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"Energy-efficient retrofitting and affordable housing: Open questions for urban research and practice"

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1. Introduction

Through the Brundtland report 'Our common future' which was published in 1987 the concept of sustainable development entered public and academic debate and has been a keyword in climate adaptation and mitigation strategies ever since. The report argued that sustainable development 'meets the needs of the present without compromising the ability of future generations to meet their own needs'. Benchmarks such as the 2°C target were proposed internationally, e.g. by the IPCC Third Assessment Report, in order to limit and control the impact of global environmental change. For the implementation of strategies to reach this and other goals, the local level is attributed an important role. One could argue that, according to political debates, the ideal city – in the sense of a sustainable city – is one that implements national and international adaptation and mitigation strategies and thus reduces its environmental footprint. In practice, the ideal turns out to be quite difficult to achieve since strategies need to be feasible not only in technical, but also in social, political and economic terms.

This paper addresses one important conflict between environmental and social goals at the urban level which is being debated in urban research and planning in Germany: the impact of energy-efficient retrofitting strategies on the provision of affordable housing.

In December 2014, the German government adopted the National Action Plan on Energy Efficiency (NAPE – Nationaler Aktionsplan Energieeffizienz) in order to uphold its energy efficiency targets. One important strategy is the renovation of buildings, in particular in terms of thermal insulation, which is funded via low-interest loans by the

German Reconstruction Loan Corporation (Kreditanstalt für Wiederaufbau, KfW) in order to stimulate private investments into the housing stock[1]. Not only – it is argued – do the renovations increase energy efficiency and contribute to climate protection, but they are also supposed to help private households lower their energy bills in times of rising energy costs.

In practice, the implementation of energy efficiency policy through building renovations has been highly contested. Housing companies and individual owners of buildings are allowed to pass on the retrofitting costs to their tenants; they may add up to 11 percent of their costs to the monthly net-rent.[2] As a consequence, rents are increasing, in spite of savings on the energy bill. On the one hand, this reduces the availability of affordable housing in general, as rents remain on a higher level even when the retrofitting costs have been written off. On the other hand, poor households may no longer be able to pay their rent and may have to move to less insulated housing stock, which will lead to ever increasing energy bills. The positive outcome of retrofitting – more energy efficiency in the building sector – is thus compromised by the danger of a new kind of segregation that is induced by energy-efficient retrofitting and reorganizes socio-spatial urban structures in an unwanted way.

Empirical data confirming the relevance and extent of this conflict is still rare. The paper discusses current literature and then illustrates the debate with two case studies conducted in two German cities – Dortmund and Erfurt – in 2014/15 in the framework of two student projects at the authors' respective universities. The case studies consist of secondary data analysis, expert interviews and non-representative surveys among residents in neighbourhoods transformed by large-scale retrofitting measures. They show that the type of house owner (municipal housing company versus company listed on the stock exchange) influences their practice to address the issue of retrofitting and to respect (or not) residents' wishes and needs in their rent policy. The housing

[1] The federal government had originally also planned to introduce targeted tax rebates, as announced in the NAPE, but the realization failed as a result of political compromise.

[2] It is important to note that the ratio of owner-occupier households is much lower in Germany than in most European countries and in North America. In Germany, about 52 percent of residents live in their own house or apartment (in 2013, de.statista.com; EU average: 71 percent in 2012).

demand (or shortage) in the particular neighbourhood impacts the potential returns for the companies and thus their behaviour towards their tenants. Thus there is a range of potential social consequences in terms of neighbourhood change, housing costs for individual households as well as the availability of affordable housing which show that housing policy and environmental policy do not necessarily go hand in hand, but may interfere to lead to unwanted side effects, particularly for those households already most sensible to housing costs. The research is work in progress, thus these findings are preliminary.

In its conclusion, the paper discusses further open questions for urban research, and it suggests starting points for a debate on more sensitive and customized political strategies to energy-efficient retrofitting in order to avoid current pitfalls.

