

# **Increase of the Transparency concerning the real estate market of Lower Saxony - Enhancement of the Valuation System with the Online-Real Estate-Price-Calculator**

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**Key words:** Purchase Price Collection, Transparency of Regional Markets of Real Estate, Multiple Regression Function

## **Summary**

Essential task of the independent German advisory committee, consisting of valuers from various relevant sectors, is to provide transparency for the real estate market. The committees offices are usually located at local cadastre offices. Base and main aim of the committees work is the maintenance of a digital inventory of property transactions (purchase price collection) and its proper evaluation. Nearly one million contracts of sale are the data base of all analyses to be carried out.

Besides the determination of average values, the latest software - including multiple regression analysis tools - supports production of plots, diagrams, indices and other influential factors on the way to open market values.

This publication first introduces some examples of the German real estate market report with its fixed "standard prices". Second it presents efficient and powerful ways to a computer assisted valuation for both built-up and non-built-up real estate. The way to an "Online-Real-Estate-Price-Calculator" ("IPK") in Lower Saxony, a special "Valuation Information System (WIS)", will be shown in following. You can calculate the rough estimate value of standard types for singly family houses, condominiums, row-houses and semi-detached houses in Internet under: [www.gag.niedersachsen.de](http://www.gag.niedersachsen.de) <section > Service. The Rate: 19,90 Euro per information for one property.

## **Zusammenfassung**

Es ist Aufgabe der Gutachterausschüsse in Deutschland, den jeweiligen Grundstücksmarkt transparent zu machen. Die Geschäftsstellen der Gutachterausschüsse sind überwiegend bei den Katasterämtern eingerichtet. Basis sämtlicher Arbeit ist die Kaufpreissammlung. Rund eine Million Kaufverträge von Immobilien werden in Deutschland jährlich von den Gutachterausschüssen ausgewertet.

Transparenz wird sowohl in Form von Mengenstatistik wie auch ganz gezielt durchgeführten Analysen erzeugt. Als Präsentations-Produkte werden jährlich die Bodenrichtwertkarten und die Grundstücksmarktberichte veröffentlicht und jedermann zugänglich gemacht.

Es wird der Weg bis hin zum Niedersächsischen Wertermittlungs-Informationssystem (WIS) aufgezeigt. Sie können mit dem Immobilien-Preis-Kalkulator (IPK) den überschlägigen Wert für Standardobjekte von Einfamilienhäusern, Eigentumswohnungen, Reihenhäusern und Doppelhaushälften im Bundesland Niedersachsen ermitteln. Die Internet-Adresse lautet: [www.gag.niedersachsen.de](http://www.gag.niedersachsen.de) <unter Service>. Die Gebühr pro Einzelauskunft beträgt 19,90 Euro.

## **1. Valuation of Real Estate in Germany**

As per law it is the main task of the committee of experts on real estates values to demonstrate the transparency of regional real estate markets. Everyone should be reliably educated about the market behaviour and the current trends. This offer is not only for experts but also for inexperienced citizens who are understandably not often involved in real estate transaction. The basis of all derivated market data is building a so called purchase price collection which is lead through the regional committee of valuation experts. This automated leadership was established in Lower Saxony in 1983. Until today it has developed into a broad Valuation System with the help of an ongoing revolution and constant enhancement.

Thanks to the internet the distribution of data of the real estate market in Lower Saxony is increasing since 2006. The online procedure allows a 24h service without any additional charges which is also enhancing customer focus. Since the year of 2000 standard ground values can be drawn online as well as real estate market reports since 2003. The institution of an online information service from the purchase price collection took place in 2006.

The latest accomplishment of the experts on real estates values in Lower Saxony is a nationwide online-information service about market values of built-up properties. A number of comparing factors are already published in real estate market reports of the committee. For years now they allow a derivation of comparing prices for standard real estate e.g. single family houses and condominiums. The determination of the purchase price usually requires an interpolation through graphs and excels spread sheets.

