TECHNICAL CONDITION OF SINGLE-FAMILY HOUSES IN POLAND.

RENOVATION NEEDS

RESEARCH REPORT

Institute of Environmental Economics

Efektywna Polska

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INTRODUCTION

We are pleased to present a report entitled 'The technical condition of single-family houses in Poland – renovation needs' which is based on survey research carried out in 2017 among owners of single-family houses. The report was prepared as a contribution to the building modernisation programme which was announced by the Polish Government at the beginning of 2017. Although the report is not long, readers will find a number of surprising answers relating to important questions concerning the shape of the programme that is being developed. The answers lead to the following conclusions:

- the scale of modernisation required is enormous and investors lack financial resources to implement the renovation work as desired (in large measure this problem can be solved through loan products, although to what degree is unclear);
- modernisation is not just about thermal modernisation but includes also other renovation work, such as roof, bathroom or kitchen renovation;
- support is essential for comprehensive renovation projects (encouraging comprehensive building modernisation through subsidies, housing modernisation rebates and other instruments).

The report comprises three complementary parts.

The first part deals with modernisation needs identified by owners of single-family houses. It is not possible to refer to research in previous years in this regard. But a surprisingly large number of respondents claimed that the heating system in their home needed replacement. It is likely that the high level of concern focused on home heating systems results from increased public awareness concerning air quality problems. If this turns out to be the case, the change should be regarded as the most significant transformation of environmental attitudes among Poles of recent years. When asking about the scope of modernization, we included questions about kitchen and bathroom refurbishment, as typically kitchen and bathroom renovation is linked to the modernization of heating systems (it is often necessary to renovate the kitchen, install hot water supply, install/ cut off gas supply, modernise/ replace electrical

installations, or install underfloor low-temperature heating and ventilation systems).

The next part draws on research concerning modernisation priorities. It is interesting to note that, in the city, refurbishment of the kitchen and bathroom seems to be more urgent than installing wall insulation, which would be more beneficial from a financial perspective. On the other hand, it should be noted that a much higher percentage of buildings have already been insulated in urban areas than in rural areas, which results from the fact that city residents use more expensive heating sources. Window replacement is not a priority due to the fact that the majority of windows in Polish houses have already been replaced (unfortunately installation of new air-tight windows is not usually associated with installation of appropriate ventilation solutions).

The third part is about matching financial needs to the renovation needs identified. Based on our internal comparative analysis and discussions with specialists, we can assume that the average investment size estimated by respondents is surprisingly accurate and reflects the real situation. But it is worth taking a closer look at the average cost of roof renovation as estimated by homeowners, who indicated that completing this type of work is key to their investment needs. This situation confirms that roof work should not be restricted only to insulation – it needs to be comprehensive in scope to include replacement of the roof cover and sometimes also adaptation of the top floor for residential use. It should be stressed, however, that installation of roof thermal insulation without concurrent renovation of roof covering typically means money wasted (as insulating materials lose their properties when exposed to damp conditions). This is an important consideration for all those preparing modernisation programmes – roof modernisation is expensive, necessary and – due to its high cost – often remains unattainable. Solving this problem requires loans and tax rebates along with a customised advisory programme.

Marek Zaborowski

INFORMATION ON THE SURVEY RESEARCH

Timing

The research was commissioned by the Institute of Environmental Economics and was carried out by the CEM Market and Public Opinion Research Institute between 18th April and 12th May 2017.

Research methods used

The research was conducted using the CATI telephone survey method. All interviews were carried out by experienced interviewers form the CATI studio located in the CEM Institute offices in Krakow.

The research sample

The survey research involved a representative sample of 1 000 owners of single-family houses in Poland. For the purposes of the research, decision-makers responsible for technical decisions in the home were targeted. Sampling made use of both stationary and mobile telephone databases. The sampling process took into account the geographical location of the buildings in question (city/rural).

Research tools

The research made use of a standardised survey questionnaire with mostly closed-ended questions.

