

# Impact of the EPC on the property value

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## Introduction

The primary objective of the EPBD is to raise awareness about building's energy performance in order to initiate a market transformation. The EPC is one of the EPBD's tools to achieve this objective; in fact, EPCs are an integral part of the EPBD. They are aimed at: (i) informing building owners, occupiers and property actors about the energy performance of buildings, for the purposes of comparing and assessing different buildings and making informed decisions, and (ii) providing practical ways to improve the energy efficiency of buildings and their performance class. Potential building buyers or tenants who are informed about the building's energy performance can better decide whether or not they want to buy or rent the building, plan possible renovation measures, and/or negotiate the property or rental price. Therefore, if a higher EPC rating's positive impact on property values can be documented, this could be seen as an indicator of the EPC's success. This factsheet explores this issue, based on various studies that evaluate the link between EPCs and property prices.

## Studies are available nearly everywhere in the EU

A literature review (carried out in September 2017) identified relevant studies in 19 Member States (MSs)<sup>1</sup>. The map in Figure 1 only reports the identified studies and does not reflect their variety in terms of scope or quality; some studies are now outdated, some have been carried out at the national level, and others focus on one city only. In some MSs there were several studies, whereas in others there was only one, and in some MSs the study was not publicly available. In most of the cases, the studies were undertaken by researchers out of their own initiative; a few of them were performed – or ordered – by governmental bodies. Most of the studies were conducted once; in some MSs the studies were carried out on a regular basis.

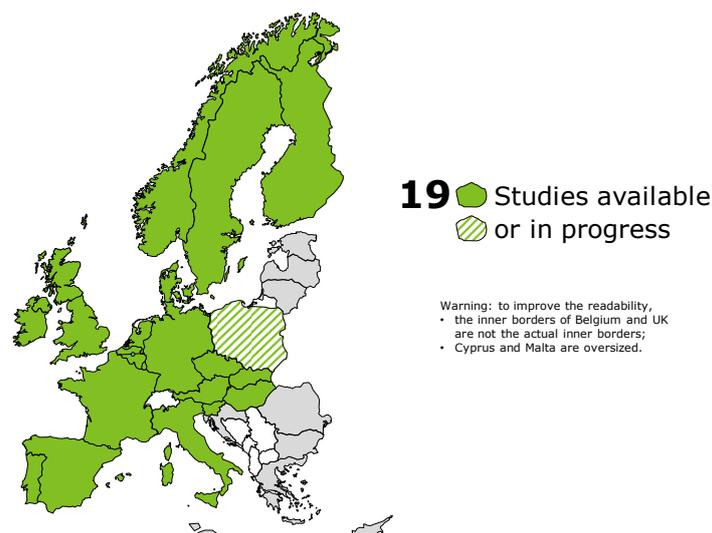


Figure 1. MSs where studies analysing the impact of the EPC on the property value were identified in September 2017.

<sup>1</sup> Even if not appropriate for countries where the EPBD is implemented at the regional level and for Norway, it is easier to use the term "Member States".



Most of (if not all) the quantitative studies used a technique called *hedonic regression*. Basically, this method can be applied to quantify the value that people are willing to pay for each characteristic of a product when the price is known and to predict prices of an item before it is known, based on some of the item's characteristics. It supposes that the price P can be estimated as:

$$P = a_0 + a_1.X_1 + a_2.X_2 + \dots + a_n.X_n + e \quad (1)$$

where

$X_i$  is a specific characteristic of the property;

$a_i$  is the value attributed to characteristic  $X_i$  and

e is a random error.

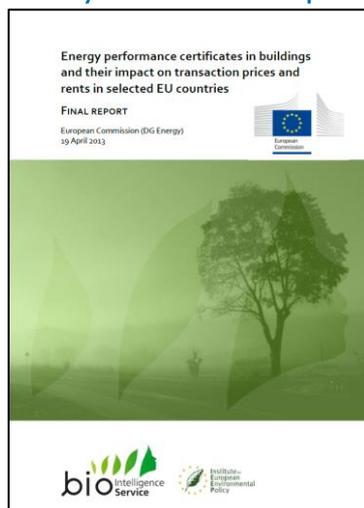
The model does not have to be linear. The characteristics that are generally included in the model are related to the building (type, size, age, maintenance level, heating system, insulation, etc.), the location, the EPC rating and the date of the transaction.

