

What's behind the façade?

A long-term assessment of the Swedish energy efficiency programme 1977–1984 and its impact on built heritage

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Abstract – Energy efficiency policies might have a negative impact on the heritage values of buildings, an issue widely recognized in Sweden during and after the extensive energy efficiency programme ‘Energy savings plan for existing buildings’ (EBB 1977–84). The purpose of this paper is to assess the long-term impact of the EBB on an urban district in Gävle, Sweden. The district comprises 69 single- and multi-family detached houses built between the 1920’s and 1950’s. Using archival sources and field studies we describe how the buildings have been modified and trace the role of the EBB on the district as a whole. The results show that despite that the EBB has had a major impact on the district, it is difficult to disentangle its role in relation to other factors. The study raises concerns over the common approach in policy making to draw distinct lines in the sand between heritage and non-heritage buildings.

Keywords – conservation; historic buildings; energy efficiency policy; program evaluation; energy retrofit

1. INTRODUCTION

To realise the ambitious targets set by the Swedish government on energy efficiency in buildings requires long term, strategic policies [1]. Evaluations of energy efficiency policies tend to focus on a narrow set of techno-economic factors and look at the most recent programme in isolation with the aim to assess its cost-effectiveness [2]. Scholars have therefore asked for evaluations that look at a broader set of effects, which necessarily require contextualization, more comprehensive models and longer time frames [3]. One unintended consequence of energy efficiency policies might be a negative impact on the heritage values of buildings, an issue which was widely recognized in Sweden after the first years of an extensive energy efficiency programme introduced after the first oil crisis of 1973, called the “energy savings plan for existing buildings” (EBB, 1977–84). EBB was the first comprehensive national programme for energy efficiency in buildings in Sweden, but the state subsidised grants on a smaller scale already from 1 July 1974 [4]. In order to improve the energy performance in the building stock, loans and grants were issued through EBB to home owners for measures such as additional thermal insulation, triple glazing windows, more efficient heating systems etc. The EEB and its predecessor has been criticised for resulting in too extensive refurbishments, thus compromising cultural values in the built environment. [5]

The objective of the paper is to assess the long-term impact of the EBB programme on a historic district in Brynäs, located in the city of Gävle, Sweden. This study will put EBB subsidised interventions in relation to additions, renovations and new construction that occurred without EBB support in the period 1974–2017. The aim is twofold. First, it is to more generally contribute to a wider understanding of the changes related to energy efficiency that the built environment in Brynäs has undergone. This is important, as the extent of energy retrofit in the existing building stock is necessary to gauge both for determining energy conservation potential and for designing policies. Second, the aim is to relate the changes in the built environment to the EBB in order to better understand how such energy efficiency policies are played out in legislative and practical context. Policies based on subsidies have continued to play a declining but important role in Swedish policies up until today, despite a lack of strategic evaluation [1].

Considering the limited space available this paper focus on the presentation of results. Further publications from the project aim to involve more theory as well as extend the analysis of the results presented here.

2. THE CASE STUDY

The study is limited to an area of eight blocks in the city district *Brynäs* in Gävle, Sweden. The area comprises 69 single- and multi-family detached houses built between the 1920's and 1950s. Four blocks were constructed in the 1920s, originally as three- or four-family houses, although most of them today are used as single-family houses. One block was built-up in the 1930s, two in the 1940s, and one in the 1940s–1950s (Figure 1). Most of the buildings from the 1930s–1950s were originally two-family houses, today used by one family. The architectural styles of the buildings as well as how they are situated on the plots shifted after the 1930s, resulting in a difference in character between the northern and southern parts of the district. Typical examples of buildings are shown in Figure 1. The area was predominately working class, and the buildings were developed and owned by the residents themselves. The northern part of the area, with buildings from the 1920s and 30s is in the most recent urban development plan described as having very high cultural values, with reference to the garden city-character of the area as well as the architectural qualities of the buildings [6]. There is however no formal designation of the area with reference to cultural heritage values; neither is any of the properties listed.