RENOVATION
NEEDS

Maintaining single-family houses in good technical condition requires the owner to carry out regular renovation work. Some of the essential renovation work, especially work related to the building outer shell, such as roof renovation or thermal insulation of exterior walls, can generate considerable costs depending on the scope of work and the size of the building. The majority of owners of single-family houses cannot afford such expenditures as they exceed the resources they have available in their day to day budgets. For this reason, undertaking major renovation work demands that the investor saves for many years prior to the planned renovation intervention or applies for financial support from external sources, such as bank loans or bank credits.

The survey research completed in 2017 involved a representative random sample of owners of single-family houses (N=1 000). Based on the responses obtained a diagnosis of the technical condition of the buildings was prepared, with reference to thermal insulation of walls and quality of the heating sources used. Respondents were asked to indicate renovation work needs related to their houses. The research involved presenting house owners with a standard list of typical renovation interventions carried out in single-family houses and asking respondents to indicate if a given intervention was, in their opinion, necessary for their building.

The results obtained indicate that the scale of investment needed by single-family houses is enormous. The majority of respondents indicated the renovation work were of significant scale. Only 30% of single-family house owners were of the opinion that no significant interventions were needed.

Investment needs related to heating system modernisation and boiler replacement were indicated most often as priorities. The fact that heating sources topped renovation needs may be evidence of the effectiveness of

air quality protection actions , which were started a few years ago as community-based initiatives and pointed to low-stack emissions as the key contributor to air pollution in Poland (this issue possibly still requires further research). Factors such as regular media coverage of air pollution and what causes it, increased local government support in the form of heating modernisation programmes, and introduction of air pollution into Poland's political discourse, have all contributed to raising awareness throughout Polish society. According to the research, owners of single-family houses, are in the main using obsolete and energy-intensive heating sources and have come to recognise that the heating systems of their buildings require modernisation. The research findings confirm that it is the owners of single-family houses located in urban areas who indicate more frequently the need to modernise their heating systems (39% of respondents living in urban areas pointed to the need for modernising heating systems and replacing the heating source as one of their key renovation needs, whereas in rural areas this need was indicated by 32% of respondents). Overall in cities, the heating sources using solid fuel do not dominate as is the case in rural areas. This means that public pressure to eliminate or modernise such heating sources may be higher in urban areas. At the same time, the cities which introduced special regulations and guidelines in relation to solid fuel use indicate that the standards as currently applied to heating sources will be significantly modified whether in the short or long term.

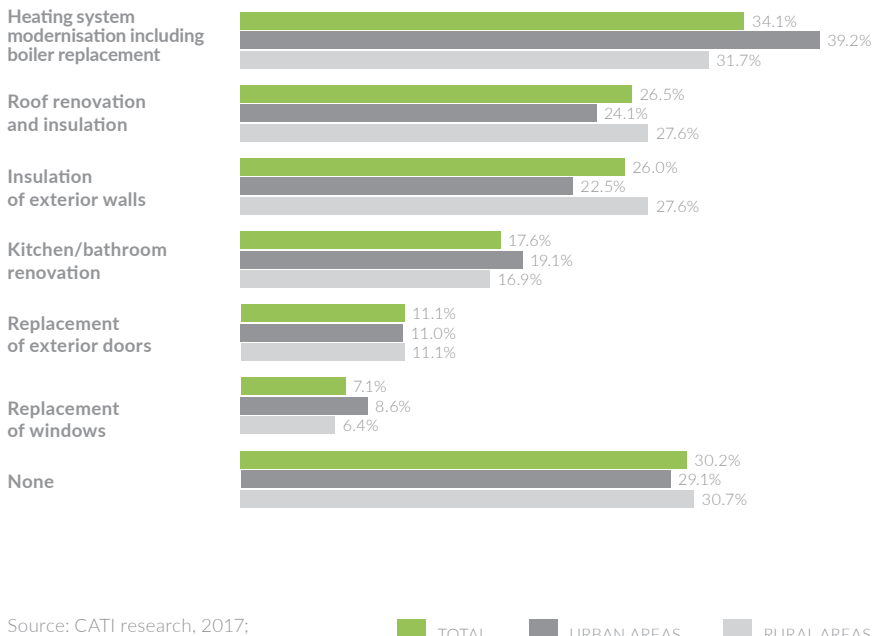
Other interventions, often indicated by the research respondents, include roof renovation and thermal insulation of exterior walls (each of these was selected by a quarter of respondents). These two types of intervention were selected more often as investment needs by those resident in rural areas. This difference can be readily explained by the fact that the percentage of houses with insulated exterior walls is several percent higher in the city than in rural areas (13% more in urban areas with respect to thermal insulation of exterior walls and more than 10% with respect to thermal insulation of top structural ceilings or attics), which is associated with higher heating costs in the city and leads to higher investment cost-effectiveness of thermal insulation work. As a result, replacement of heating sources has become one of the key investment priorities in this segment. It