In general, the difficulties encountered by the researches were the following:

- identification of relevant characteristics and cross-correlation between characteristics;
- access to data, due to national or European data protection laws, especially if the researcher is not the data owner;
- availability of EPC data, even if compulsory;
- availability of data related to the characteristics identified in the model;
- rapid changes in the real estate market that may not be fully captured by the data collected;
- availability of the final sales price (rather than the price that the property was advertised at).

In some countries, the impact of the EPC on prices was analysed in a qualitative way through stakeholder surveys. The ZEBRA 2020 project described below followed this approach, in combination with the quantitative approach.

## Study for the European Commission (2013)



The European Commission commissioned a study in 2012. At that time, the EPBD recast was not yet fully implemented, especially the requirement to have the EPC published in advertisements. Data was collected and analysed in 5 MSs: Austria, Belgium, France, Ireland and the United Kingdom. The study identified a clear relationship between a property's energy performance (as measured by its EPC) and its advertised price or rent, except in some specific situations. At that time, the authors had difficulties in collecting sufficient data to perform their analysis, partly due to data protection regulations, partly because EPC databases were not available at that time, and partly because some EPC schemes were not yet mature.

The report *Energy performance certificates in buildings and their impact on transaction prices and rents in selected EU countries* was published in April 2013 and is available at:

[https://ec.europa.eu/energy/sites/ener/files/documents/20130619-energy\\_performance\\_certificates\\_in\\_buildings.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/20130619-energy_performance_certificates_in_buildings.pdf).

## Study from the ZEBRA 2020 project (2016)



The ZEBRA 2020 (<http://zebra2020.eu/>) project, co-funded by the Intelligent Energy Europe programme of the European Union, aimed to put low-energy buildings in Europe in the spotlight. One of the goals of the project was to analyse the impact of EPCs on property values. Two different approaches were followed. In the first approach, the opinion of real estate agents was investigated in 8 MSs. According to the surveyed real estate agents, the factors most influencing the choice of property, not surprisingly, were **location, price** and **size**. Even though they were not asked to rate the EPC directly, they were asked about several aspects that can be (to some extent) linked to the information on the EPC, such as running costs, the technical condition of the building and the cost for electricity and heat. In the real estate agents' opinions, all those aspects seem to be far less important than other aspects when someone selects a property (Figure 2).

