

Energy and building certificates – instruments to the support sustainable development?

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1 This is how it looks like

On purchase the user of a car receives exact technical data about future energy consumption, maintenance requirements, environmental profiles etc. All this does not happen when purchasing a house. In 1999 real estate in the value of 178 billion Euros changed owners in Germany. The year of construction, the number of rooms and perhaps some more trivialities are almost everything the future home owners get as a decision base. In very exceptional cases the buyers will have actually known, what they got for their money. The result of this lack of transparency leads to misleading offers in the real estate business. High-quality supplies, corresponding to the criteria of sustainable construction, find it more difficult to stand their ground on the market. Simultaneously it becomes easier to sell inferior real estate qualities at high prices. This lack of transparency also handicaps the work of the companies which offer solid quality. Structural damage and further costs for the home purchaser are the consequences.

And this also annoys your credit institute

The rearrangement of the equity capital regulations for the credit institutions is described with the keyword "Basel II". It is the aim of "Basel II" to increase the stability of the international financial system. This means in the core that the credit institutions must mobilize the more equity capital the higher the risk of the borrower is. If the credit rating is good, the probability is low that there may be difficulties at the repayment of the credit and consequently the interest is low, too. That means good opportunities will result for enterprise with a good credit rating. Enterprise with a bad credit rating must adapt themselves to worse credit conditions in future. In this game energy and building certificates may serve as proper tools to get better terms for loans.

A further problem: Deregulation

There are further uncertainties coming from the deregulation in the field of building permits: Local authorities reduce the scope of their examination procedures for building permits in Germany. Often detached houses or two family houses can be set up without any permit on the understanding that only a few requirements are to be met. It is sufficient to announce a planned measure to the building authority. The building measure can be carried out after the announcement without further-reaching exam. This procedure saves costs and time in the period until the beginning of the building measure. On the other hand this procedure also increases the responsibility of the clients. Most building owners are not yet conscious of the consequences. They still have the idea that all essential aspects of their building projects are checked by the local authorities.

However, this is not true any more. Building owners must increasingly take over the responsibility for their building projects. This requires mature citizens. However, the aids for building owners are lacking, to attain the competence required. Corresponding to the decrease of the public examination new forms of quality control must be developed.

2 Attempts to shed light upon the matter

An attempt, besides many others, is the introduction of energy and building certificates and building awards. These instruments may become meaningful in connection with this.

Problem: No common standards

But there is a problem: There are no common standards for energy and building certificates and building awards. The available certificates serve a great variety of needs: A certificate can be sold as a two-sided paper with the most essential technical qualities of a building, comparable with motor vehicle licences. However, a building certificate can be also understood as an extensive documentation of the very different building characteristics such as building construction plans, calculations, official permits, building materials, operation guidelines including the assessment of environmental compatibility of building materials.

2.1 Energy certificates

The aim

The aim of energy certificates is to make building owners and tenants aware of energy-saving measures. The energy certificate, primarily in combination with an energy advice by a qualified civil engineer or a chimney-sweep, shall be the impulse for energy-saving investments. Therefore the presentation of an energy certificate is frequently a precondition for public subsidies.

The contents

- In energy certificates you will find a general description of the building type (detached house, multiple dwelling, terraced house etc.), living space, year of construction and the components in the thermal cover of the building. Sometimes the heating system is described in detail too.
- Energy certificates represent the energy balance of a building. Based on the energy balance the primary energy value, the final energy value and the useful energy value as well as the CO₂-issues are calculated.
- The essential thermal weak points of the building and sometimes of the heating system are analyzed.
- The energetic quality of the building and the heating system is evaluated. Underlaid assessment scales are frequently used for the representation in flow diagrams.
- Finally economically efficient measures are suggested for the energetic modernization of the building. In connection with attention is often also drawn to current subsidies.

An example – The “Building typology”

An example for an Energy certificate is the two-sided data sheet of the Building Typology, in which a typical building is represented for each particular building epoch and for each building type.

Besides a common description the data sheet also includes a short textual description of typical constructions in the thermal cover like panels, roof, cellar and windows as well as the U-values.

Typical energetic modernization measures are suggested as a standard design and described briefly in the second data sheet. The new U-value is determined. Moreover the costs for the measures are assessed. A criterion for the economical efficiency of the measures is indicated in the last column. The results from the energy balance with the energy-saving potentials are represented in a diagram.

On the basis of the data sheets it is possible to make a rough estimate for energy-saving measures without taking the advice of a specialist. With that the client has a first orientation about useful measures for his building. By taking into account the concrete energetic data the energy balance for a building can be calculated in the second step. Based on construction cost catalogues fundamental statements can be hit according to the profitability of energy-saving measures. At last it is possible to develop an optimized measure catalogue for the client which is based on the concrete building parameters, the energy balance and the construction cost catalogue. In the meantime there are very far developed computer programmes for energy advice on the base of building typologies in Germany.