## **2. Online-Real-Estate-Price-Calculator**

In 2007, the committees of experts on real estate values in Lower Saxony developed a brand new service to use and provide data of the real estate market. In addition to the standard ground values the submarkets of the developed properties and rented flats should be presented with transparency for everyone. For this purpose, a price information system was evolved for properties with single family houses and houses with two apartments as well as for condominiums - the Online Real Estate Price Calculator. This version will be enlarged in the near future in order to include also properties for twin houses and terraced houses.

The keynote of the Online Real Estate Price Calculator is the specific preparation and consolidation of the real estate market data of the local committees of experts on real estate values. The regression calculation is the basis for these programmes which calculate a price level for nearly every developed standard property in Lower Saxony. The price is calculated by applying only a few user data on the basis of comparing factors from the regression analysis. The calculation does not include detailed information about the property of valuation. With the help of these few essential data each citizen is now in a position to determine a price level in an independent, rapid and direct way at any time possible. In order to offer a homogeneous system for the price calculation throughout Lower Saxony, the committees of experts on real estate values defined common parameters for the appraisal of developed properties. In this connection, the year of construction and the living space of the building as well as the location and the size of the property turned out to be decisive criteria. These four characteristics are the basis for the online price calculation. Using the price calculator, these characteristics must follow the parameters of the sample which has been taken as a basis. Hence the valuation of exceptional properties is normally not possible.

For the calculation, individual characteristics of the condition and the equipment can be considered as little as the need of rehabilitation or modernisation of properties. Besides, legal restrictions of properties are not taken into consideration for the analysis. Prices for properties with ancient assets as well as for properties with very small or huge living spaces or plots cannot be established by the online price calculator, either. The user must be aware of these facts. The application is limited to highly homogeneous submarkets and provides only the price level for an average property without considering specialities which could have an impact on the value.

All in all, the Online Real Estate Price Calculator offers a user-friendly and low-cost online access to individually conditioned market data of properties in terms of average price levels of developed properties. After the introduction phase the price is 19.90 € for an individual information, but it is also possible to place a subscription.

First evaluations prove that not only house owners but also credit institutions and estate agents especially appreciate the application spectrum of the Online Real Estate Price Calculator. During the testing phase in the first half of 2008, the price calculator was consulted about 150 times per day on average.

It should be specifically noted that the result does not correspond to a market value which is defined according to Article 194 of the German Federal Building Code (BauGB). The determined price level is not binding and rounded up to the nearest ten thousand Euros. The online information cannot and shall not replace the traditional valuation report of the market value. It is not a result from the purchase price collection, either. The Online Real Estate Price Calculator is just an additional information system which offers the customer a well directed, but only rough estimation of the price level of the concerned property.

### **3. Online Calculation of a Price Level**

The Online Real Estate Price Calculator can be found on the Internet page of the Lower Saxony committees of experts on real estate values: [www.gag.niedersachsen.de](http://www.gag.niedersachsen.de) / section "Service". The home page offers at first some introducing information about the calculation programme and basic comments on the application as well as on the meaning and use of the results.

The first of four programme steps asks the user to enter the address of the property which should be valuated. This information is compared with the existing geographic data. With the help of the supplied address it is determined whether a standard ground value and a statistical regression analysis exist for this item. If this condition is fulfilled, the next step is to query the parameters of the standardised values like year of construction, living space and - for single family houses and houses with two apartments also the size of the property (see figure 1). Of course, the different possibilities of the data input are limited to the range of parameters of the transferred sample whereby the user obtains precise limit values for the calculation. If all conditions for the calculation are fulfilled and successfully verified, the penultimate step requires the declaration of consent to the terms of use and then the confirmation of the entered data (see figure 2). After the price level has been calculated in the background of the programme, the result is finally presented. As illustrated in figure 3, the calculation

programme offers additionally to the price level also information about the value as well as an explanation of the result and an extract of the corresponding standard ground value map.