2. Energy-efficient retrofitting as driver of segregation? Debates in academia, urban politics and planning

Segregation has been an important issue in urban research for decades. The drivers of residential segregation are well known and established in the literature. On the micro-level, *selective housing mobility* leads to concentrations of better off and lower social strata households. On the housing market, households might face *restrictions* in housing choice, a mechanism that mainly works through prizes and *affordability* limiting access to more costly housing market segments for lower income households. Choice is made under the general conditions of coercive segregation (e.g. Clark 1992; Clark & Dieleman 1996; Rex & Moore 1967). Another restriction are *socially selective allocation strategies* of owners of rental housing – in this case more pronounced referred to as *gatekeepers* – which discriminate specific social groups like migrants or ethnic minority groups, low income groups or specific household types (Massey & Denton, 1993; Giffinger, 1998; Maloutas & Fujita, 2012). The *practices of private housing market actors*, developers, banks, and real estate agents or companies follow market mechanisms in maximizing profit. The *upgrading of existing housing stock* or a replacement of lower quality (but affordable) housing is a well-known mechanism of

direct or indirect gentrification including deliberate *displacement* measures. Finally, also *state policies* like the construction of large spacial clusters of social housing can contribute to an uneven distribution of social groups in urban space (see Musterd & Ostendorf 1998).

In Germany, increasing pressure on local housing markets – due to, for example, reurbanisation of young middle-class families who tend to be turning away from suburban locations (Frank 2012) – has stimulated local debates on gentrification when urban renewal and retrofitting measures have led to rising rents and thus to a displacement of local residents. According to calculations of various segregation indices, segregation has been increasing in Germany throughout the 2000s in general, with Eastern Germany seeing especially high growth in segregation indices (Dohnke et al. 2012; BBSR 2009). In cities with a significant share of housing vacancies segregation is even fostered through the unfolding dynamics (Grossmann et al. 2015). In recent years, all over Germany except in some constantly shrinking cities and rural areas, housing prizes have been more or less steadily increasing while the share of social and affordable housing diminishes (Rink et al. 2015).

Observers argue that energy-efficient retrofitting may become another driver for segregation (Grossmann et al. 2014). In a non-empirical expertise for the association of German housing companies, it was even claimed that energetic refurbishment will increase the social polarisation of cities with young, higher income well educated groups choosing energetically fit housing despite higher basic costs as a long-term strategy while lower income households tend to minimize housing costs in a short-term perspective irrespective of energetic fitness of the chosen housing. This would automatically lead to a concentration of higher income groups in energetically refurbished stock and a concentration of lower income households in unrefurbished stock (Gerth et al. 2011). Other authors make less ambitious claims by focussing on smaller scale effects, asking for the potential of displacement occurring through energetic refurbishments. On the one hand, energy savings for individual households are – due to high retrofitting costs and also constantly increasing energy costs – usually low compared to the rent increase related to retrofitting. In sum, the overall rent

increase may then be too much for households to cope with (Holm 2011; Malottki & Vaché 2014). In practice, housing companies tend to combine energy-efficient retrofitting measures with other measures of modernisation – barrier-free bathrooms, new balconies, elevators etc. – so that energy-efficient retrofitting may not be the main driver for rent increase. A study summarizing the cost effects of retrofitting measures has shown that cost increase due to specific energetic refurbishment measures tends to remain below the calculated savings, while it is the additional improvement measures, which lead to rent increases beyond the savings achievable (Neuhoff et al. 2011). Media reports have frequently shown examples where owners intentionally use energetic refurbishments to upgrade their housing stock, raise rents in rather large percentages and even intentionally dislocate residents.

3. Energy-efficient retrofitting in German cities: Two case studies

To illustrate potential conflicts, we draw on our work with two student projects. Case studies were conducted in the cities of Dortmund, North Rhine-Westphalia, and Erfurt, Free State of Thuringia (see figure 1). Both cities present quite different settings for this research, but interestingly, the discussed phenomena can be found in both cities.

Figure 1: The location of the case study cities Dortmund and Erfurt in Germany *(Kaja Rocks)*

3.1 Dortmund

The city of Dortmund is located in the East of the Ruhr area (Ruhrgebiet) in North Rhine Westphalia. It used to be an important location for steel production, coal mining and breweries. From the 1950s on, the economic base of the city was severely affected by economic transformation processes and since then has slowly been shifted towards new technologies and the service

sector. According to statistics, Dortmund is the German city with the highest risk of poverty for its residents (in 2012 average income below 869 Euro/month: 26.4 percent). In general, rents are still low, but as the number of residents and households has been increasing slowly over the past years, rents have also been rising, however gradually.