3. METHOD

The study was carried out in four steps. First, archival studies of the municipal archive of building permits were carried out in order to find original drawings for the buildings, as well as approved exterior alterations. Secondly, we have carried out ocular observations of the current state of the buildings, in order to find out whether approved alterations have actually been carried out, and to detect alterations carried out without consent from the municipality. The third step has been to find out whether alterations made in 1977–1984 were granted support from

the EBB. This was done using the archive of the regional housing committee (*Länsbostadsnämnden*). The committee handled subsidies and loans included in the EBB. By using these methods, the vast majority of exterior modifications can be traced, dated and associated with the EBB.

The fourth and final step consisted of a collective interview that was conducted in order to better understand the development of the area, as well as how this development is perceived today by urban planners and heritage professionals. A conservation officer from the County Administrative Board of Gävleborg, as well as a conservation officer, and an architect from Gävle Municipality, participated in a walking tour of the area. After the tour there was a discussion that was recorded and transcribed. An energy expert from the County Administrative Board participated in this discussion, in addition to the individuals already mentioned.

A survey with the aim to assess the impact of the EBB on the district's heritage values was carried out already in 1979 after the first years of the programme [7]. The area has been re-surveyed in 1984 and 2012 by the County Administrative Board of Gävleborg. The survey and the follow-up work made by the County Administrative Board have been used both as comparison and as valuable sources of information about the area and its changes.



Figure 1. To the left: Map showing the studied area and the different periods when the houses were built. The map is adapted from [7]. Upper right: Architectural drawing for Hackan 9, from 1923. Lower right: Architectural drawing for Bommen 1, from 1943. Source: Gävle kommuns arkiv.

4. RESULTS

In this result section we focus on to what extent windows and façades have been changed, as these are the exterior parts of a building which commonly are changed in energy retrofits. As demonstrated in Figure 2, by the end of the EBB most of the properties in the district had undergone exterior changes, especially in the northern, older part.

Out of a total of 69 properties, 45 (65 %) had new windows and/or façades installed. These new façades were all constructed with additional thermal insulation, most commonly 50 mm of mineral wool. 43 of the properties (62 %) received EBB grants for improved energy efficiency, of which 27 were for exterior measures (63 % of granted funds). Some properties received grants for more than one measure in one or multiple applications. In the district, a total of 56 applications to EEB were accepted.