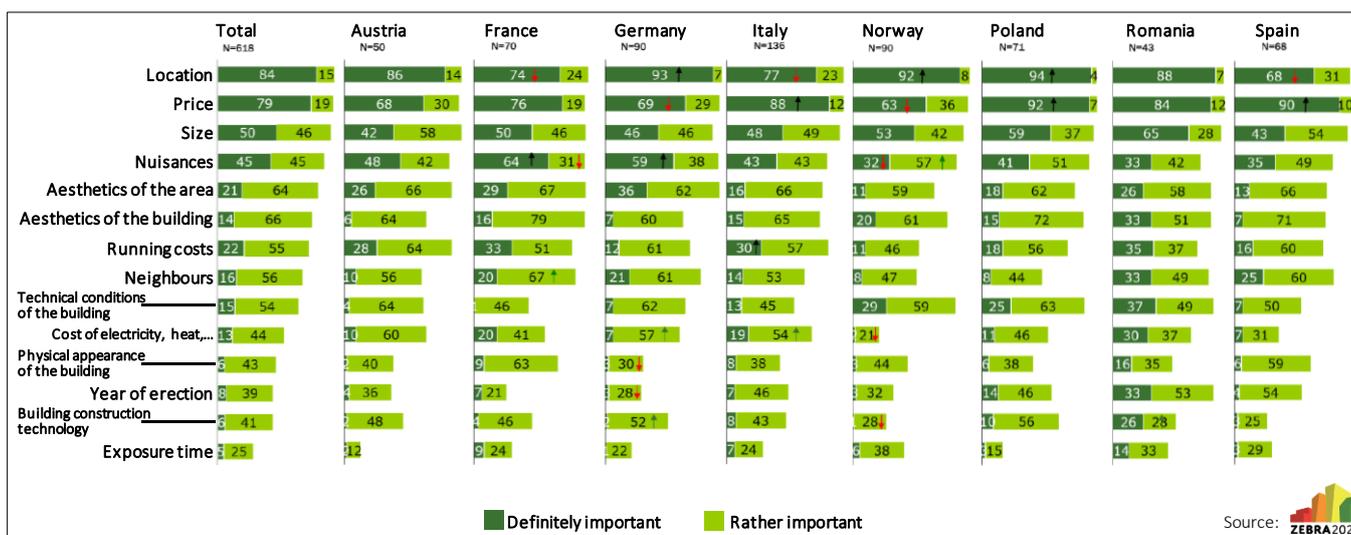


Figure 2. According to your experience as a real estate agent, what is the importance of each aspect for the choice of property?

Another question asked was if real estate agents believed there is a cost premium associated with buildings with a high energy performance rating for renting or buying. On average, real estate agents did not believe there was one, except in Germany (Figure 3). Therefore, real estate agents' opinions seem to be contradictory to what the quantitative analysis demonstrated.

Real estate agents were also asked if they believed that the time to sell or rent a property with higher Energy Performance Classes (A, A+, etc.) is shorter in comparison to other classes. Seventy-five per cent (75%) of them believed that it was not the case, 14% believed that the time to sell was indeed shorter and 11% had no idea. Among those that claimed that the time to sell is shorter, 45% of the respondents indicated that this time is 2-3 months shorter.

The second approach analysed data in 12 MSs using a hedonic regression. In most of the MSs, a price premium was found for buildings with a high energy performance. The premiums were very different from MS to MS. The sales premium was always higher than the rental premium.

If, in general, a higher performance means a higher price, two exceptions were also identified. Firstly, in Austria, Denmark, Slovakia and Spain, a shift of one letter can lead to a price deficit for buildings having the highest

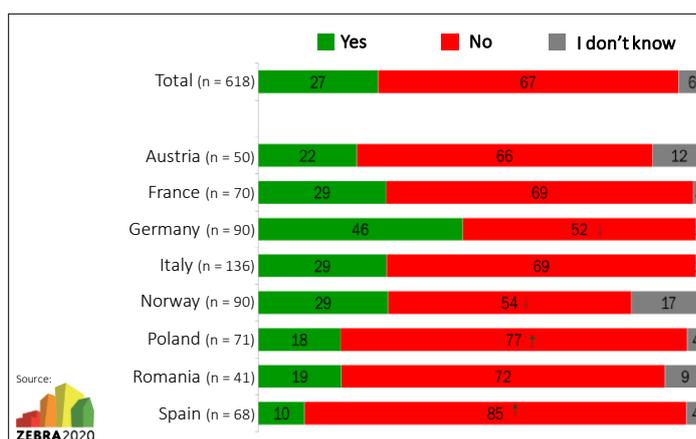


Figure 3. According to your experience as a real estate agent, is there a rent/price premium of buildings/flats with high energy performance rating?

performances. Secondly, in the Netherlands, both the sales and rental market showed a price deficit instead of a price premium. This was in contradiction with previous studies, including the one for the European Commission discussed above, as well as research carried out afterwards (see below). According to the authors, the omission of some important characteristics of the buildings in the analysis, such as location and building quality, could explain this.

The report *The Impact of Energy Performance Certificates on property values and nearly Zero-Energy Buildings - Report for policy makers* was published in July 2016 and is available at: <http://zebra2020.eu/>.

## What will you pay for an 'A'? (Conference paper 2017)



This study is different from the two previous ones. The author has not made any quantitative analysis of her own, but has critically reviewed existing studies (including the two discussed above). The study focused on the methodologies, the difficulties in carrying them out and what can be learnt. Fifteen (15) studies covering 14 MSs plus Norway have been examined.

