Final Project Report

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Smart Renovation Factory
by INDU-ZERO

Interreg
North Sea Region
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Market potential of the INDU-ZERO product, targeting the Dutch and Northwest-German market?

Introduction

Market potential is the entire size of the market for a product at a specific time. It represents the upper limits of the market for a product. Determining the market potential of INDU-ZERO is part of a successful marketing process. In this section multiple types of dwellings are listed: (semi)detached dwellings, terraced houses and Maisonette-, gallery-, porch-, and other apartments. Depending on how large a dwelling is, prices of INDU-ZERO packages can vary. Therefore, the detached dwellings are split into large ones consisting of more than 150 m2 usage area and small ones consisting of less than 150 m2 usage area. In the following part, the Dutch and German market potential is identified. Given the specifications of the product, it is most suitable for houses built after the Second World War, and before approximately 1990. After 1990 there has been much more attention for energy efficiency, so that the effects of an energetic renovation will be rather limited. Before the Second World War, houses are usually built in a very diverse matter, or are considered to be monuments, which makes a renovation on an industrialized scale quite difficult.

The Netherlands

As mentioned in the introduction, there are different types of buildings for which the INDU-ZERO renovation packages are most suited. These are listed in this section, with the numbers of dwellings/residential units included.

Large detached dwellings built before 1966

The larger detached dwellings from before 1966, with **206,000** houses, represent more than 3% of the Dutch housing stock. The majority, 91%, is privately owned and about 8% is rented out the private sector. In this case, a larger home means that the home is larger than 150 m2 usable area. The houses in this category often have four rooms, a walkable attic and a cellar. These houses often have ground floors made out of wood. These wooden ground floors even exist in this type of homes until the late 1970s.

Large detached dwellings built between 1966-1988

The larger detached houses built in the period from 1966 to 1988, with **144,000** houses, represent 2.2% of the Dutch housing stock. The majority, 99%, is privately

owned and about 1% is let in the private sector. The homes that fall into this category often have four to six rooms, spread over 2 to

4 floors, a walkable attic and no basement. The houses built at the beginning of the period 19661988 are often traditionally built. In the years that follow, the diversity of the homes will increase. There are virtually no houses of this type in the portfolio of Dutch housing associations.

Small detached dwellings built before 1966

The smaller detached houses from before 1966, with **307,000** houses, represent almost 5% of the Dutch housing stock. The majority, 84%, is privately owned, about 12% is rented in the private sector and 4% in the social sector. In this case, a small house means that the house is smaller than 150 m2 in use. The homes that fall into this category often have four rooms, a walkable attic and a basement. These houses often have ground floors made out of wood. These wooden ground floors even exist in this type of homes until the late 1970s.

Small detached dwellings built between 1966-1988

The smaller detached houses built in the period from 1966 to 1988, with **151,000** houses, represent 2.3% of the Dutch housing stock. The majority, namely 91%, is privately owned, about 5% is rented in the private sector and 4% in the social sector. The homes in this category often have five rooms, no walkable attic and no basement. The houses built at the beginning of the period 1966-1988 are often traditionally built. In the years that followed, the diversity of the homes increased.

Terraced house built between 1946-1965

The terraced houses built in the period 1946 to 1965 represent more than 10% of the Dutch housing stock with **669,000** houses. 61% of these homes are in the social housing sector, 34% are owner-occupied homes and only 5% are privately rented. The homes that fall into this category often have four to five rooms, spread over three residential layers, a walkable attic and a basement. Due to the housing shortage after the Second World War, the construction industry made a major shift from traditional construction to more industrial construction during this period. The emphasis was on a more efficient construction process in order to be able to realize the large needed amount of new buildings. One aspect of this efficiency improvement is the emergence of "system building". The use of wooden floors is decreasing in this period.

Terraced house built between 1966-1975

The terraced houses built in the period 1966-1975 represent, with **654,000** houses, almost 10% of the Dutch housing stock. Half (50%) is privately owned, about 41% is rented out in the social sector and 9% in the private sector. The homes that fall into this category often have five rooms, a walkable attic and no basement. Characteristic of this construction period is that system construction is increasingly used. This is especially visible in the floors, which are made of concrete, and the frame fillings with sandwich panels

Terraced house built between 1976-1979

The terraced houses built in the period 76-79 represent, with **165,000** homes, 2.5% of the Dutch housing stock. About 71% is privately owned, roughly 26% is rented in the social sector and 3% in the private sector. The homes that fall into this category often have five rooms, an open kitchen, a walkable attic and no basement. Characteristic of this construction period is that system construction continues to develop. This mainly includes walls and facades made of prefab concrete or cast construction. New in this period is the introduction of concrete floors with insulation.

Terraced houses built between 1980-1988

The terraced houses built in the period 1980-1988 represent **469,000** homes, more than 7% of the

Dutch housing stock. Half (51%) is privately owned, about 39% is rented in the social sector and 10% in the private sector. The homes that fall into this category often have four rooms, an open kitchen, a walkable attic and no basement. Characteristic of this construction period is that less and less traditional construction is taking place. System construction continues to develop with the introduction of prefab concrete fronts and roofs.

Maisonette apartment built before 1966

The maisonettes from before 1966, with **203,000** homes, represent approximately 3% of the Dutch housing stock. About 36% are owner-occupied, 34% are rented in the social sector and 30% in the private sector. The homes in this category often have four rooms and a walkable attic. The houses in this category are often built in the traditional way with masonry walls and facades. The floors and roof boards are often made of wood.

Maisonette apartment built between 1966-1988

The maisonettes built in the period 1966-1988 represent 1.4% of the Dutch housing stock with **94,000** homes. The majority, 67%, is rented in the social sector and 13% in the private sector, the remaining 20% is owner-occupied housing. The homes in this category often have three rooms and no attic that can be walked on. Characteristic of this construction period is that system construction is being introduced and applied more.