A second example – The "Energiepass"

A second example is the so called "Energiepass". This computer programme calculates on the basis of a building typology and an assigned component catalogue. Common heating systems with different sources of energy as well as unusual heating systems like combined heat and power plants or solar heating and different hot water systems are put together in a data base.

With that the complete system of building and heating can be evaluated. The results are comprised in the energy certificate. It demonstrates the energetic building quality to the house-owner or the tenant clearly. Suggestions on energy-saving measures can be made easily. The potential of energy-saving is well represented. The documentation of the basis and the calculation results in a short final report makes the evaluation transparent. Therefore the evaluation is comprehensible for every customer.

2.2 Building certificates

The aim

A building certificate is a document which describes in a comprehensive manner the qualities and features of a building. Thus a building certificate is like a radiographic picture which shows qualities and deficiencies of a building objectively. Quality characteristics and deficiencies are made transparent. The building certificate draws the "cat out of the bag" for the real estate economy. A housing enterprise can e.g. assess the maintenance and modernization expenditure of its complete building stock by a standardized portfolio grid on the basis of building certificates. Considering housing enterprises, which are competitive at the market, strategic decisions on investments to save the long-term demand or the value of buildings can be taken on this basis. But also for purchaser a building certificate, which contains comprehensive details, can be an objective basis for building assessment or for comparing different offers and to come to a decision. The certificate provides the safety required for credit institutes.

Thus the building certificate goes far beyond the aim of the energy certificate, namely to cause impulses for energy-saving measures. The building certificate represents the qualities of a building rather comprehensively.

The contents

- In detail the building certificate contains a general description of the building.
- As a rule, building certificates refer to traditional quality characteristics like stability, structural protection and sound insulation.
- Beyond these traditional quality characteristics the building certificate might contain also environmental qualities like analysis of the living space quality, health and hygienics.
- The building certificate should contain a detailed itemized breakdown of the costs of required refurbishment and the urgency of the measures.
- Similar to energy certificates building certificates calculate energy-saving potentials. Economically meaningful measures are suggested in the context of a detailed concept.

The building certificate for a new building can be produced with relatively low additional effort by collecting the required data among the process of planning and construction. The effort is significant greater in the building stock. Here it matters to collect the available data at the suitable time. That means in the moment of refurbishment, extension, at the renewal of the heating system etc. This is the way the building certificate can gradually be produced also for existing buildings without great additional effort. With that the building certificate is an essential instrument to bring light into the darkness of property economy. The building certificate gives the necessary base for the purchase decision and the bank gets the required safety for the credit award. Also when selling whole enterprises building certificates can be used to asses the building stock of the company.

An example – The “Hausakte”

An example for a building certificate is the so-called “Hausakte”, developed by the Federal Ministry of Transport and Building in face of deregulation of the tasks of local building authorities. The Hausakte consists of two parts, first: the building certificate and second the house-document.

The aim of the Hausakte is to support the collection of obtained documents for the building authorities by those who are involved in the building process. It is introduced on voluntary base and contains the most important data of the building. The building certificate should not cause any additional costs. This is to be reached by collecting available documents during the process of construction.

1. Part: “Building certificate”

Therefore the building certificate of the Hausakte contains:

- general details of the building like location, number of storey, living space,
- a description of the building construction and individual components like rain water use, use of regenerative energy or waste management facilities and details on sound insulation,
- with a declaration of finishing building-materials like floor coverings, tiles, glue, built-in

furniture or fittings like sanitary objects,

- with a description of technical equipments, heating, telecommunications, electric equipment, building safeguarding.
- The building certificate shall contain the Energy-certificate regulated by the so-called German “Energieeinsparverordnung”.
- Official documents like the building permission, building announcement, fire protection equipment and building plan,
- an index of companies involved in planning and extension and
- acceptance certificates with defects queried or guarantee periods should be contained, too.

With that the building certificate includes all data at hand at the time of the completion of the building. Therefore the building certificate will be submitted to the owner when the construction of the building is finished. The addition to the building certificate, which includes the data by the time of completion only, is the House-document.

2. Part: “House-document”

In the second part of the Hausakte, the so-called “House-document” there are collected the data during the use time of the building like:

- Inspection and maintenance records of e.g. water stop valves, water filters, drain pipes, eaves gutters, sealing coats,
- running costs for local property tax, insurances, inspection and maintenance of the building construction and technical plants, for supply with water, electricity, gas, oil and waste disposal,
- documentation of refurbishment measures carried out, completed by a photo documentation,
- control and revision certificates for technical plants like elevators, ventilation systems or measurement records.

The Hausakte does not have the task of evaluating or certifying qualities or standards. It is up to the client to complete the Hausakte by valuation methods in aspects seeming important to him.