needs to be taken into account in the future.

Kitchen and / or bathroom renovation was indicated as one of the renovation needs identified as being of equal significance regardless of place of residence.

Every tenth owner of a single-family house indicated the need to replace their exterior doors. Not many respondents indicated the need to replace windows (only 7%). But the research findings indicate that this type of investment had already been partly or completely implemented in the majority of buildings.

Which of the following renovation work should be carried out in your house?



Source: CATI research, 2017;
Sample N=1 000; own analysis

It is only natural that residents of houses built recently (after 2000), indicated renovation needs less frequently. Nevertheless, a quarter of respondents thought that the heating system in their building was in need of modernisation.

Which of the following renovation work should be carried out in your house?

	TOTAL	BUILDING CONSTRUCTION YEARS				HOUSEHOLD MONTHLY NET INCOME	
		BEFORE WORLD WAR 2	1945-1988	1989-2000	2001 +	< 4000 PLN	> 4000 PLN
Heating system modernisation including boiler replacement	34.1%	31.7%	35.9%	36.8%	26.2%	31.6%	38.1%
Roof renovation and insulation	26.5%	28.6%	30.4%	26.2%	8.0%	30.7%	23.7%
Insulation of exterior walls	26.0%	29.1%	31.9%	19.7%	5.8%	31.7%	22.0%
Kitchen/bathroom renovation	17.6%	14.3%	19.7%	18.7%	11.8%	16.2%	20.0%
Replacement of exterior doors	11.1%	8.3%	11.7%	13.5%	9.5%	13,6%	10,2%
Replacement of windows	7.1%	6.7%	5.8%	12.0%	5.9%	6.9%	7.9%
None	30.2%	30.0%	26.1%	29.1%	49.1%	29.0%	28.4%
SAMPLE (N)	**1 000**	**183**	**518**	**175**	**124**	**544**	**456**

Source: CATI research, 2017; Sample N=1 000; own analysis

KEY
INVESTMENTS

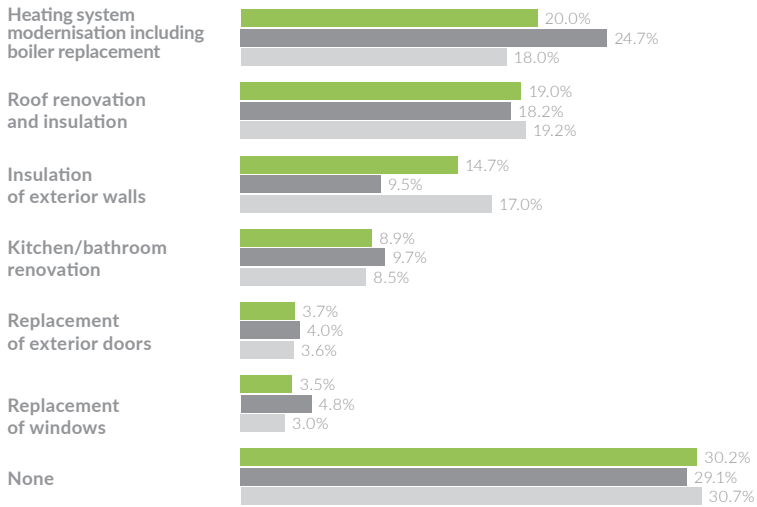
One fifth of single-family house owners indicated heating system modernisation or boiler replacement as the key priority interventions. This was also the intervention most often selected among key renovation needs for the building. This situation relates especially to urban area residents. A quarter of single-family house owners living in the city indicated the need to modernise their heating systems.