Gallery apartment built before 1966

The gallery apartments from before 1966 represent approximately 1.7% of the Dutch housing stock with **112,000** homes. The majority, 59%, is rented in the social sector

and 19% in the private sector, the remaining 22% is owner-occupied housing. The homes in this category often have four rooms. The property is part of a multi-storey residential building with an elevator. The houses are located on an open gallery.

Gallery apartment built between 1966-1988

The gallery apartments built in the period 1966-1988 represent, with **208,000** homes, 3.2% of the Dutch housing stock. The majority, 67%, is let in the social sector and 19% in the private sector, the remaining 14% is owner-occupied housing. The homes in this category often have four rooms. The property is part of a multi-storey residential building with an elevator. The houses are located on an open gallery.

Porch apartment built before 1966

The porch apartments from before 1966 represent about 7% of the Dutch housing stock with **458,000** homes. The majority, 52%, is rented in the social sector and 26% in the private sector, the remaining 22% is owner-occupied housing. The homes in this category often have three rooms. The property is part of a multi-storey residential building with no lift. The houses are located on a closed porch. Due to the housing shortage after the war, the construction industry made a major shift from traditional construction to more industrial construction during this period. The emphasis was on a more efficient construction process in order to be able to realize the large amount of new construction. This applies to all types of apartments.

Porch apartment built between 1966-1988

The porch apartments built in the period 66-88 represent, with **179,000** homes, 2.7% of the Dutch housing stock. The majority, 71%, is rented in the social sector and 16% in the private sector, the remaining 13% is owner-occupied housing. The homes in this category often have three rooms. The property is part of a multi-storey residential building with no lift. The houses are located on a closed porch.

Other apartment built before 1966

The other apartments from before 1966, with **223,000** homes, represent about 3.4% of the Dutch housing stock. Half, 50%, is let in the social sector and 33% in the private sector, the remaining 17% is owner-occupied housing. The homes in this category often have two rooms. The property is part of a multi-storey residential building.

Other apartment built between 1966-1988

The other apartments built in the period '66 -'88 represent, with **202,000** homes, 3.1% of the Dutch housing stock. Almost three quarters, 72%, are let in the social sector and 15% in the private sector, the remaining 13% are owner-occupied homes. The homes in this category often have two rooms.

The property is part of a multi-storey residential building.

Table 1: Summary of the Dutch housing stock

Type of dwelling	Amount of dwellings	Dutch housing stock	Social sector	Private sector	Owner-occupied
Large detached dwellings	350,000	5.2%		5.1%	94.3%
Small detached dwellings	458,000	7.3%	4%	9.7%	86.3%
Terraced house	1,957,000	29.5%	46.1%	7.4%	46.5%
Maisonette apartment	297,000	4.4%	44.4%	24.6%	28.7%
Gallery apartment	320,000	4.9%	64.2%	19%	16.8%
Porch apartment	637,000	9.7%	57.3%	23.2%	19.5%
Other apartment	425,000	6.5%	60.5%	24.4%	15.1%
Total	**4,444,000**	**67.5%**	**42.3%**	**13.3%**	**44.3%**

Northwest-Germany (Nordrhein-Westfalen and Niedersachsen)

Stock of buildings and apartments

The subject of the evaluations in this chapter are, unless otherwise indicated, residential buildings (excluding dormitories) and apartments located in them.

On the date of the building and apartment census on May 9, 2011, in Germany a total of 18,922,618 buildings with living space and 40,563,320 therein included apartments are counted.

The buildings are almost exclusively residential (without Dormitories). Buildings that are mostly used for residential purposes account for and contain around 96% of the building stock nationwide at the same time around 96% of the apartments. Residential buildings dominate Germany.

Half of all buildings and apartments are spread across just three regions

The shares of the countries in the total building and housing stock (see diagram) show that almost half of all buildings and apartments located in Germany are concentrated in the three most populous states of Nordrhein-Westfalen, Bayern and Baden-Württemberg. The density of dwellings (number of dwellings in residential buildings per square kilometre, W / km²) is around 108 W / km² on a national average, with the regional values showing a considerable range. At the top are values in the four-digit range, which are reached by 24 independent cities from the Bavarian capital Munich with 2,307 W / km².

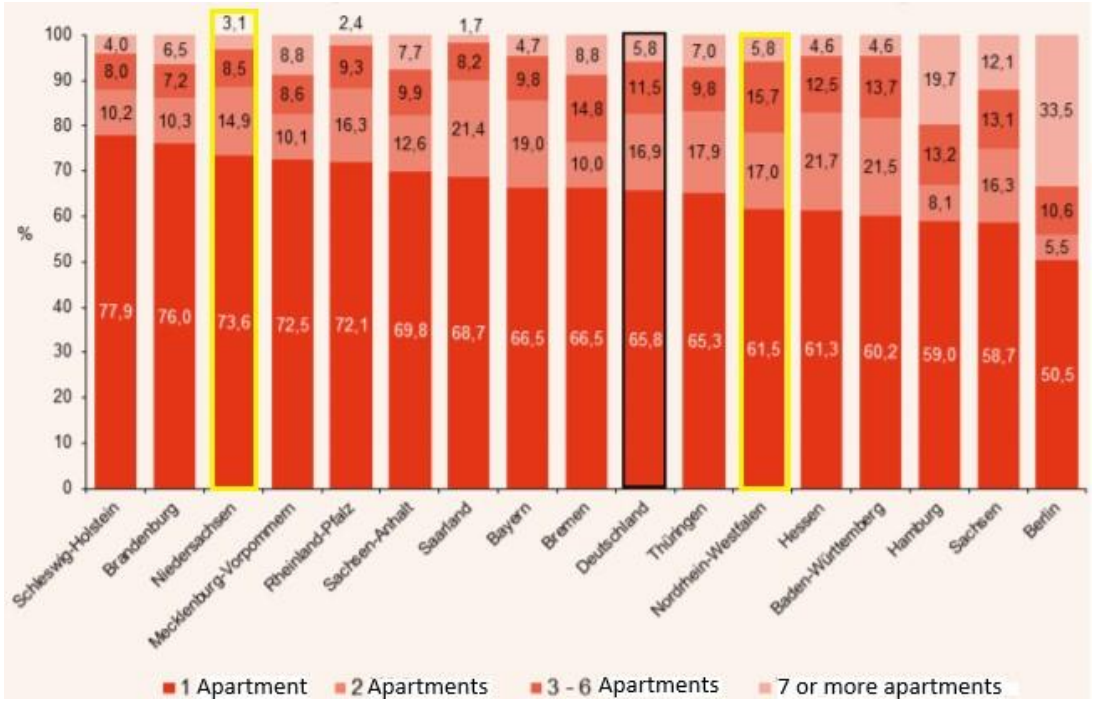
Figure 1: Share (%) of total housing stock in each region