The two case study areas are located in the South-West of the inner city of Dortmund and in Dortmund-Löttringhausen at Dortmund's Southern border. Both areas are no distinct statistical districts, so that data which specifically represents the case study estates is hardly available. The housing companies themselves only seem to have little statistical information on their residency (or may be unable or unwilling to share it), so that for the analysis deductions had to be drawn from statistical data on higher administrative levels, from expert interviews and from non-representative interviews with residents. In the framework of the student project, expert interviews were conducted with two housing companies who own the estates that were examined (Deutsche Annington, DOGEWO 21), with a former Löttringhausen redevelopment agent, with the Löttringhausen neighbourhood agency (Nachbarschaftsagentur), a local tenants' initiative (Mieterinitiative) fighting against rising rents in the Annington estate, and Dortmund's local tenants' association (Mieterverein). Interviews with residents were only conducted randomly.

At this point the results are non-representative and preliminary, even if tendencies are becoming clear.

Housing market in Dortmund

Dortmund's housing stock consists mainly of buildings built between the 1950s and the 1970s. The demand for housing in Dortmund has been increasing over the last years when after years of population decline the number of residents began to increase again (+4,400 from 2011-2013), mostly due to immigration. At the same time, the number of households has also been increasing (+6,500 from 2012-2013). In 2013 almost 49 percent of all households were single households (AfW 2014, 41). Increasing

unemployment rates, higher dependency on social welfare (especially among elderly) and the number of house-seeking households reported at the municipal housing department (+1,300 in 2012, +1,400 in 2013) point to a high demand for affordable and social housing (see figure 2).

Figure 2: Dortmund Social Structure Data

December	Unemployment	SGB II	SGB II (Bedarfsgem.)	SGB XII (People outside facilities)
2012	12.9 percent	79,721	42,231	9,524
2013	13.1 percent	81,371	43,096	10,145

Source: AfW 2014, 46

The available social housing stock has been decreasing over the same time from ca. 26.500 apartments in early 2013 to an estimated 20,000 until the year 2021 (AfW 2014, 27). New constructions over the past years were primarily targeted at high-income residents (AfW 2014, 49). Dortmund's city council thus decided in April 2014 to encourage new constructions for housing, one fourth of which is supposed to be social housing (AfW 2014, 37f). Structural vacancy rates (of more than three months) have decreased: in 2012, it was only 2.0 percent on average and even lower in the South of Dortmund (where the case study areas are located) than in the North.

Rents are – compared to other German cities – still low. The median price per square meter was 5.50 Euro in 2013 (German average: 6.21 Euro) in older estates and 9.78 in newly built housing (AfW 2014, 49). But rents have been slowly rising. The new rent index takes retrofitting measures into account and allows +0.45 Euro per m2 for renovations from 2004 on (Mieterverein Dortmund 2015).

Like other German cities, Dortmund sold part of its former social and municipal housing stock to international private investors in the 2000s. But also workers' housing estates, originally built and owned by the large companies in the coal and steel

industry for their workers, were sold. Private investors have been showing only little commitment to the maintenance of their housing stock and been more interested in short-term returns. They are particularly involved in the purchase of comparably run-down housing stock located close to the inner city where margins for the companies' rates of return are highest. Today, main owners of housing in Dortmund are private individuals and groups of private owners (70 percent of all housing, about 26 percent owner-occupier), housing companies (67,000) and housing cooperatives (18,000) (AfW 2014, 29). The municipal housing company DOGEWO 21 – one of the owners in the case studies – owns about 16,000 apartments. The Deutsche Annington – the second owner – owns more than 17,500 apartments in Dortmund, which makes Dortmund the Annington's largest housing stock.

The situation of Dortmund's housing market shows that the demand for affordable housing has been increasing, while the number of social housing has been on decline. Energy-efficient retrofitting enhances the risk that even more affordable housing will be lost. However, the following cases show that in Dortmund, the social effects of energy-efficient retrofitting, particularly in terms of segregation, depend to some extent on the strategies employed by the housing companies.