2.3 Building awards

The aim

Building awards are marketing instruments offered predominantly in the private sector, based on the integral analysis and assessment of a variety of parameters. However, the main emphasis lies in energy, construction quality and health. Building awards go beyond the intension of

building certificates, namely documentation. In fact building awards shall document the fulfillment of defined quality requirements. Thus defined quality criteria are the basis for the grant of building awards. Moreover clear target-settings facilitate the communication among those involved in the construction process. They have come to an agreement on common aims before starting the construction process. Client and building firm know about the defined quality criteria, which enhances the confidence and the certainty of agreement in the relation between client and building firm.

The quality criteria are the basis for control measures during the building process. Often Blower-Door-tests are carried out to control the workmanship. Supplementarily indoor pollutant examinations are offered too. The accompanying measures are to support the quality during the construction process.

An example – The “Grüne Hausnummer” Saarland

An example is the “Grüne Hausnummer” Saarland, a public award maintained by the Ministry of Environment of the German federal state of Saar. It is awarded to environmentally conscious house-owners. Its scope encompasses building-ecology, indoor-air-quality and in part the behaviour of the inhabitants. The award means a rise of social esteem for the awarded households and helps to communicate good examples. The requirements, that have to be fulfilled to obtain the award are in general reaching beyond existing legal standards. Awarded is voluntary ecological better practice. The procedure follows a detailed eco-check that is carried out by the applicants themselves: 34 ecological items are assessed according to a credits-catalogue (e.g. heating system, equipment of water supply and sewage, solar equipment, building materials, construction and others). The results have to be underpinned by respective documents, photographs etc. and are reviewed by the maintaining authority. A score of at least 100 credits is required to obtain the award out of a maximum of about 280 credits.

An interesting feature of the instrument is its procedure of criteria- and benchmark-setting. The set of criteria was set up within a process of workshops and round-table-discussions with participation of different interested parties and stakeholders. It provides a good example for an instrument, that seeks to gain transparency and acceptance by public participation. Parts of the instrument - as for example the energetic requirements - are on the way to become legal standards.

One problem of the approach may be seen in the implicitly existing orientation towards the detached single-family home, which itself may be regarded as principally not compatible with sustainable standards.

3. And what about the practice?

Energy certificates

Although energy certificates are offered at low cost and have simultaneously a highly recognizable use, the demand is relatively low. Only if energy certificates are prerequisite for an investment subsidy, the demand is considerably increasing. Also the imbedding in public campaigns and the cooperation with various pressure groups of the building and construction industry increases the public acceptance of energy certificates. The various energy certificates, which are mostly restricted to a definite region, reflect the diversity of the requests in the building

field. Unfortunately this aggravates the orientation. There are no connections being made between the different energy certificates, generally recognized quality criteria are missing.

However, the positive effect is, that after almost ten years of practical experience, at present attempts are made at a simplification and standardization in order to achieve a broader and supraregional acceptance.

Building certificates

There has been only little experience with building certificates in Germany up to now. The instrument is not made use of. Nevertheless building certificates are increasingly used by construction companies as basis for the internal building management. May be the introduction of the "Hausakte" will offer impulses towards an uniform grid and a further coordination.

Building awards

The recommendations and guidelines for the award of buildings at hand have a model character for common. Mostly they contain recommendations illustrating minimum standards for ecological construction and living. Unfortunately most efforts for a standardization have remained unsuccessful until now. Moreover a great problem is the missing of general assessment standards for the areas environment and health up to now. The bases for the award of certificates are frequently not comprehensible.

4. Optimizing existing attempts

As a result of the experience with energy certificates, building certificates and building awards the following essential requirements for further development can be formulated:

- **Standardized bases**

Standardized conceptual bases and algorithms with a standardized declaration of technical and ecological features have to be defined to promote the acceptance and the supraregional distribution. Partly fundamental research is still required here.

- **Integration into the construction process**

The examination of the quality requirements has to be increasingly shifted into the construction process. Besides the integration of ecological requirements there is increasingly also a task of safeguarding the classical building qualities, such as e.g. sound insulation and air tightness. In this connection building certificates must assume a much stronger function of consumer protection as well as for protection of the building and construction trade by distinctly formulated target-settings.

- **Improvement of basic conditions**

It is a fundamental phenomenon of market economies that visible product features have a stronger influence on the investment decision than hidden qualities. Therefore ecology in the housing field is often focused on energy reduction and water saving. With the focus on optimizing individual ecological aspects the overall look on a combination of all factors, also in the sense of sustainable development, gets lost. The by now hidden quality features of a sustainable building must be made transparent, if they are to play a future role in the marketing of the building and construction products. A great step towards this aim is the introduction of a widely recognized certificate on the basis of uniform conceptual standards,

so that sustainable action becomes visible and part of a strategic market advantage of the company.

5. Conclusion

- **Need for transparency**

There is a need for quality assurance and transparency which simultaneously can support sustainable development in the building industry. Instruments like Energy and building certificates may serve as proper tools.

- **Energy certificates and awards available**

Although or may be because of the fact that many energy and building certificates are available, they are not sufficiently standardized or integrated into the building process.

- **Further development required**

So the overall conclusion is: Further development and standardization are required to use these instruments for sustainable development in the building sector.