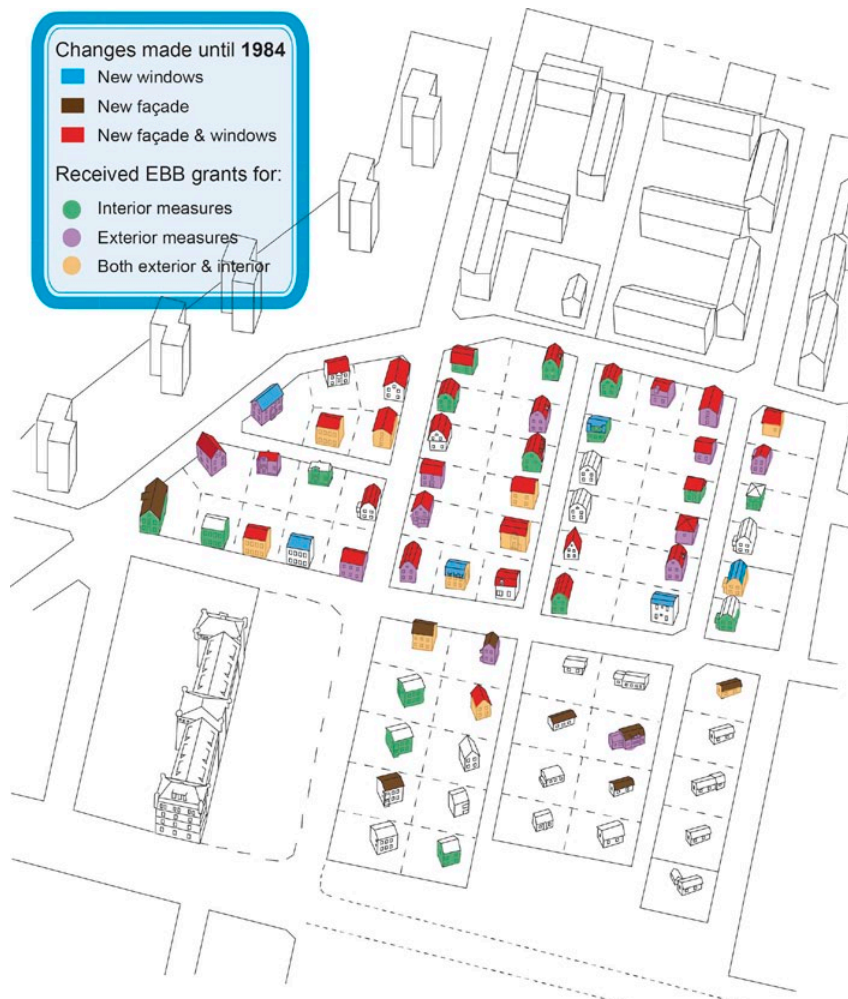


Figure 2. Houses that had undergone exterior retrofitting of windows and façades in 1984. Properties that had received grants from the EBB-programme are shown. Exterior measures can be either more energy-efficient façades or windows, interior measures can be internal wall or loft insulation, improved control (e.g. thermostats), improved or changed heat source (e.g. more efficient boiler or connection to district heating). The map is adapted from [7] and the data from 1979–1984 comes from the County Administrative Board of Gävleborg.