Quarter 1: South-Western inner city

The area was built in the 1950s by a local coal and steel company (Hütten-AG) (see figure 3). In World War II, about 74 percent of Dortmund's housing stock had been damaged or destroyed (ASW 1959, 7), which was an incentive for local companies to build housing estates for their workers. After several changes of ownership over the decades, the Deutsche Annington (a stock company which mainly belongs to a British investment company) bought the estate in 2005. The estate consists of typical 1950s multiple dwelling row houses (250 housing units in 42 buildings; see figure 3). It is located close to Dortmund's inner city. Railway and metro lines are in walking distance, as are local suppliers and services.

Figure 3: The case study area South-Western inner city (photos SH)

Many residents moved into the estate in the late 1950s, but the social structure has been changing due to the ageing of the population for several decades. However, the share of long-term residents is still high. Rents cover a range from 5.75 to 7.30 Euro per m2, the vacancy rate is below 1.5 percent. The unemployment rate is lower than Dortmund's average (7.2 percent); the average income only comes up to 89 percent of Dortmund's average. However, the poverty rate is lower (2.7 percent) than in Dortmund total (4.0 percent) (A05 2015, 50).

Energy-efficient retrofitting measures took place from 2011-2013. The housing company Annington intended, according to the head of the local branch office (also for the following see interview with the Annington's head of local branch office in May 2015[3]), to maintain the housing stock and to upgrade it to meet today's energy-efficiency standards. According to residents, however, there was generally a high need for maintenance and repair measures as the housing substance had been severely neglected for years. Energy-efficient retrofitting included insulation works on the walls and partly on the roofs and cellars. In addition, balconies were constructed and electric

[3] The interview was conducted by Maggi Yuen and Moritz Schulte.

lines renewed (A05 2015, 78f); also works on the rain gutters took place and windows in the hallways were exchanged. When residents moved out, bathrooms, heating, electricity and windows were renewed inside the apartments also. The company was very pleased with the way the retrofitting measures were realized and attributes their success to the fact that a centralized and experienced modernization and accounting unit of the company was responsible for the organization und realization. The deadlines could be met, all went according to plan.

The Annington paid particular attention to reducing the barriers in the apartments so that elderly and handicapped people can live there as independently as possible (due to technical reasons, barrier freedom cannot be reached in the 1950s and 1960s housing stock). The company used funding by the KfW. It assumes that about 30 percent of energy can be saved after the retrofitting measures were finished and claims that most tenants are very happy with the result. The head of the local branch office does not know about any tenants' problems due to rising rents, and he has not noticed any higher fluctuation of tenants than usual which could be related particularly to retrofitting.

This positive conclusion by the housing company can be contrasted with residents' observations. Most of the interviewed tenants do appreciate the new balconies and acknowledge that there are energy savings (however, not even close to the promised 30 percent). But many tenants also complained about the bad quality of the renovation works and about the workers. Some argued that some of the measures had not been necessary at all, or that they were undertaken in an unprofessional way (insulation falling off the wall after a few weeks, nests of wasps or woodpeckers in the insulation). On average, the rent increase seems to be higher than 7 percent, but below the 11 percent that are legally allowed. All interviewed residents knew of one or more households who actually left the area due to the rent increase. According to information provided by the tenants' association, rents in the South Western inner city after the retrofitting are around 6,37 Euro/m2, which hits particularly those tenants hard who have been living in the area for a long time and thus still had very low rents

before the renovation; households that had moved in during the renovation were confronted with higher rents to begin with (A05 2015, 81f).

Quarter 2: Dortmund-Löttringhausen

The Löttringhausen estate was built by Dortmund's municipal housing company DOGEWO 21 in 1965 and is still owned by DOGEWO 21 today. It also consists of 3- and 4-storey lines of apartment buildings and one high-rise building (see figure 4). The case study area covers 426 housing units in 48 buildings. It is located on Dortmund's southern edge and served by one bus line every half hour during the day. There is a local supply centre in the core of the area with a supermarket (which has announced its closure in the near future), bakery, hairdresser, restaurant and the neighbourhood agency.