Building size and construction

Most residential buildings are single or two-family houses. The majority of the 18 million residential buildings in Germany (66%) contain only one residential unit. Another 17% are buildings with two apartments, the rest with three or more apartments. Only about 6% of the existing buildings are large apartment buildings that contain seven or more apartments. However, this size class accounts for almost a third of all apartments in Germany - apartments in single-family houses have roughly the same proportion.

The distribution of the building size varies considerably in different parts of the country. So is the proportion of buildings with seven or more apartments in the East-German territorial states, at 8%, twice as high as in West-Germany, where it is around 4%. At the same time, large residential buildings are urban, as the high values in the city-states show. This is especially the case for Berlin, where one-third of residential buildings has seven or more apartments. Single-family houses, on the other hand, are typical for the more rural and sparsely populated areas. These include, in particular, the states of Schleswig Holstein, Brandenburg, Niedersachsen as well as Mecklenburg-Vorpommern and Rheinland-Pfalz.

Diagram 2: Residential buildings with number of residential units



Detached houses

Around two thirds of the residential buildings are detached, one third is built as a semi-detached, a duplex house, a terraced house or flat. Germany wide, 16.9% of all residential buildings are semi-detached and duplex houses. The remaining 17.3% of the residential buildings are terraced houses and larger flats. In the Bundesländer in focus in this study, Niedersachsen and Nordrhein-Westfalen, the makeup of the housing types is rather different. Niedersachsen has a lot more detached houses in comparison with Nordrhein-Westfalen and also compared to the Netherlands. Niedersachsen has less large flats compared to the German average, whereas Nordrhein-Westfalen has around the same amount.

Year of construction

Almost three quarters of all buildings and apartments in Germany were only just being built after 1950, with the 1960s and 1970s being the strongest building decades. The country comparison reveals a considerable age gap between East and West. The eastern regions show far larger proportions of old buildings built before 1950 than the western ones. Buildings and apartments from 1950 to 1989 make up a relatively small percentage of the housing stock of the eastern Bundesländer. Especially in smaller cities of the former GDR, flats from this period have either been renovated already or completely torn down. Dwellings built in this time period are

mostly larger apartment buildings. When comparing the average number of residential units, residential buildings from the period between 1950 and 1989 have on average of 2.1 residential units in the west, while the eastern ones have 3.6 apartments. After 1989, the proportions of buildings and apartments are largely the same in both east and west.

Forms of ownership

Housing supply mainly in private hands

In Germany, 84.9% of all residential buildings are in the hands of private persons, as well as 58.8% of all apartments. That is therefore by far the most common form of ownership. The second largest group of owners are owners' associations. Their share in the ownership of residential buildings is 9.2%. For the apartments in these buildings, it concerns both apartments used as owner-occupied housing and apartments that are offered on the rental market. All in all, owner-occupied apartments account for 25% of the total housing stock.

The ownership breakdown of residential buildings is as follows. 84.9% is owned by one private person and 9.2% owned by an association of owners) and consists of:

1. Single-family houses (detached, semi-detached, terraced house)
2. Multi-family houses (apartments) (55.8% owned by one person of which 25% are owner-occupied).

The other groups of owners consist of around 6% of the number of residential buildings, of which housing associations account for only 1.6%, much lower than in the Netherlands.

- 84.9% owned by private persons
- 9.2% owned by an association of owners
- 1.7% owned by a local municipality (social housing)
- 1.7% owned by institutional investors
- 1.6% owned by housing associations
- 1.0% other, such as houses owned by churches, the Bundesland, or the central government

When looking at the number of residential units instead of the number of residential buildings, the situation changes slightly. Since social housing associations own a lot of larger flats, the share of housing associations in the amount of residential units is larger, but with large regional differences.

Regional differences in municipal and other forms of cooperative housing

With regard to the distribution of the various forms of ownership, there are large regional differences. In the eastern German Bundesländer, roughly every fourth apartment (26.5%) is in a communal or cooperative residential building. For some individual cities in the eastern part of the country, more than twice as high proportions are found. Similar conditions prevail in the city-states Berlin, Hamburg and Bremen, where 22.5% of the apartments are owned by municipal companies and cooperative organized owners. In Niedersachsen and Nordrhein-Westfalen, social housing is found mostly in larger urban centres. The share of residential units owned by communal and housing association is on average 6.5% in these Bundesländer.