Firstly, the coverage of the reviewed studies varied over a very large range: time period (from 1 month to 17 years), geographic region (city, region or country), and number of transactions (600 to 320,000).

Secondly, all studies used the same basic approach – the hedonic regression technique described above. However, the parameters used for this varied greatly from study to study. In total, 14 different parameters (other than the EPC result) were used.

Out of these 14 different parameters, only 1 was used across all 15 studies, whereas 6 were used in just one study alone.

To be able to define energy efficiency as an independent parameter and gain robust results, the four main key parameters to account for are: **size, geographic location, period of construction** and **date of transaction**.

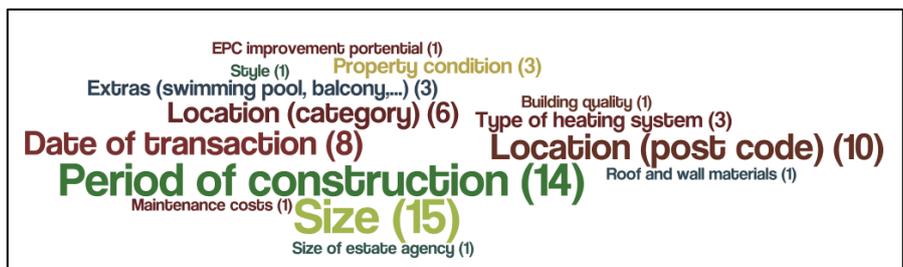


Figure 4. Parameters used in the studies, and frequency of use.

Those four parameters are important to isolate the energy efficiency effect on the property value; however, not all 15 studies appear to use these.

A study done in 2016 for flats in Helsinki illustrates the importance of accounting for location at a sufficiently detailed level. When looking at the regional level, the price premium for the top three EPC ratings appears at 3.3%; however, when the data was looked at for the neighbourhood level, this dropped to 1.3%. In the case of Helsinki, when looking at a more detailed level, it was harder to see a trend.

The period of construction is important because the energy performance is strongly correlated to it, due to changes in building technology and construction products, as well as to energy building codes becoming more and more demanding (since they appeared, generally in the 1970s).

The date of transaction is important because of rapidly changing market conditions.

The author also emphasised the difficulty in making cross-comparisons between the results from different MSs; each study was done for its own market and therefore did not need to be comparable to other studies. The way that the results were expressed were therefore very different. The only conclusion that can be drawn with certainty is that increasing energy efficiency increases the value of residential property, and this is true for a wide range of climates. However, it is difficult to assess if this is the effect of the EPC itself, or the effect of the elements that have an impact on the EPC which the potential buyer/tenant can directly see for themselves, such as glazing type or the type of heating system installed.

The study "What will you pay for an 'A'? - a review of the impact of building energy efficiency labelling on building value" was a self-funded project presented at the European Council for an Energy Efficient Economy (eceee) summer study 2017 and is available on <http://proceedings.eceee.org/visabstrakt.php?event=7&doc=6-033-17>.

## Situation in The Netherlands

In the Netherlands, there is currently an ongoing research study to analyse the effect of the EPC on property values. The research is done by Tilburg University through the Tias Business School. The data on EPC information and housing data is collected from real estate agents. The research is repeated every six months. This cycle started in 2010; thus, trends over the years can be tracked. The university controls the data for the known variable parameters, e.g., date of sale, location, dwelling age and quality. In 2015, the EPC system was changed to enable issuing a basic EPC. The benefit of this change means that now 95% of the building stock in the Netherlands has an EPC. This allows a larger data sample to be analysed to determine the effect of the EPC on property values.

The most recent set of outputs from the six monthly data analysis (Figure 5) shows that the EPC rating correlates with the value of a property and the sale time. This occurs at both ends of the EPC rating scale. An 'A' rated property has a higher price and also a quicker sale time. It also shows that the effect of a lower rating has a more significant impact, a bigger value loss and a longer sale time. For instance, a G-building would take 65 days longer to sell than a D-building of the same age and same size.