Adresse [http://www.gag.niedersachsen.de/master/C41222619\\_N26101952\\_L20\\_DO\\_I7540589.html?](http://www.gag.niedersachsen.de/master/C41222619_N26101952_L20_DO_I7540589.html?)

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Service

Immo-Preis-Kalkulator

Schritt 2/4: Eingabe der Objektdaten

Objektart: **Freistehendes Ein-/Zweifamilienhaus**  
 Ort/Gemeinde: **Wolfenbüttel, Stadt**  
 Straße: **Neuer Weg**  
 Hausnummer: **0022**

Geben Sie bitte das Baujahr, die Wohnfläche und die Grundstücksfläche ein und beachten Sie, dass die Eingabe innerhalb der zulässigen Eingabebereiche liegen muss.

Baujahr:  zulässiger Eingabebereich (von 1950 bis 2002)  
 Wohnfläche:  m<sup>2</sup> (von 52 bis 250 m<sup>2</sup>)  
 Grundstücksfläche:  m<sup>2</sup> (von 290 bis 1500 m<sup>2</sup>)

Neue Eingabe Zurück Beenden Weiter

*Figure 1: Input of Property Data for Price Calculation*

Adresse [http://www.gag.niedersachsen.de/master/C41222619\\_N26101952\\_L20\\_DO\\_I7540589.html?](http://www.gag.niedersachsen.de/master/C41222619_N26101952_L20_DO_I7540589.html?)

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Schritt 3/4: Überprüfung der Eingabedaten

Überprüfen Sie bitte Ihre Eingabedaten:

Objektart: **Freistehendes Ein-/Zweifamilienhaus** Baujahr: **1970**  
 Ort/Gemeinde: **Wolfenbüttel, Stadt** Wohnfläche: **120 m<sup>2</sup>**  
 Straße: **Neuer Weg** Grundstücksfläche: **800 m<sup>2</sup>**  
 Hausnummer: **0022**

Die Ermittlung des Preisniveaus ist mit diesen Eingaben möglich.

Die [Nutzungsbedingungen](#) habe ich gelesen und erkläre mich damit einverstanden.

Einzelauskunft Abonnement

Zurück Beenden

*Figure 2: Verification of Entered Data and Declaration of Consent to Terms of Use*

## Auskunft über das Preisniveau einer Immobilie

mit folgenden Daten:

|   |   |
|---|---|
| Objektart: <b>Freistehendes Ein-/Zweifamilienhaus</b> | Bodenrichtwert: <b>125 €/m<sup>2</sup>, W</b> |
| Gemeinde: <b>Wolfenbüttel, Stadt</b>                  | Baujahr: <b>1970</b>                          |
| Straße: <b>Neuer Weg</b>                              | Wohnfläche: <b>120 m<sup>2</sup></b>          |
|   | Grundstücksgröße: <b>800 m<sup>2</sup></b>    |

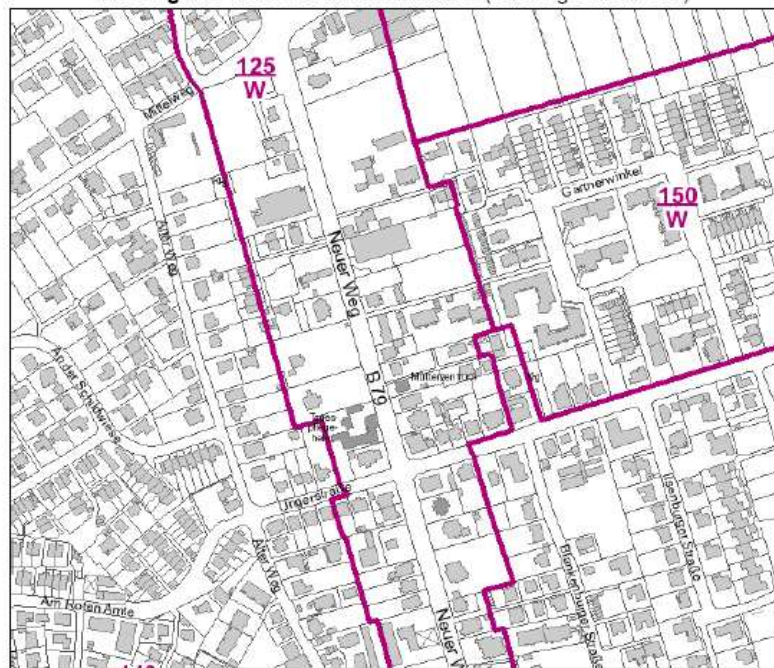
**Das mittlere Preisniveau der Immobilie beträgt: 160.000 €**