Statistical Tables

Table 1: Nordrhein-Westfalen structural information - 2011

		Residents	Area	Residential buildings (without dormitories)		Apartment per km2	Apartments per building
				Buildings	Apartments		
	Name	Amount	km²	Amount			
05	**Nordrhein-Westfalen**	**17 538 251**	**34 092**	**3 750 155**	**8 331 044**	**244,4**	**2,2**
	davon						
	Kreisfreie Städte	7 019 727	3 726	1 129 432	3 588 074	963,1	3,2
	Kreise	10 518 524	30 367	2 620 723	4 742 970	156,2	1,8
District of Düsseldorf		**5 076 864**	**5 291**	**980 124**	**2 514 771**	**475,3**	**2,6**
	Kreisfreie Städte						
05111	Düsseldorf	586 291	217	69 063	317 066	1 459,7	4,6
05112	Duisburg	488 468	233	78 346	246 964	1 060,7	3,2
05113	Essen	566 201	210	86 189	297 622	1 415,1	3,5
05114	Krefeld	222 247	138	44 707	113 823	826,3	2,5
05116	Mönchengladbach	255 188	170	53 604	127 468	747,8	2,4
05117	Mülheim an der Ruhr	166 865	91	30 374	86 710	949,8	2,9
05119	Oberhausen	210 216	77	37 004	105 214	1 364,5	2,8
05120	Remscheid	110 708	75	20 073	56 229	753,7	2,8
05122	Solingen	155 265	90	31 142	77 381	864,2	2,5
05124	Wuppertal	342 661	168	52 479	182 886	1 086,1	3,5
	Kreise						
05154	Kleve	300 989	1 232	88 933	129 751	105,3	1,5
05158	Mettmann	477 778	407	94 487	232 467	571,0	2,5
05162	Rhein-Kreis-Neuss	437 393	577	102 584	201 602	349,7	2,0
05166	Viersen	296 175	563	81 237	132 813	235,8	1,6
05170	Wesel	460 419	1 042	109 902	206 775	198,4	1,9
District of Cologne		**4 285 861**	**7 364**	**960 732**	**2 023 413**	**274,8**	**2,1**
	Kreisfreie Städte						
05314	Bonn	305 765	141	54 201	152 670	1 081,1	2,8
05315	Köln	1 005 775	405	132 531	514 247	1 269,2	3,9
05316	Leverkusen	158 984	79	29 132	77 479	982,4	2,7
	Kreise						
05334	Aachen, Städteregion	539 516	707	116 429	260 073	367,8	2,2
05334002	dar. Aachen, Stadt	236 420	161	38 344	122 712	762,2	3,2
05358	Düren	258 760	941	73 026	114 943	122,1	1,6
05362	Rhein-Erft-Kreis	451 514	705	115 942	206 073	292,5	1,8
05366	Euskirchen	187 940	1 249	58 869	82 911	66,4	1,4
05370	Heinsberg	248 161	628	78 027	106 803	170,1	1,4
05374	Oberbergischer Kreis	273 011	919	72 051	122 019	132,8	1,7
05378	Rheinisch-Bergischer Kreis	278 183	437	70 869	129 218	295,4	1,8
05382	Rhein-Sieg-Kreis	578 252	1 153	159 655	256 977	222,8	1,6
District of Münster		**2 571 195**	**6 911**	**586 536**	**1 155 051**	**167,1**	**2,0**
	Kreisfreie Städte						
05512	Bottrop	117 311	101	23 105	56 368	560,3	2,4
05513	Gelsenkirchen	258 766	105	36 645	132 438	1 262,0	3,6
05515	Münster	289 576	303	52 681	142 644	470,8	2,7

Table 2: Nordrhein-Westfalen residential buildings by type - 2011

		Building				
		Amount	Building type			
			Detached house	Duplex house	Terraced house	Other building type
	Name		%			
05	**Nordrhein-Westfalen**	**3 750 155**	**49,1**	**20,1**	**27,7**	**3,1**
	davon					
	Kreisfreie Städte	1 129 432	28,7	22,0	45,2	4,1
	Kreise	2 620 723	57,9	19,3	20,2	2,6
District of Düsseldorf		**980 124**	**32,2**	**24,0**	**40,7**	**3,2**
	Kreisfreie Städte					
05111	Düsseldorf	69 063	18,9	16,0	61,9	3,2
05112	Duisburg	78 346	16,6	23,8	53,6	6,0
05113	Essen	86 189	21,0	26,7	48,2	4,1
05114	Krefeld	44 707	23,6	23,9	49,7	2,8
05116	Mönchengladbach	53 604	21,2	21,8	54,0	2,9
05117	Mülheim an der Ruhr	30 374	30,8	26,9	40,7	1,7
05119	Oberhausen	37 004	25,1	29,3	42,9	2,8
05120	Remscheid	20 073	43,7	18,7	28,9	8,6
05122	Solingen	31 142	46,1	22,3	27,3	4,2
05124	Wuppertal	52 479	33,1	17,8	46,9	2,2
	Kreise					
05154	Kleve	88 933	52,5	24,7	20,3	2,5
05158	Mettmann	94 487	33,1	22,1	42,2	2,6
05162	Rhein-Kreis-Neuss	102 584	34,5	26,0	37,2	2,3
05166	Viersen	81 237	38,0	25,6	32,6	3,7
05170	Wesel	109 902	41,7	27,6	28,5	2,2
District of Cologne		**960 732**	**46,5**	**19,4**	**31,5**	**2,7**
	Kreisfreie Städte					
05314	Bonn	54 201	30,6	17,9	47,6	3,9
05315	Köln	132 531	21,0	16,3	59,5	3,2
05316	Leverkusen	29 132	35,2	25,6	37,4	2
	Kreise					
05334	Aachen, Städteregion	116 429	35,4	23,4	38,4	2,9
05334002	dar. Aachen, Stadt	38 344	25,2	20,6	50,9	3,2
05358	Düren	73 026	48,5	18,0	30,7	2,9
05362	Rhein-Erft-Kreis	115 942	38,3	24,0	35,2	2,5
05366	Euskirchen	58 869	69,2	13,9	13,8	3,0
05370	Heinsberg	78 027	51,2	22,0	24,1	2,7
05374	Oberbergischer Kreis	72 051	77,8	13,0	7,5	1,7
05378	Rheinisch-Bergischer Kreis	70 869	59,0	22,0	17,0	2,0
05382	Rhein-Sieg-Kreis	159 655	57,7	18,4	21,6	2,4
District of Münster		**586 536**	**53,3**	**21,7**	**21,3**	**3,7**
	Kreisfreie Städte					
05512	Bottrop	23 105	31,3	30,9	31,6	6,3
05513	Gelsenkirchen	36 645	18,5	22,0	50,7	8,8
05515	Münster	52 681	37,9	20,3	37,8	4,0