Roof renovation ranked second among the priority interventions selected by respondents. Rural residents indicated roof renovation to be a priority more often than heating system modernisation.

One in seven respondents listed thermal insulation of exterior walls among their priority investments. This intervention was selected more often by respondents living in rural areas. Somewhat fewer respondents indicated kitchen and bathroom renovation as priorities, although it should be noted that among city residents this type of intervention was ranked at a similar level as thermal insulation of exterior walls.

Replacement of windows and exterior doors was selected least frequently as a priority intervention.

Which of the investments indicated is a priority in your opinion?



Source: CATI research, 2017;
Sample N=1 000; own analysis

Heating system modernisation was selected most frequently as a priority investment, regardless of building age. It is interesting to note that this type of investment was indicated most frequently as a priority for respondents who were better off. The priority was selected more frequently by city residents where average household incomes were higher than in rural areas.

Which of the investments indicated is a priority in your opinion?

	TOTAL	BUILDING CONSTRUCTION YEARS				HOUSEHOLD MONTHLY NET INCOME	
		BEFORE WORLD WAR 2	1945-1988	1989-2000	2001 +	< 4 000 PLN	> 4 000 PLN
Heating system modernisation including boiler replacement	20.0%	21.8%	19.2%	20.5%	20.1%	14.6%	26.0%
Roof renovation and insulation	19.0%	20.1%	22.3%	16.1%	7.1%	23.6%	15.7%
Insulation of exterior walls	14.7%	14.0%	18.0%	12.7%	5.3%	18.5%	11.7%
Kitchen/bathroom renovation	8.9%	8.9%	9.7%	7.1%	8.0%	7.4%	10.3%
Replacement of exterior doors	3.7%	3.1%	2.3%	7.0%	6.4%	3.7%	4.2%
Replacement of windows	3.5%	2.1%	2.4%	7.5%	4.0%	3.2%	3.7%
None	30.2%	30.0%	26.1%	29.1%	49.1%	29.0%	28.4%
SAMPLE (N)	**1 000**	**183**	**518**	**175**	**124**	**544**	**456**

Source: CATI research, 2017; Sample N=1 000; own analysis

ESTIMATING
FINANCIAL NEEDS

We have tried to estimate the cost for each type of renovation intervention at the national level based on the surveyed expected cost of priority renovation interventions. The table below lists an average cost for investments based on calculations carried out by the respondents themselves. The estimates calculated in this way constitute only an indicative value, as the cost of renovation work may vary considerably depending on the size of the building. Similarly, the scale of intervention required may also vary significantly. These differences are most clearly visible in relation to roof renovation work. They can be limited to a simple and relatively low-cost renovation, which involves laying mineral wool in the attic at a cost of a couple of thousand PLN or may require a complete rebuilding of the entire top floor, with costs reaching 100 000 PLN or more. Analysing the data compiled below, it is important to note that the quantitative estimates listed reflect the subjective assessment and needs of individual single-family house owners and are not based on detailed cost calculations as prepared by professional building contractors. This means that the actual cost of the proposed renovation work could be considerably higher.

The average total value of investment needs among respondents who identified at least one renovation need amounted to 21 000 PLN (67% of respondents).