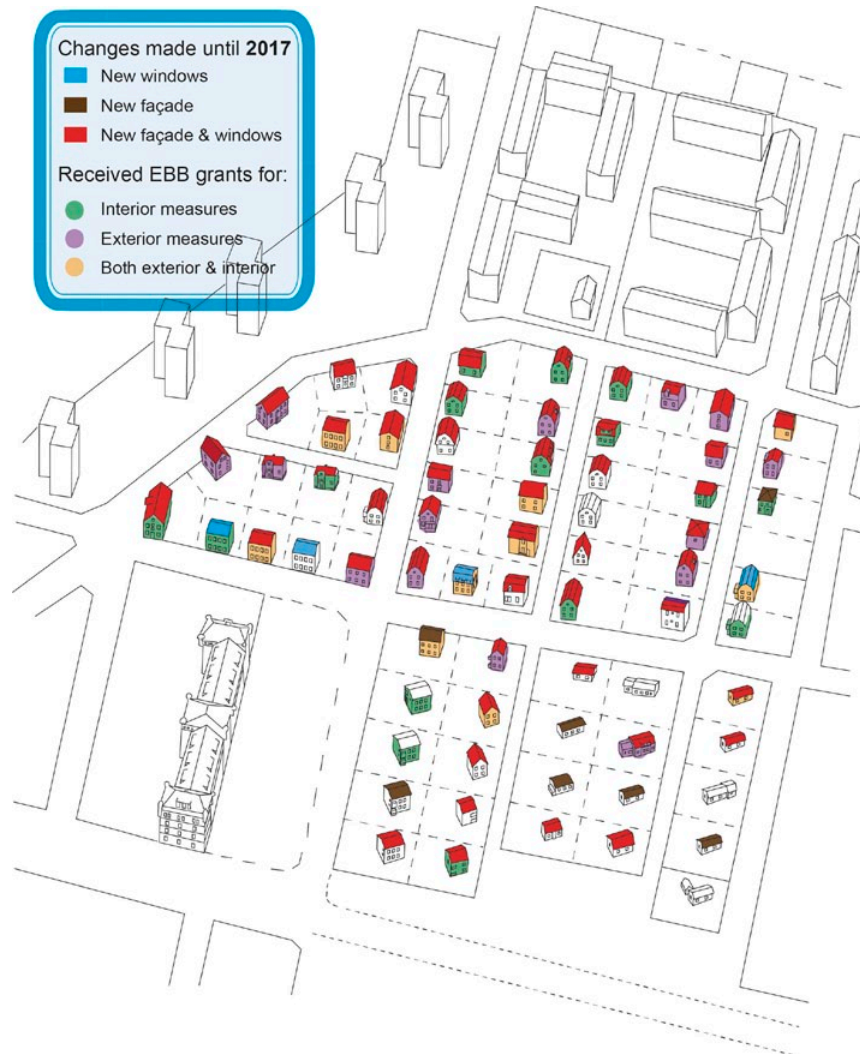


Figure 3. Houses that had undergone exterior retrofitting of windows and façades in 2017. Properties that had received grants from the EBB-programme are shown. The map is adapted from [7].

As demonstrated in Figure 3, alterations to the buildings did not stop with the EBB. Since then, most of the houses unaffected by the programme have been subjected to changes of façades, windows or both. From 1985, 16 additional houses have new windows and/or façades. One house has been demolished. Only seven of the 69 houses still have original windows and façades, only one of the houses from the 1920's. The share of buildings with new windows increased compared to 1984, from 54 % (37 out of 69) to 79 % (54 out of 68), and the number of retrofitted façades increased from 57 % (39 out of 69) to 84 % (57 out of 68).

The graph in Figure 4 summarizes the developments shown on the maps, and it demonstrates clearly that a vast majority of buildings from the 1920s and 1930s, and most from the 1940s and 1950s, had altered windows and façades in 2017. The retrofitting of facades and windows has continued in the area since 1984, although the rate of change has been lower in 1985–2017 than during the EBB.

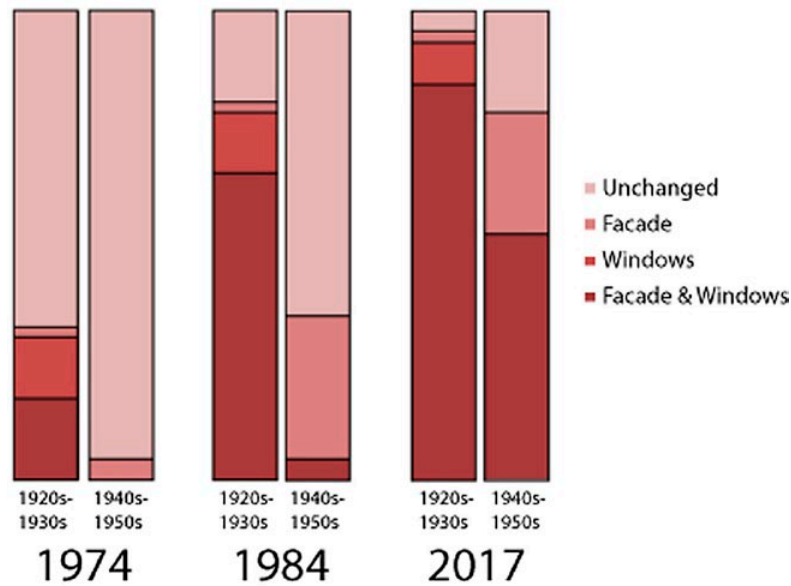


Figure 4. Share of houses that have had retrofitted façades, windows or both before and after the EBB programme 1974–1984 and in 2017. The left columns show houses built in the 1920s and 30s in the quarters Korpen, Spettet, Krattan, Hackan and Spaden (N=46), while the right columns show houses built in the 1940s and 50s in the quarters Bommen, Gaffeln and Røjeln (N=23).