Table 3: Nordrhein-Westfalen Residential buildings and apartments by year of construction - 2011

		Building						
		Amount	Built in period...					
			Before 1919	1919-1949	1950-1969	1970-1989	1990-1999	2000 and after
	Name		%					
05	**Nordrhein-Westfalen**	**3 750 155**	**11,0**	**11,3**	**30,3**	**25,7**	**11,7**	**10,1**
	davon							
	Kreisfreie Städte	1 129 432	13,4	15,0	34,9	21,0	7,8	7,9
	Kreise	2 620 723	10,0	9,6	28,2	27,7	13,4	11,0
District of Düsseldorf		**980 124**	**12,5**	**12,4**	**31,2**	**24,9**	**10,3**	**8,9**
	Kreisfreie Städte							
05111	Düsseldorf	69 063	10,5	17,9	37,5	19,5	6,9	7,7
05112	Duisburg	78 346	14,7	19,9	35,6	15,0	7,8	7,0
05113	Essen	86 189	15,7	18,7	38,3	17,2	4,5	5,7
05114	Krefeld	44 707	11,6	15,1	31,1	24,9	8,8	8,4
05116	Mönchengladbach	53 604	15,1	12,7	28,0	27,3	9,8	7,2
05117	Mülheim an der Ruhr	30 374	15,9	14	34,6	21,1	7,1	7,1
05119	Oberhausen	37 004	16,9	13,3	34,3	19,7	8,1	7,9
05120	Remscheid	20 073	17	13,8	33	21,5	9	6,2
05122	Solingen	31 142	24,0	13,7	25,6	19,8	7,8	9,2
05124	Wuppertal	52 479	17,8	14,8	33,2	22,2	6,1	5,9
	Kreise							
05154	Kleve	88 933	10,5	9,4	24,7	27,2	15,2	13,2
05158	Mettmann	94 487	7,9	7,3	30,9	34,8	10,6	8,5
05162	Rhein-Kreis-Neuss	102 584	7,1	7,9	29,8	31,5	12,7	11,0
05166	Viersen	81 237	13,3	8,9	26,4	26,2	14,9	10,3
05170	Wesel	109 902	9,6	8,4	28,7	28,5	14,0	10,8
District of Cologne		**960 732**	**9,6**	**10,2**	**30,5**	**27,1**	**12,1**	**10,5**
	Kreisfreie Städte							
05314	Bonn	54 201	14,3	10,3	35,4	23,1	9,1	7,8
05315	Köln	132 531	8,5	15,6	38,8	20,1	7,9	9,0
05316	Leverkusen	29 132	11,4	13,2	33,9	22,6	9,1	9,8
	Kreise							
05334	Aachen, Städteregion	116 429	12,5	13,2	31,4	24,1	10,1	8,8
05334002	dar. Aachen, Stadt	38 344	12,4	12,4	34,9	25,4	7,8	6,9
05358	Düren	73 026	9,2	9,8	31,0	25,8	13,9	10,2
05362	Rhein-Erft-Kreis	115 942	5,9	8,9	28,8	33,2	12,8	10,4
05366	Euskirchen	58 869	11,8	8,6	27,2	26,7	13,1	12,7
05370	Heinsberg	78 027	7,6	11,2	28,2	25,5	14,2	13,2
05374	Oberbergischer Kreis	72 051	13,9	8,3	28,1	26,3	13,3	10,2
05378	Rheinisch-Bergischer Kreis	70 869	8,4	7,7	30,4	29,9	12,8	10,8
05382	Rhein-Sieg-Kreis	159 655	8,2	6,3	25,0	33,6	14,9	12,0
District of Münster		**586 536**	**8,6**	**10,3**	**28,4**	**26,5**	**13,8**	**12,4**
	Kreisfreie Städte							
05512	Bottrop	23 105	17	11,5	31	23,0	9,9	8
05513	Gelsenkirchen	36 645	19,5	16,5	38,2	13,8	6,5	5,4
05515	Münster	52 681	3,1	10,0	33,4	29,3	11,4	13

Table 4: Nordrhein-Westfalen Residential buildings and apartments by type of ownership - 2011