Estimates of the financial resources required to implement priority investment needs in single-family houses were based on the expected costs cited by respondents. Scaling up to match the total number of single-family houses in Poland, the total financial resources needed can be estimated as nearly 80 billion (a thousand million) PLN.

The largest portion of the total sum relates to costs of roof renovation and thermal insulation of exterior walls. The total cost of these two types of

interventions is estimated as amounting to more than 50 billion PLN. The expected cost of the investment which was most frequently named as the main priority – heating system modernisation – amounts to 16 billion PLN. The least costly interventions in the overall investment ranking include replacement of exterior doors and replacement of windows. These costs are estimated at slightly above 3 billion PLN.

The estimate of 80 billion PLN may be regarded as excessive. But if we consider that such an investment would meet the most urgent renovation needs of nearly half of Poland's population, it can be seen as reasonable.

	AVERAGE EXPECTED COST	PERCENT OF BUILDINGS FOR WHICH THIS TYPE OF INVESTMENT WAS INDICATED AS PRIORITY	NUMBER OF BUILDINGS IN POLAND, FOR WHICH THIS TYPE OF INVESTMENT WAS INDICATED AS PRIORITY	EXPECTED TOTAL COST OF THE INVESTMENT
Insulation of exterior walls	26 100 zł	14.7%	788 949	20 591 568 900 PLN
Roof renovation including thermal insulation	29 200 zł	19.0%	1 019 730	29 776 116 000 PLN
Replacement of exterior doors	4 500 zł	3.7%	198 579	893 605 500 PLN
Replacement of windows	12 800 zł	3.5%	187 845	2 404 416 000 PLN
Kitchen/bathroom renovation	17 800 zł	8.9%	477 663	8 502 401 400 PLN
Heating system modernisation including boiler replacement	14 800 zł	20.1%	1 078 767	15 965 751 600 PLN
TOTAL				**78 133 859 400 PLN**

Source: CATI research, 2017; Sample N=1 000; own analysis

Average expected cost for specifics elements of a buildings and estimated total expected costs of investment in Poland.

EXPECTED AVERAGE COST OF SPECIFIC WORK IN A BUILDING	EXPECTED TOTAL COST OF INVESTMENT IN POLAND
26 100 PLN	**20 591 568 900 PLN**
29 200 PLN	**29 776 116 000 PLN**
4 500 PLN	**893 605 500 PLN**
12 800 PLN	**2 404 416 000 PLN**
17 800 PLN	**8 502 401 400 PLN**
14 800 PLN	**15 965 751 600 PLN**

78 133 859 400 PLN

Source: CATI research, 2017;
Sample N=1 000; own analysis

ABOUT US

The Institute of Environmental Economics (IEE) is a non-governmental organisation, active in the area of environment protection, energy efficiency and climate policy. Its current activities focus on two key problems of environment protection in Poland that are inter-related:

- Air pollution caused by burning of coal and waste in household furnaces.
- Modernisation of single-family houses, given that heating them is the main cause of air pollution in Poland.

Activities undertaken by IEE in previous years have involved: ESCO markets, the Polish system of white certificates, virtual power stations, group purchasing and implementation of the zero emissions building concept.

List of selected IEE publications:

- Energy Efficiency in Poland - Review – 2012, 2013, 2015 editions
- Buildings Modernisation Strategy: Roadmap 2050
- Bank loan products for supporting thermal modernisation of buildings. Context, current situation, opinions and recommendations
- ESCO market in Poland

All publications can be downloaded from the IEE website: http://www.iee.org.pl/?a=text&b=32

Efficient Poland (EP) is a cooperation platform initiated and moderated by the IEE. Activities carried out as part of this initiative focus on two problems identified by IEE, namely: modernisation of single-family houses and air quality in Poland. The initiative involves organisations and institutions, including industry associations, which see these problems as vitally important, but it does not represent the interests of any particular industry or organisation.