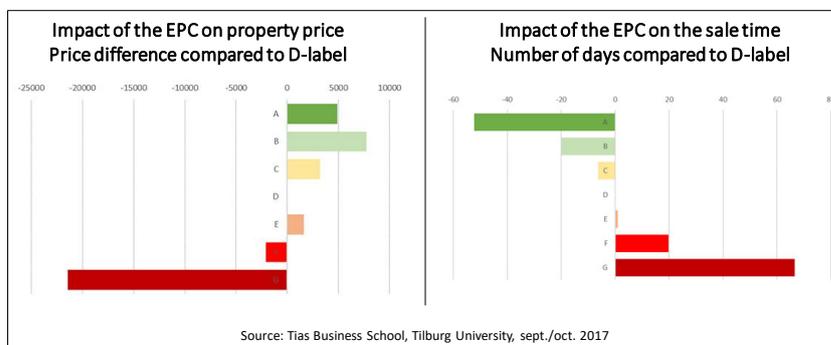


Figure 5. Effect of the EPC on domestic property sales in the Netherlands.



Figure 6. Price premium is stable, price discount is increasing.

Looking at the year-on-year figures (Figure 6) there is also a trend that a property with an A/B rating gets a standard price increase; however, the impact of an E/F rating is having an increasingly negative effect on the property value.

Other positive developments worth-mentioning are: surveys have shown growing energy efficiency awareness and willingness to take action. There is also an impact on the banking industry, both regarding the availability of loans and that of interest rates, resulting from the increasing connection between lower risk and more energy efficient buildings. This change was first seen with "green banks" however other banks are also beginning to follow without necessarily requiring incentives from the government. To satisfy people's growing willingness to improve the energy efficiency of their houses, increased access to finance is required.

## Situation in Portugal

In Portugal, there is an initiative to link the EPC database with other building databases. This includes the national statistics data and GPS information. From the EPC database, many variables can be used and integrated into other data sources to create a richer data set that can be used by many different people. Twenty per cent (20%) of the building stock in Portugal has an EPC. Studies done in Lisbon show there is a positive correlation between higher EPC bands and transaction prices.

A third-party company uses the EPC database to do analyses for real estate. They incorporate the data with property sale price and date of sale information. Companies can register to the site, which uses cross reference data, produces statistics and reports on cities, neighbourhoods or for the whole country. A recent example dataset shows a correlation between the value of a property and the EPC rating (Figure 7). This is both for good EPC ratings and poor EPC ratings.

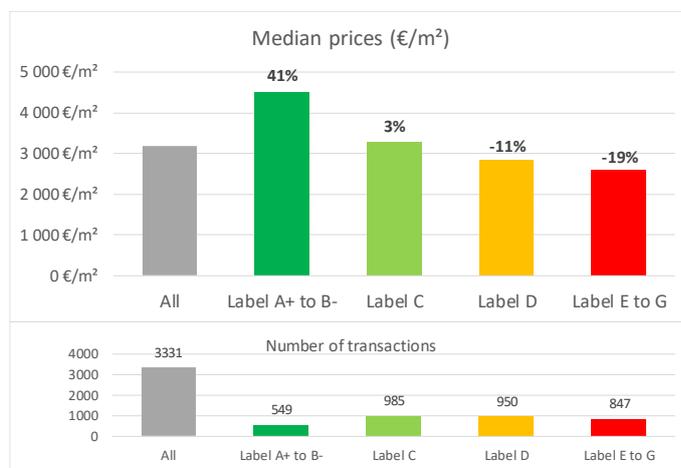


Figure 7. Trend for EPC rating effect on property value in Lisbon.

It was noted that the sample size for the analysis was small and different neighbourhood factors need to be accounted for, but there still appears to be a premium for higher EPC rated buildings.

