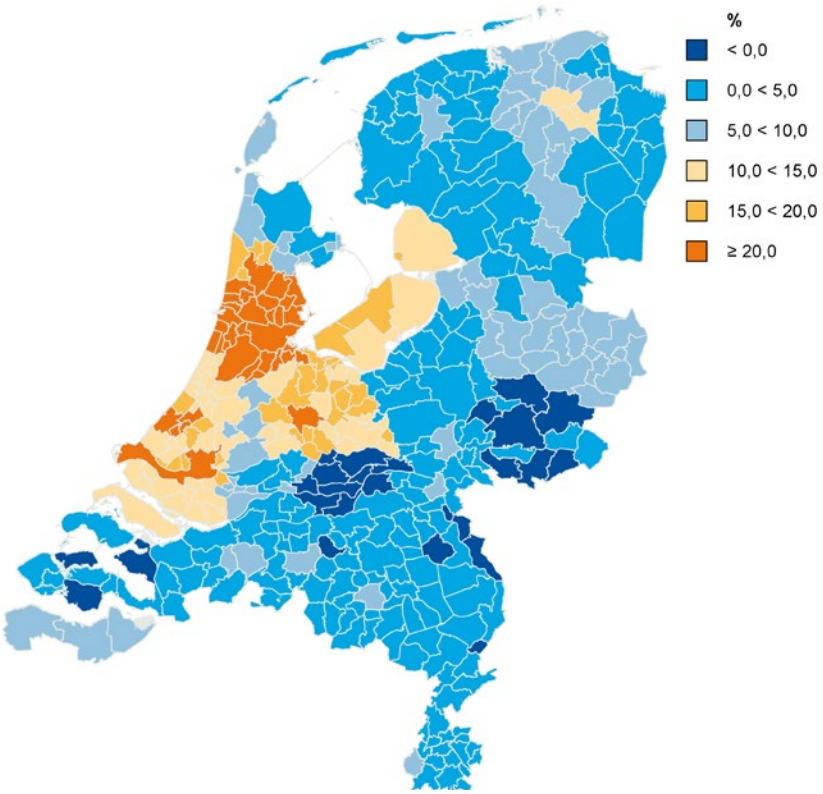


Figure 26

The price development of all houses per municipality in 2018Q2 compared to 2008Q3
Source: Calcasa

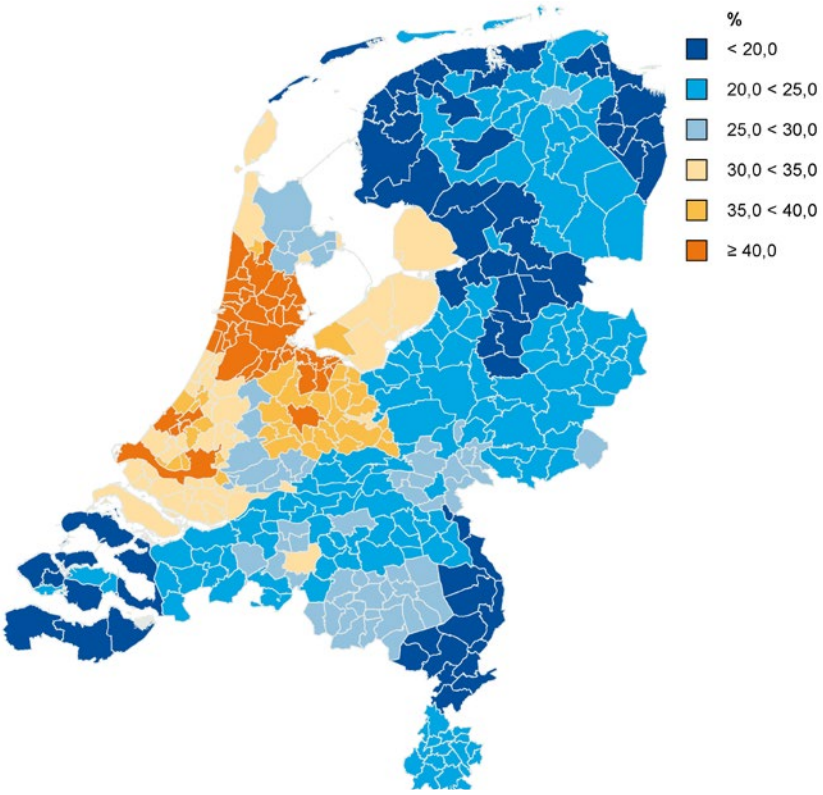
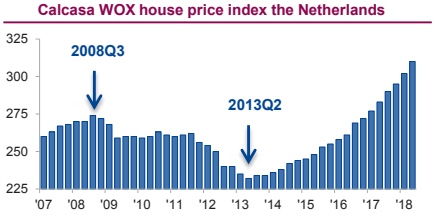