Figure 4: The case study area Löttringhausen (photos SH)

As in the South Western inner city, many residents moved in when the estate was built, thus the estate has been undergoing a slow change of residents over the past decades. Due to the lack of data for the area, the following figures represent an estimation based on figures for the statistical district. The average age is high: 40 percent are 60 years or older. Due to the large average size of the apartments, the area is also inhabited by young families with children. Unemployment rate is 3.9 percent (Dortmund 13.1 percent), poverty quasi non-existent (0.3 percent). The average income comes up to 193 percent of Dortmund's average and thus to the highest in Dortmund. Rents are estimated to be around 6 Euro/m2 and thus higher than the average rent in Dortmund, while the vacancy rate is lower (1.7 percent) (A05 2015, 65ff).

The municipal housing company DOGEWO 21 announced its retrofitting plans in 2013, and planned the renovation of the area in three phases (two of them finished by now, which are the case study areas; the third phase is still on-going). DOGEWO 21 argues that after 50 years some of the building material needed to be renewed, and also names climate protection goals as part of its considerations. According to the neighbourhood's former redevelopment agent, the housing company conducted an analysis of its tenants to find out who was living in the area and who might be attracted in the future. The analysis led to the idea that energy retrofitting needed to be combined with other modernisation measures such as the (optional) reorganization of barrier-free bathrooms, elevators and the installation of a neighbourhood agency which supports in particular elderly people in terms of health and care issues, but also organizes leisure and communication. Retrofitting measures included the installation of central gas heating, an exchange of windows, and insulation of the cellar and the renovation of the façade. The outdoor facilities were also newly designed and equipped with playground furniture so that the area is also attractive for young families (a kindergarten and an elementary school are close by).

The social structure of the area has not changed over the retrofitting works; on the contrary, it seems that many elderly residents see the chance to stay in the area because the barrier-free bathrooms and the elevators make it easier to live

independently in case of age-related impairments (A05 2015, 70). When asked about their opinion of retrofitting works, interviewees in general showed high appreciation of the renovations of bathrooms and the upgrading of the outdoor facilities which seem to have left a much greater impression on them than energy-efficient retrofitting, which is seen as a more or less agreeable side-effect. How much energy can be saved is not yet verifiable, and the rent increase was individually set according to the tenants' rent contracts because the housing company set its priority to affordability rather than to the highest-possible returns (A05 2015, 72f).

Since the retrofitting measures in the area took place in three subsequent phases, some tenants tried to move into the already-renovated areas in order to avoid the hassle related to the construction work. Residents perceive their neighbourhood as socially mixed: one-parent families, seniors, low-, mid- and high-income households (A05 2015, 67). Interviewees from the residency, the housing company and the neighbourhood agency agree that the rising rents due to energy retrofitting have not yet caused any evictions. Most interviewed residents stated that they were able to pay higher rents without any further restrictions in other spheres of life. On the contrary, they argue that their rents are still comparably low.

3.2 Erfurt

Erfurt is a medium sized city, the capital of the state of Thuringia. Situated in the eastern part of Germany, it is a post-socialist city, which went through the classic features of post-socialist urban development (Sykora & Bouzarovski 2011), including a deindustrialisation in the early 1990s, fast rearrangement of institutions according to the western German system, liberalisation of the housing market or suburbanisation. Erfurt has a historical, well refurbished centre, a ring of largely refurbished residential districts from the 19th and early 20th century, post-war housing estates at the outer parts and adjacent some suburbs incl. both older villages and new suburban housing.