## Situation in France

In France, notaries associations have undertaken multiple studies on the impact of the EPC on property value. The first study was undertaken in 2013 and there have been updates of the study in 2015 and 2017. The studies use the hedonic pricing model for the analysis to split up the value of the property based on characteristics of the property. There is a lot of data available to be included in the studies, although location at neighbourhood level cannot be taken into account. Each time the study has been updated, more precision has been added. The analysis has been done across the whole country. From the latest dataset for single-family homes, for transactions during 2016, both a price increase for good EPC ratings and a price reduction for poor EPC ratings can be seen (Figure 8). There is also a visible trend that the impact on the price is more significant for the lower EPC ratings. It is particularly worth mentioning that, in Paris, this trend is not visible, as location within the city plays such a significant role.

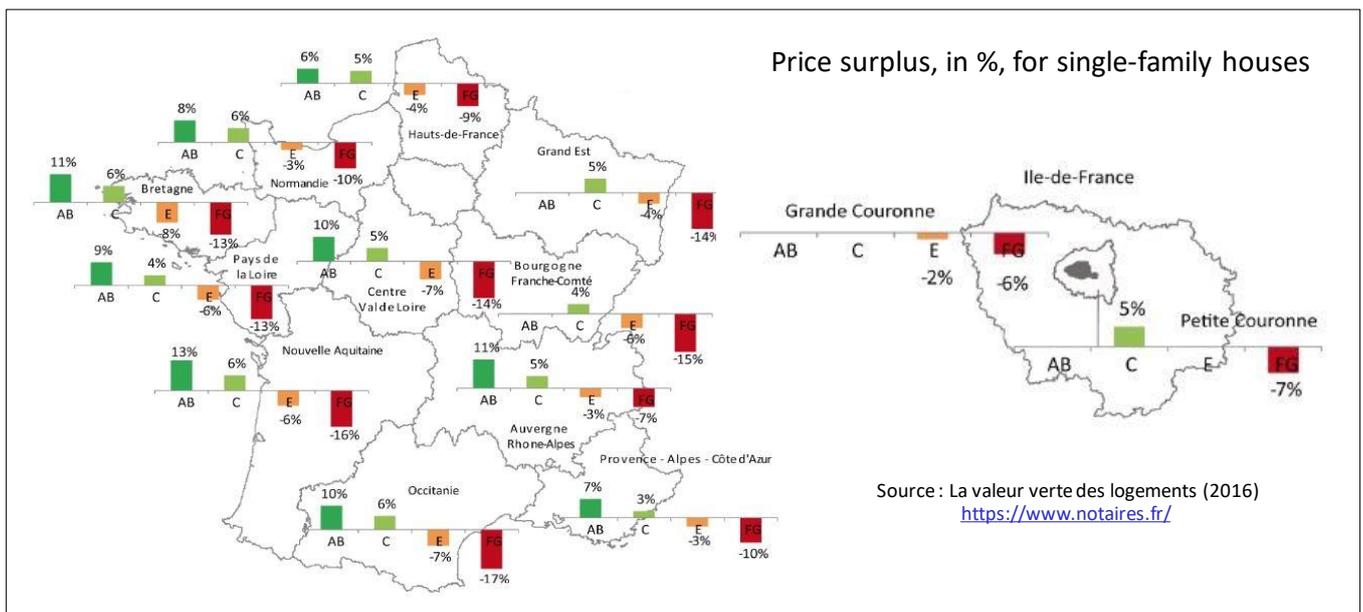


Figure 8. Impact of EPCs on property values across French regions.

## Conclusion

Several studies have shown a correlation between the EPC and the property price, except in specific market conditions. In general, the impact is the largest for poorly performing buildings, and the impact on the price is higher for property sales than in the rental market.

All quantitative studies used the same techniques, called hedonic regression. Even as more and more studies are carried out, the determination of the EPC impact on the property value remains a very difficult task.

The main challenge is the lack of access to sufficient data which includes all the parameters that need to be integrated into the model. At a minimum size, detailed geographic location, period of construction and date of transaction must be considered, but several other parameters might be interesting to analyse, such as building quality. Those other parameters might not be easily retrieved from databases. Moreover, in many MSs, databases must be cross-referenced with each other, as, for example, the official EPC database does not include data about sales or rental transactions.

Finally, cross-comparison between MSs should be made with caution, because EPC schemes are different. For instance, a one letter change in one MS does not mean the same thing in another MS.

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