To sum up the development of the area when it comes to exterior energy efficiency measures, one could say that it shows an expected pattern of two waves of renovation activity related to the age of the buildings. What is unexpected is the massive extent of the retrofitting activity in the area. The first wave of renovations was carried out almost exclusively in the older stock of buildings from the 1920's during the period of the EBB. These buildings were by then 50 years or older and in need of modernization. Some of them had undergone major renovations with external insulation and change of windows already before 1974 (Figure 4). EBB seems therefore to have accelerated a renovation movement that was already in force, rather than establishing a new one. The houses from the 1940s–1950s were not in need of major renovations at the time, which is evident in the fact that only one building had its façade changed before 1974. Still, there were some exterior measures carried out during the EBB-period, mainly consisting of exterior insulation covered with metal cladding. However, this area with post war buildings has undergone a second wave of renovation since 1984 and most of the buildings today have new façades and windows.

5. DISCUSSION

The studied area has been subject to continuous change in the last half century. The EBB had a significant impact on the built environment and accelerated the number of major exterior alterations, such as new windows and façades. But despite that the impact of the programme was significant at the time, it is

difficult to disentangle its role in relation to other factors, especially since the rate of alterations was continuously high after the programme had ended. For the individual household there is an array of rationales involved in the decision to renovate, and this decision is made in a fragmented and for the household more or less opaque policy context. It will always remain difficult to determine the impact of a certain policy instrument in such situations.

It is however likely that the EBB continued to exert influence long after it was cancelled. During the group interview, it was discussed whether the area at some point in time had reached a tipping point due to the many alterations made during the EBB. Since the area had been subjected to extensive changes and had lost its original character and uniform style, conservation can be expected to have been given a lower priority also for the individual, and sometimes well preserved, building.

Another issue that was discussed during the group interview was the role of the municipality in relation to the EBB, which was administrated by the state. One conclusion is that the municipality has not used its authority to decline or influence energy efficiency measures. One example is that for the many exterior insulations made during the programme, it was only needed to get consent from the municipality for changes to the surface (i.e. colour, material) and not for the change of construction which had a significant impact on the character of the building.

So far in this paper, we have only focused on *if* a certain measure was carried out or not, not *how*. During the walking tour of the area, and in the following group interview, there was a discussion about the importance of *how* energy efficiency measures had been carried out in relation to what was understood to be the character of the district. There was consensus among the interviewees that most of the exterior alterations made in the district, both during EBB and in recent years, had been unnecessarily intrusive and thus had compromised the cultural and architectural values of the district to an unnecessarily high extent. There was however disagreement about the potential to carry out external retrofits without compromising the character of the building, and about what elements that now remained as character-defining in the area.

Today, the municipality seems to have remained with a *laissez-faire* attitude towards external retrofits in the area. Most likely, they would be more inclined to protect heritage values if the area had more of its original qualities preserved. From a conservation point of view, this is problematic since it risks that areas become left out of discussions of preservation and the built environment being divided between areas having cultural values worth preserving, and others that do not. In recent years, there has been a discussion among policy-makers on whether to include listed buildings in energy efficiency programmes, considering the risk that their cultural values will be compromised. Perhaps it is time to discuss the potential problem of cultural heritage values being neglected in areas that are already heavily affected by exterior alterations? From a conservation point of view, the problem for this area is not that energy efficiency measures

have been carried out. Since the original houses had insufficient insulation and low thermal comfort, it is likely that they would have been neglected or demolished if measures were not taken. The problem is rather that measures have been poorly executed and that they have been too extensive, altering the area's character and subsequently leaving the area neglected by the municipality.

In this paper we have explored the first results of the study, with a focus on quantitative changes. Further publications will contextualize the results and provide a deeper analysis of the development of the district. Comparisons will also be made with other urban districts, not least to better understand the role of the municipalities in relation to the EBB.

6. ACKNOWLEDGEMENTS

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