Due to the central functions of the city, the transition period did not lead to extremely high unemployment rates as it did elsewhere. Unemployment declined in recent years

and amounted about 7,0 percent in 2012. Erfurt hosts a number of larger institutions such as Länder level state government, administration and two universities. Whereas other large cities faced rather heavy outmigration in the 1990s, Erfurt did suffer less. The population has shrunk, but not dramatically until the mid 2000s (peak of 224.000 inh. in 1990, bottomed out at 196.000 in 2002) and slowly regrows since to ca. 206.000 inhabitants in 2014 (City of Erfurt 2014). Thus, the housing market did indeed go through a phase with upcoming market active housing vacancies, but not as dramatic as in many other Eastern German cities. Housing prizes have been rather high and stable as compared to other eastern German cities, but certainly much lower than housing prizes in Munich, Hamburg or Frankfurt. As has been shown for Leipzig, housing vacancies tend to increase residential segregation (Grossmann et al. 2015; Strohmeier 2006)

3.2.1 Case study Wacholderweg, district Wiesenhügel

The case study Wacholderweg comprises one block of flats in a post-war housing estate in prefabricated technology, which was built in the 1980s. As most other blocks of flats in the district, it has five stories with 10 flats per entrance. In the administrative district 'Wiesenhügel', ca. 5345 inhabitants lived as of Dec. 31st 2014 with an average age of 46.8 years. Whereas between 1995 and 2012, inhabitant numbers fell to nearly half of the amount of inhabitants from before 1989, it has been seeing a slight regrowth lately (net gain of 233 in 2014).

The 1990s brought a first wave of modernisations incl. facades, windows, and sometimes also balconies were added. Between 2005 and 2010, again measures were undertaken in some parts incl. a make-over of the stair-cases, elevators, new balconies etc. The green spaces were improved around the blocks. In the district, three bigger owners hold stock: the municipal housing company (KOWO) and two other big housing cooperatives, 'WBG Einheit' and 'WBG Erfurt'.

Figure 5: The case study area Wacholderweg (photo Max Murek)

The block under investigations belongs to the municipal housing company, which holds 1164 housing units in the district. In their stock, between 2008 and 2013 about 28 mio. Euro have been invested, among other measures also into energetic modernisation. In a special project concerning energy saving, retrofit together with educational programs on how to efficiently heat and manage fresh air, the goal was to reduce heat energy consumption by 40 percent. This has been funded by the German Reconstruction Loan Corporation (Kreditanstalt für Wiederaufbau, KfW) in their housing programme.

The two cooperatives invested in the stock so that today, Wiesenhügel appears as a fully refurbished, quite nicely located area at the fringe of the city close to the recreational area 'Steigerwald'. Still, it is well equipped with infrastructure in terms of social services, shopping facilities or public transport. As the census in 2011 revealed, housing vacancies were rather low with just 3 percent (City of Erfurt 2013).

The refurbishment is recalled by residents rather differently. Whereas some of the residents say that they do not know what this was all about and complain about the dust and hustle with the construction works, others clearly remember a mobile info-bus explaining the intended energy savings. Most of the inhabitants are rather satisfied

with the process. They recall that information came early, the process was perceived as a fair one.

Rents did increase, but given the limits of the data, an overview cannot be provided and not all residents openly spoke about financial issues. An example can illustrate the situation[4]: A couple, 58 and 61 years of age, remembers that information was provided early, they do recall the bus providing information and that all deadlines were kept. Nevertheless, they are rather unhappy with the process and outcome of the refurbishment. The constructions works meant that for several months, the kitchen was out of use due to the dust and dirt. The work was done in small steps so that the process lasted long. For their flat, they evaluate the outcome rather negatively. The walls were broken up for the new electricity, parts of their flooring is in a worse state than before. Most importantly, the new ventilation system leads to a situation where they actually use more heating energy than before; plus it causes dust in the bath room. To avoid this and the loss of warmth, they simply put cello-tape over the ventilation slots. The net rent for the 84 m2 flat increased from 462 Euro to 544.13 Euro. Still, this is less than was announced. In the first information, the rent was supposed to increase to 605 Euro. For heating, they say that there are no savings, they still pay the same amount for heating energy. The couple has a monthly budget of about 2000 Euro.

The couple recalls that with the announcement of modernisation, most neighbours moved out. About their motivations and new places of residence, no info was given. What might have had an impact is that some years ago, the company intended to demolish this block which led to conflicts and protest, as interviewees reported. In our interpretation, the retrofit might have been the stray that broke the camels back, and that made residents leave. To what extent the announced prize increase played a role here, we do not know. Today, young households have moved in and the couple feels a bit alienated with their long-term neighbours gone.