		Building						
		Amount	Form of ownership					
			Private person (s)	Homeowner association	Municipal housing agency	Private sector housing agency	Housing association	Other
	Name		%					
05	**Nordrhein-Westfalen**	**3 750 155**	**82,7**	**10,4**	**1,2**	**3,3**	**1,5**	**0,9**
	davon							
	Kreisfreie Städte	1 129 432	72,6	14,4	2,5	6,3	2,9	1,4
	Kreise	2 620 723	87,0	8,7	0,6	2,0	1,0	0,7
District of Düsseldorf		**980 124**	**78,6**	**12,2**	**1,9**	**4,2**	**2,1**	**1,0**
	Kreisfreie Städte							
05111	Düsseldorf	69 063	65,4	19,7	3,0	6,0	3,9	2,0
05112	Duisburg	78 346	65,3	13,8	4,1	12,1	3,7	1,0
05113	Essen	86 189	67,9	15,1	3,5	9,2	3,1	1,2
05114	Krefeld	44 707	80,2	12,9	3,3	2,5	0,2	0,9
05116	Mönchengladbach	53 604	81,9	11,8	2,2	2,5	0,4	1,2
05117	Mülheim an der Ruhr	30 374	74,1	14,3	3,8	4,3	2,6	0,8
05119	Oberhausen	37 004	71,2	15,0	0,2	6,6	6,1	1
05120	Remscheid	20 073	74,8	14,3	5,5	2,3	2,0	1,2
05122	Solingen	31 142	76,4	13,7	0,2	1	8,2	1
05124	Wuppertal	52 479	72,1	18,3	1,3	3,4	2,7	2,2
	Kreise							
05154	Kleve	88 933	92,0	5,9	0,2	0,7	0,7	0,6
05158	Mettmann	94 487	81,1	12,7	0,8	2,3	2,0	1,1
05162	Rhein-Kreis-Neuss	102 584	85,9	10,0	1,0	1,2	1,6	0,4
05166	Viersen	81 237	89,5	7,0	1,0	1,5	0,5	0,4
05170	Wesel	109 902	82,9	8,8	1,9	4,9	0,4	1,0
District of Cologne		**960 732**	**85,8**	**9,1**	**1,3**	**2,0**	**0,9**	**0,9**
	Kreisfreie Städte							
05314	Bonn	54 201	76,9	15,1	1,9	3,9	0,5	1,8
05315	Köln	132 531	71,5	16,1	4,1	3,4	3,3	1,6
05316	Leverkusen	29 132	71,9	11	3,9	8,6	2,4	2,0
	Kreise							
05334	Aachen, Städteregion	116 429	85,2	9,2	1,2	3,3	0,4	0,8
05334002	dar. Aachen, Stadt	38 344	80,1	13,2	2,8	2,3	0,1	1,5
05358	Düren	73 026	90,6	5,9	0,7	1,1	0,7	0,9
05362	Rhein-Erft-Kreis	115 942	89,1	7,8	0,7	1,7	0,2	0,5
05366	Euskirchen	58 869	93,5	5,0	0,6	0,3	0	0,7
05370	Heinsberg	78 027	91,7	4,2	0,1	2,4	0,2	1,4
05374	Oberbergischer Kreis	72 051	89,0	8,6	0,3	0,6	0,9	0,6
05378	Rheinisch-Bergischer Kreis	70 869	87,7	9,6	0,8	0,6	0,8	0,5
05382	Rhein-Sieg-Kreis	159 655	90,9	7,0	0,5	0,6	0,6	0,5
District of Münster		**586 536**	**83,4**	**9,8**	**0,7**	**4,3**	**0,8**	**0,9**
	Kreisfreie Städte							
05512	Bottrop	23 105	68,5	14	2	13,7	1,1	1
05513	Gelsenkirchen	36 645	63,6	12,9	2,6	15,6	2,3	2,9
05515	Münster	52 681	79,8	12,8	1,7	3,4	1,0	1,3

Table 5: Niedersachsen structural information - 2011

		Residents	Area	Residential buildings (without dormitories)		Apartment per km2	Apartments per building
				Buildings	Apartments		
	Name	Amount	km²	Amount			
03	**Niedersachsen**	**7 777 992**	**47 613**	**2 141 405**	**3 605 962**	**75,7**	**1,7**
	davon						
	Kreisfreie Städte	972 942	1 125	213 563	508 005	451,8	2,4
	Landkreise	6 805 050	46 488	1 927 842	3 097 957	66,6	1,6
Region of Braunschweig		**1 577 735**	**8 100**	**398 941**	**777 129**	**95,9**	**1,9**
	Kreisfreie Städte						
03101	Braunschweig	242 537	192	40 847	129 953	676,3	3,2
03102	Salzgitter	98 895	224	22 795	53 362	238,3	2,3
03103	Wolfsburg	119 984	204	25 622	61 658	302,2	2,4
	Landkreise						
03151	Gifhorn	171 333	1 563	52 384	72 533	46,4	1,4
03152	Göttingen	248 037	1 117	56 451	122 253	109,4	2,2
03153	Goslar	140 137	965	37 921	72 412	75,0	1,9
03154	Helmstedt	91 410	674	28 012	45 235	67,1	1,6
03155	Northeim	137 445	1 267	39 101	65 278	51,5	1,7
03156	Osterode am Harz	76 785	636	22 837	38 116	59,9	1,7
03157	Peine	130 398	535	38 810	58 801	109,9	1,5
03158	Wolfenbüttel	120 774	723	34 161	57 528	79,6	1,7
Region of Hanover		**2 094 564**	**9 048**	**498 832**	**1 020 096**	**112,7**	**2,0**
	Landkreise						
03241	Region Hannover	1 102 240	2 291	219 641	557 558	243,4	2,5
03241001	dar. Hannover, Landeshauptstadt	506 416	204	65 500	276 146	1 353,7	4,2
03251	Diepholz	211 185	1 988	65 260	90 485	45,5	1,4
03252	Hameln-Pyrmont	150 259	796	40 793	75 555	94,9	1,9
03254	Hildesheim	277 595	1 206	71 646	133 412	110,6	1,9
03255	Holzminden	73 548	693	22 110	36 123	52,2	1,6
03256	Nienburg (Weser)	122 241	1 399	35 974	52 562	37,6	1,5
03257	Schaumburg	157 496	676	43 408	74 401	110,1	1,7
Region of Lüneburg		**1 668 910**	**15 494**	**518 500**	**756 121**	**48,8**	**1,5**
	Landkreise						
03351	Celle	176 690	1 545	55 454	82 412	53,3	1,5
03352	Cuxhaven	198 777	2 058	64 692	92 252	44,8	1,4
03353	Harburg	238 443	1 245	74 848	108 310	87,0	1,4
03354	Lüchow-Dannenberg	49 205	1 221	17 973	23 642	19,4	1,3
03355	Lüneburg	174 123	1 323	47 665	80 605	60,9	1,7
03356	Osterholz	110 907	651	35 762	47 953	73,7	1,3
03357	Rotenburg (Wümme)	162 726	2 070	52 035	68 728	33,2	1,3
03358	Heidekreis	136 693	1 874	41 735	62 387	33,3	1,5
03359	Stade	195 450	1 266	58 892	87 335	69,0	1,5
03360	Uelzen	93 596	1 454	29 447	44 465	30,6	1,5
03361	Verden	132 300	788	39 997	58 032	73,7	1,5