Das ermittelte Preisniveau der Immobilie ist unverbindlich. Es bezieht sich auf ein mit den obigen Eingabewerten typisiertes Grundstück (Boden- und Gebäudewert). Der Wert ist auf volle 10 Tausend Euro gerundet. Das Preisniveau ist auf der Grundlage der beim örtlichen Gutachterausschuss für Grundstückswerte geführten Kaufpreissammlung durch Analyse der Kaufpreise überschlägig ermittelt.

Das Preisniveau der Immobilie gilt für ein durchschnittliches Objekt im normalen Unterhaltungszustand; wertbeeinflussende Besonderheiten in Zustand und Ausstattung des Gebäudes sowie in der Lage des Grundstücks sind nicht erfasst und können ebenso wie weitere wertbeeinflussende Merkmale (z. B. auf einem Grundstück ruhende Rechte und Belastungen) zu einem vom obigen Wert abweichenden Preisniveau führen.

Die durchgeführte Berechnung ist keine Verkehrswertermittlung nach § 194 Baugesetzbuch; sie erfolgt ohne eine örtliche Besichtigung allein auf der Grundlage der oben genannten Eingabedaten.

**Auszug aus der Bodenrichtwertkarte (Stichtag 01.01.2008)**



Darstellung unmaßstäblich!

Ihr zuständiger Ansprechpartner:

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niedersachsen.de

**Figure 3: Display: Information about Price Level of a Real Estate**

## Example: Calculation of the Price Level of a Real Estate

Following example, the price level of a property with a singly family house within the Country of Wolfenbüttel, should be determined with the help of the Online Real Estate Price Calculator of the committees of experts on real estate values of Lower Saxony (GAG). The procedure of the online price calculation has been described in details in the preceding chapter. An example of the calculation method of the Online Real Estate Price Calculator will follow below:

Property of Valuation (fictitious; without any personal reference):

Single Family House at Wolfenbüttel  
Street Address: Neuer Weg 22

After the address has been entered the Online Real Estate Price Calculator determines the standard ground value zone with the help of the corresponding geographic data and derives the value for the calculation. According to the indicated address a property with a single family house at Wolfenbüttel has a standard ground value of 125 €/m<sup>2</sup>.

Valuation Data:

|                               | User Data | Calculation Data | Calculation Unit       |
|-------------------------------|-----------|------------------|------------------------|
| Year of Construction(BAUJ)    | 1970      | 7.0              | (BAUJ-1900)/10         |
| Living Space (WOFL)           | 120 sqm   | 1.2              | 100 sqm                |
| Size of Property (FLAC)       | 800 sqm   | 8.0              | 100 sqm                |
| Standard Ground Value (LAGE)  | 125 €/sqm | 1.25             | 100 €/sqm              |
| Date of Purchase (DATU)       | 2008      | 18.0             | Year of Purchase -1990 |
| Purchase Price / Living Space | Target    | Target           | 100 €/sqm              |