[4] Interview conducted by Mandy Krämer and Max Murek

Most likely, this is a rather extreme case. In other entrances, people were mostly satisfied. Often they were not willing to be interviewed and closed the door shut saying that they are satisfied with everything. The issue of losing warmth in the flat has been mentioned more often, though. People help themselves by using cello-tape, but a reduction of heating energy was rarely felt. Housing mobility seems to be induced by a combination of factors rather than the prize increase of the retrofit alone. Older residents tend to report on high fluctuation and the loss of neighbourly networks in general. In a different entrance, an old woman said that only four of her older neighbours are still there and the house is rejuvenating, some students come in.

3.2.2. Case study Clara-Zetkin-Street, district Daberstedt

The houses belonging to the case study in Daberstedt were built in the 1920s by a housing company of the former railway company 'Reichsbahn', intended to provide housing for railway workers. They are situated in close proximity to the station, in a central location, connected well to social and other infrastructure. Daberstedt has become a desirable housing area, comprising mostly older housing stock in well refurbished state. It is located in the inner south of Erfurt, close to some other more prestigious old built-up areas.

In socio-demographic terms, Daberstedt has a stable population of about 13.500 inhabitants. The district has a below average share of migrants with just 1.2 percent (Erfurt 3.3 percent). It is slightly ageing with an increase in average age from 47.1 years in 2006 to 48.3 years in 2011 (44.3 in Erfurt). Unemployment rates are lower than the city's average and have been declining as has unemployment in the city in general (Daberstedt from 7.9 (2006) to 5.1 percent (2011); Erfurt from 11.3 percent (2006) to 7.0 percent (2011). (City of Erfurt 2013)

The houses under investigation belong to the Deutsche Annington, a large private housing company, actually the same owner as in the Dortmund-South-West case. The Deutsche Annington bought these houses in 2001. They were unrefurbished, but comparatively well maintained for older housing stock in inner city locations of post-

socialist Germany. The residents of the houses are mostly older and retired households with strong neighbourly bonds which have developed over the decades. Here, we found a conflictuous situation with protest forming but also frustration.

Figure 5: The case study area Wacholderweg (photo Max Murek)

Different from the Wiesenhügel case, especially the process of refurbishment is contested. The residents feel treated unfair, mistrust is the dominant state of mind towards the landlord. One problem is that means of communication do not work, questions remain unanswered, contact persons are not available. The residents received partly different information. Those with a long-term contract from before 1990 received more information, and they received it earlier. They were contacted by employees of Deutsche Annington and informed about the refurbishment plans. This potentially has to do with their differing rights resulting from the old contracts incl. a right to oppose against refurbishment measures in case of rent-increases. The older residents reported visits of employees from Deutsche Annington where information

was given and consent to these plans was asked rather on the side. Others were contacted and informed later by mail with the announcement of refurbishment measures incl. energetic refurbishment but also a make-over of stair-cases, balconies, the roof, the basement, the green areas surrounding the buildings etc. In the opinion of residents, many of these measures were pointless and not useful. In the case of one couple who shared their documents, net rents increased by 95 Euro per month[5]. A saving on energy bills as of 0.20 Euro/m2 and month was calculated in the announcements. Because the construction work is only just about to begin, it is still unclear how actual energy bills will develop. What stroke residents though was the fact that rent increases were not calculated by the same means; but differently from household to household. Those residents with a pre-1990 contract had the highest increases in net rents per m2 (numbers not available), recent newcomers the lowest. This supports the assumption of residents that the main goal of rent increases is to raise rents up to a certain level instead of refinancing retrofit let alone saving energy or protecting the climate.

Two households in one entrance, both students, had already moved out, others were thinking about it. The main motivation reported here is to escape the price increase.

4. Social consequences of retrofitting measures: Promoter of segregation?

With respect to the above outlined drivers of residential segregation, we will now discuss to what extent in in what way energetic retrofit is – or can be – a contributing factor here. Given the limits of the data, this discussion has a rather exploratory character and does not yet result in reliable, representative findings.