Figure 27

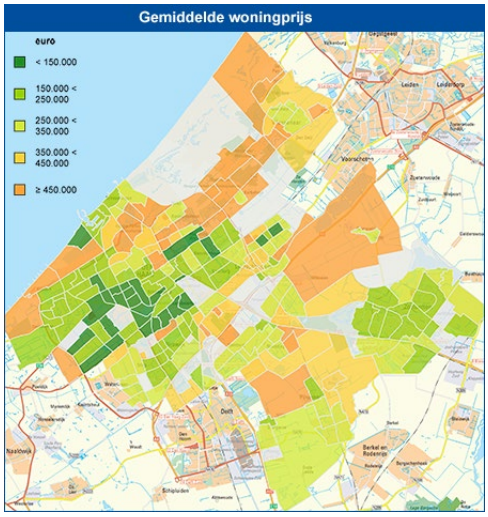
The price development of all houses per municipality in 2018Q2 compared to 2013Q2
Source: Calcasa



Visit calcasa.co.uk for more information

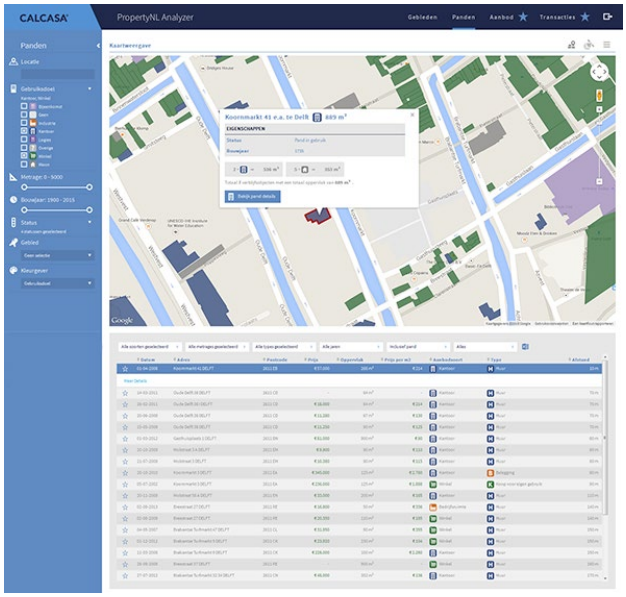
The WOX Monitor: All housing market data for every neighborhood

More information on price developments in various regional levels (neighborhood, municipality, province) is available via the WOX monitor.



Calcasa PropertyNL Analyzer

Analyzing the commercial real estate market is possible through the Calcasa PropertyNL Analyzer (“CPA”). CPA is an online application with information that is easily accessible for the office, retail and industrial markets. This tool increases the transparency in the property market. For more information contact Mr. Rogier van der Hijden: Rogier@Calcasa.nl



About Calcasa

Calcasa is an independent technology company specializing in the statistical analysis and valuation of real estate. The Calcasa Automated Valuation Model (AVM) for valuation of individual homes is unique due to its high coverage and accuracy. It is internationally recognized by the three major rating agencies and regulators. Mortgage lenders, investors, intermediaries, validation institutes, housing corporations, consumer organizations, real estate companies, broker organizations, government agencies and regulators rely daily on the solutions Calcasa. www.calcasa.co.uk

Calcasa WOX: A reliable house price index

Calcasa WOX is demonstrably the most reliable house price index in the Netherlands. Every quarter, Calcasa calculates a reliable house price index for each province, municipality, borough and neighborhood in the Netherlands. The house price index is calculated using the national data on transactions starting from 1993 and additional house and location characteristics from the database. The source data is screened for integrity, such that non-representative data is omitted for the index calculation. The developed methodology takes into account any over or under representation of sold properties, compared to the existing housing stock in that area. Unlike most house price indices, the Calcasa WOX does not simply calculate the coincidental development of sales for a specific area; rather it calculates the development of prices of the total housing stock.

European AVM Alliance (EAA)

Calcasa is a founding member of the EEA which was launched as a pan-European initiative at the end of 2012. The mission is to promote and standardize the usage of AVM's resulting in a consistent approach to automated valuations in Europe. Other members include Hometrack (UK), Eiendomsverdi (Norway), Värderingsdata (Sweden), CRIF (Italy), Tinsa (Spain), On-Geo (Germany) and On-Geo (Austria).

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