After the valuation data have been sent to the calculation programme, the valid regression function starts in the background of the programme. The following regression function of the committees of experts on real estate values Braunschweig is valid for the property of valuation:

$$\begin{aligned}
 \text{Zielgröße}^{EZ} = & A + K_{1D} \cdot \text{DATU}^{E_{1D}} + K_{2D} \cdot \text{DATU}^{E_{2D}} + K_{3D} \cdot \text{DATU}^{E_{3D}} + \\
 & K_{1B} \cdot \text{BAUJ}^{E_{1B}} + K_{2B} \cdot \text{BAUJ}^{E_{2B}} + K_{3B} \cdot \text{BAUJ}^{E_{3B}} + \\
 & K_{1L} \cdot \text{LAGE}^{E_{1L}} + K_{2L} \cdot \text{LAGE}^{E_{2L}} + \\
 & K_{1F} \cdot \text{FLAC}^{E_{1F}} + K_{2F} \cdot \text{FLAC}^{E_{2F}} + \\
 & K_{1W} \cdot \text{WOFL}^{E_{1W}}
 \end{aligned}$$

$K_{ij}$  : Regressionskoeffizient i der Einflußgröße j  
 $E_{ij}$  : Exponent i der Einflußgröße j  
A : Absolutglied

Using the corresponding coefficients of regression, exponents and calculation data of the valuated property the following multiple regression formula is valid:

$$\left(\frac{KP}{WOFL}\right)^{0,6} = 57,248 - 9,936 \cdot 18 + 0,650 \cdot 18^2 - 0,014 \cdot 18^3 +$$

$$3,782 \cdot 7 + 0,545 \cdot 7^2 - 0,024 \cdot 7^3 +$$

$$1,349 \cdot 1,25 + 0,073 \cdot 1,25^2 +$$

$$0,220 \cdot 8 + -0,010 \cdot 8^2 +$$

$$3,811 \cdot 1,2^{-0,4}$$

The regression result shows the relation of the purchase price to the living space:

$$\left(\frac{KP}{WOFL}\right) = 1.356,97 \frac{\text{€}}{\text{m}^2}$$

Multiplying this result with the living space shows the requested price level:

$$\text{Preisniveau} = 1.356,97 \frac{\text{€}}{\text{m}^2} \cdot 120 \text{ m}^2$$

$$= 162.836 \text{ €}$$

$$\approx \underline{160.000 \text{ €}}$$

The calculated value must be rounded up to the nearest ten thousand Euros, as the result refers to a fictitious property with a developed single family house with an average equipment; further conditions which could have an impact of the property value have not been taken into consideration.

#### 4. Results of transparency of Regional Real Estate Markets

With the help of the Online-Real-Estate-Price-Calculator one is able to get comfortable Information about price levels of single family homes, house with two apartments as well as condominiums. This can be done with the help of specific, rehashed comparing factors that are published by real estate market reports. The application is fairly easy even for amateurs. All that needs to be entered is the address and characteristics that most likely influence the real estate price of the affecting property. Those characteristics include the year of construction as well as the area or living space. The influence of the location of the affected property and the land value is determined by the Online-Real-Estate-Price-Calculator through georeferenced standard ground value map of the committee. In order to do so the standard ground values are divided with the help of a digital land register map, so the correct land value can be allocated with each address.

Result of the online calculation is the price level for a certain real estate with property data of compatible real estate with average features and condition. This information cannot substitute an expert opinion of valuation but it gives every citizen the opportunity to find out information about the price level of a developed site in Lower Saxony, for just 19,90 €. Within a short time it will be possible to enlarge the calculation of real estate also for mid terraced houses and twin houses.

Thereby Online-Real-Estate-Price-Calculator will create even more transparency of the real estate market of Lower Saxony. This project has already been honoured and placed third at

the “GIS Best Practice Award 2008“, from German Association of Surveying (“Deutscher Verein für Vermessungswesen”; DVW).

## **REFERENCES**

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## **BIOGRAPHICAL NOTES**

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