Table 6: Niedersachsen residential buildings by type - 2011 Table 7: Niedersachsen

		Building						
		Amount	Built in period...					
			Before 1919	1919-1949	1950-1969	1970-1989	1990-1999	2000 and after
	Name		%					
03	**Niedersachsen**	**2 141 405**	**10,7**	**9,3**	**27,0**	**26,5**	**15,0**	**11,4**
	davon							
	Kreisfreie Städte	213 563	8,4	14,2	32,0	24,7	10,8	9,9
	Landkreise	1 927 842	11,0	8,8	26,5	26,7	15,5	11,6
Region of Braunschweig		**398 941**	**16,3**	**10,6**	**28,8**	**23,4**	**11,7**	**9,2**
	Kreisfreie Städte							
03101	Braunschweig	40 847	10,7	17,8	34,1	20,8	6,3	10,2
03102	Salzgitter	22 795	9,2	17,9	33,1	21,7	10,8	7,4
03103	Wolfsburg	25 622	4,0	5	37,7	25,1	11,7	16,6
	Landkreise							
03151	Gifhorn	52 384	8,0	5,6	22,5	29,1	22,0	12,7
03152	Göttingen	56 451	18,4	9,6	27,6	26,2	10,5	7,7
03153	Goslar	37 921	23,9	13,6	30,5	20,0	7,4	4,7
03154	Helmstedt	28 012	20,5	8,3	30,2	22,6	10,3	8,2
03155	Northeim	39 101	25,5	11,5	27,5	20,5	8,4	6,5
03156	Osterode am Harz	22 837	22,1	13	31,4	21,0	7,8	4,7
03157	Peine	38 810	15,7	10,5	24,0	23,8	14,6	11,3
03158	Wolfenbüttel	34 161	21,0	6,4	27,2	22,2	13,6	9,6
Region of Hanover		**498 832**	**12,8**	**9,7**	**29,2**	**25,6**	**12,8**	**9,9**
	Landkreise							
03241	Region Hannover	219 641	8,1	9,2	31,2	27,8	13,2	10,6
03241001	dar. Hannover, Landeshauptstadt	65 500	9,0	15,9	38,7	19,1	8,9	8,4
03251	Diepholz	65 260	10,7	9,4	24,4	27,7	16,0	11,8
03252	Hameln-Pyrmont	40 793	18,5	9,9	30,9	22,5	10,0	8,1
03254	Hildesheim	71 646	18,9	9,4	28,0	23,2	11,4	9,1
03255	Holzminden	22 110	24,0	12,2	29,1	22,0	7,7	4,9
03256	Nienburg (Weser)	35 974	16,2	12,5	27,7	20,8	13	9,5
03257	Schaumburg	43 408	15,5	10,0	27,5	24,0	13,2	9,8
Region of Lüneburg		**518 500**	**10,1**	**8,6**	**25,2**	**28,4**	**16,1**	**11,6**
	Landkreise							
03351	Celle	55 454	8,6	10,0	30,5	28,0	13,1	9,9
03352	Cuxhaven	64 692	13,0	10,4	26,0	25,8	13,8	10,9
03353	Harburg	74 848	6,3	5,5	22,5	33,4	18,7	13,7
03354	Lüchow-Dannenberg	17 973	25	10,0	21	26,0	12,0	6
03355	Lüneburg	47 665	11,1	7,8	23,1	26,0	18,5	13,5
03356	Osterholz	35 762	7,3	6,3	25,2	32,9	15,2	13,2
03357	Rotenburg (Wümme)	52 035	7,1	9,7	24,7	27,4	19,1	12,1
03358	Heidekreis	41 735	10,2	11,0	28,4	23,3	15,4	11,7
03359	Stade	58 892	9,8	7,7	22,2	30,8	17,6	12,0
03360	Uelzen	29 447	13,9	11,3	31,3	22,8	13,0	7,7
03361	Verden	39 997	10,7	7,7	22,6	31,3	15,9	11,8

Residential buildings and apartments by year of construction – 2011

Table 8: Niedersachsen Residential buildings and apartments by type of ownership - 2011