First of all, energetic retrofit alters the composition of housing market segments. It adds higher quality housing to the market, reduces the share of low-cost housing available in a city just like any other refurbishment activity. In our four cases, the retrofit of privately owned stock in central locations led to conflicts between owner

[5] Interviews conducted by Tom Wedding and Yvonne Rubel.

and tenants. In both cases, outmigration occurred, even though in the Erfurt case, the neighbourly network in the inner city location was probably a factor of strong enough place attachment to keep residents in place.

What we learned is that retrofitting is clearly a mobilizing factor, but is remains open to what extent relocations alter patterns of residential segregation. It seems that students or younger and less affluent households are the first to leave a place after the announcement of retrofit-measures. Sometimes, retrofit announcements serve as a catalyst for upcoming mobility decisions of households which were on the move anyway. It seems that the combination of energy-efficient retrofitting with measures to make apartments, entrances and staircases barrier-free and measures to improve the quality of outdoor facilities lead to a higher satisfaction with construction-works and to a better acceptance of rent increases. The communication strategy of the housing company proved to be an important factor: When information was provided in detail and regularly and when residents had a say what was done – when indeed measures were customized as much as technically feasible – tenants were more willing to put up with noise and dirt, and their attitude towards their landlord was much more positive. Interestingly enough, in the Dortmund case it became apparent that also the ways the housing companies organised the construction in terms of contracting made a great difference for the tenants.

Thus what we see so far is that the retrofitting strategies and the communication of retrofit measures of the analysed housing companies are a decisive factor in the evaluation of residents. Landlords also clearly follow different goals. Whereas the private company under investigation apparently gives little priority to keeping their tenants, the municipal companies provided much more information and more transparently revealed the composition of costs. Rents have been rising in all cases, and although we cannot confirm higher rent increases in the central locations held by private companies, the interviews show that they are certainly felt harder and less considered justified here. Here, prize-related outmigration occurs rather often. In the municipal housing stocks in both cities, satisfaction of remaining residents (with specific exceptions in Erfurt) is rather high. Especially in flats in the first floor technical

problems are most severe so that even energy bill-increases were reported. However, in the Dortmund case it seems that satisfaction is mostly linked to other retrofitting measures such as bathrooms and elevators and less attributed to energy-efficient retrofitting, even when savings on the energy bill are reported.

We can also see that affordable housing is lost which affects the housing market on the city-wide level. The engagement of private investors such as the Deutsche Annington is focused on profitable neighbourhoods where the gap between current rents and rents which could be realised due to location factors (proximity to the city centre, to local suppliers and/or other amenities) is great. Thus it is these locations in particular that can come into the focus of private investment. Households with small or sometimes even medium incomes who live in these areas today do usually not have many alternative housing options close by. So they either cope with rising rents, or they have to move elsewhere.

State policies, in this case, tend to work in favour of segregation and displacement measures. They allow for extensive modernisation measures and the addition of up to 11 percent of the total modernisation costs to the net-rents (§559 BGB). A newly introduced brake mechanism which is supposed to limit potential rent increases (Mietpreisbremse) is not effective in the case of energetic retrofit, because energetic measures are explicitly excluded (in order not to keep owners from energy-efficient retrofitting). However, while there is an obligation to report which measures were taken (at least when KfW and other fundings have been utilized), it is not necessary to prove that actual energy savings could be achieved, so the danger of abuse of the regulations exists. In effect, especially in marketwise valuable locations, dislocations can be fostered. At present, it depends on owners and their social responsibility to keep rents low.

5. Open questions for research

Our findings are certainly preliminary, as our empirical basis still needs to be extended, but it gives some hints to where more solid research can start from. As with research

on gentrification, the endeavour to empirically investigate dislocations occurring from energetic retrofitting is rather difficult. On top, reported outmigration might have to do with prize increases but it might also have other motivations, too. Our findings show that ownership and the strategies of owners (landlords) play an important role, as does – as expected – the location. But then we also found mobility which is most likely an outcome of ongoing conflicts with the announcements of retrofits being the straw to break the camels neck. Further, social consequences go beyond evictions, they come also about in the potential to destroy neighbourly networks and in the need to reduce expenses elsewhere, e.g. make cuts in other areas of consumption. Research would have to take this into consideration.

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