		Building						
			Form of ownership					
		Amount	Private person (s)	Homeowner association	Municipal housing agency	Private sector housing agency	Housing association	Other
	Name		%					
03	**Niedersachsen**	**2 141 405**	**89,4**	**6,7**	**1,0**	**1,1**	**0,9**	**0,9**
	davon							
	Kreisfreie Städte	213 563	79,3	9,6	2,0	4,2	2,5	2,5
	Landkreise	1 927 842	90,5	6,3	0,9	0,8	0,8	0,7
Region of Braunschweig		**398 941**	**86,3**	**7,8**	**1,8**	**1,4**	**1,3**	**1,4**
	Kreisfreie Städte							
03101	Braunschweig	40 847	74,8	11,9	3,0	4,0	5,4	0,9
03102	Salzgitter	22 795	74,0	9,4	2,9	0,8	0,5	12,4
03103	Wolfsburg	25 622	78,3	8,1	6,1	6,0	0,7	1
	Landkreise							
03151	Gifhorn	52 384	93,3	5,0	0,1	0,2	1,0	0,4
03152	Göttingen	56 451	85,6	8,7	1,2	1,5	2,2	0,9
03153	Goslar	37 921	86,2	9,4	2,0	0,6	1,0	0,8
03154	Helmstedt	28 012	89,7	5,9	1,6	1,8	0,2	0,9
03155	Northeim	39 101	89,9	7,0	1,1	1,3	0,1	0,7
03156	Osterode am Harz	22 837	89,8	7,5	1	0,2	0,6	0
03157	Peine	38 810	91,7	6,2	1,3	0,4	0,1	0,4
03158	Wolfenbüttel	34 161	89,1	7,4	1,3	0,3	1,1	0,8
Region of Hanover		**498 832**	**86,8**	**8,4**	**1,4**	**1,2**	**1,3**	**0,9**
	Landkreise							
03241	Region Hannover	219 641	83,0	9,7	1,7	2,0	2,3	1,2
03241001	dar. Hannover, Landeshauptstadt	65 500	69,4	14,6	3,8	4,4	5,6	2,3
03251	Diepholz	65 260	91,9	6,4	0,5	0,4	0,3	0,5
03252	Hameln-Pyrmont	40 793	87,6	9,0	1,5	0,7	0,7	0,6
03254	Hildesheim	71 646	88,4	7,7	1,8	0,4	1,1	0,5
03255	Holzminden	22 110	90,2	7,3	0,6	1,2	0,2	0,5
03256	Nienburg (Weser)	35 974	90,9	5,7	1,8	0,5	0,1	1,0
03257	Schaumburg	43 408	90,1	8,2	0,6	0,7	0	0,4
Region of Lüneburg		**518 500**	**91,9**	**5,5**	**0,6**	**0,7**	**0,6**	**0,8**
	Landkreise							
03351	Celle	55 454	90,8	4,9	1,0	1,0	0,9	1,4
03352	Cuxhaven	64 692	91,8	5,1	1,2	0,7	0,8	0,5
03353	Harburg	74 848	93,1	5,5	0,2	0,6	0,2	0,4
03354	Lüchow-Dannenberg	17 973	94	4,5	0,3	0	0,4	0,9
03355	Lüneburg	47 665	90,4	6,4	1,0	0,5	0,5	1,2
03356	Osterholz	35 762	92,8	5,4	0,4	0,8	0	0,5
03357	Rotenburg (Wümme)	52 035	93,5	4,6	0,2	0,8	0,4	0,5
03358	Heidekreis	41 735	91,3	5,5	0,1	1,0	0,6	1,4
03359	Stade	58 892	91,3	5,9	0,2	0,6	1,3	0,7
03360	Uelzen	29 447	91,4	5,5	1,1	0,5	0,7	0,8
03361	Verden	39 997	91,2	6,8	0,9	0,3	0,1	0,8

Legislative environmental conditions affecting the market potential in NL and West-Germany

The Netherlands

Sustainable housing: overview of Dutch financial possibilities

In 2020, The Netherlands experienced a 50% increase in mortgage applications for renovations and sustainability. Approximately half a million homeowners applied for a second mortgage. And the National Heat Fund saw an increase in applications last year for the Energy Savings Loan, a government concession to make sustainability more affordable. In addition to the Energy Savings Loan, the government has several financial guides and subsidies available to make it more attractive for private individuals and home owner associations to make dwellings more sustainable.

Loans and grants from the government

Loans and subsidies are available for a large number of measures that will enable you to make immediate savings on the use of energy in your home. These loans and/or subsidies are offered by the central government and parties who work closely with the government, such as the Dutch national heat fund (Nationaal Warmtefonds). Most subsidies and loans can be combined, which makes it even more advantageous to improve sustainability.

Investment subsidy for renewable energy

Investment subsidy sustainable energy (ISDE) is made available by the government to heat dwellings in a sustainable way. This way, gas consumption is replaced by sustainable heat. The ISDE guide ran until December 31, 2020, but has been extended to 2030. In 2021 there is € 124,000,000 available for private individuals. You can get a subsidy for the purchase of solar boilers and heat pumps. Since this year, insulation is also included as a measure in the ISDE. Connection to the heat network is now also included in the ISDE. The subsidy received differs per device that produces sustainable heat. Until 31 December 2019, subsidies for biomass boilers and pellet stoves were available via the ISDE.

In addition to insulation and connection to the heat network, there is another extension: until 31 December 2023 there is a temporary subsidy for business installation for small-scale energy generation with solar panels and wind turbines.

Status subsidy ISDE: In 2021 there is € 124,000,000 available for private applications. Combined with business applications, this budget stands at € 164,000,000. (Hendriks, 2021)

Heat pump

Prices for a heat pump range from € 2,500 to € 19,500. For a heat pump, depending on the capacity and type of device, you can receive a subsidy of between € 500 and € 8,000. The larger the capacity of the heat pump, the higher the subsidy. For a hybrid heat pump and ventilation heat pump you still need a central heating boiler. For these variants you receive less subsidy than for a fully electric heat pump.

Solar thermal panel

A solar thermal panel heats water with sunlight and is therefore an environmentally friendly replacement for natural gas. Note that your energy consumption for hot water is almost half as much as when you do not have a solar thermal panel. You are also replacing natural gas with solar energy. The government incentivises this with a minimum subsidy of € 500 to maximum € 2,500, depending on the type of solar thermal panel that is purchase.

(SEEH): Dutch subsidy for home energy savings

All types of insulation, such as roof insulation or cavity wall insulation, contribute to savings on your energy bill. The government therefore supports to realize better insulated dwellings and has made subsidy for saving energy available. This is only available for owner associations, because as of January 4, insulation falls under the ISDE. If an individual has a private home within an association in which they live, then they can apply for the subsidy association. A maximum of 20% of insulation costs can be retrieved. However, the whole association must participate. In order to qualify for the subsidy, the owner association must have at least two types of insulation carried out. For each insulated apartment, an association receives € 4,000 on top of combined subsidy it has already received. Furthermore, a grant can be collected for energy advice and for drawing up a sustainable long-term maintenance plan for the entire homeowner association. The application has to be submitted before the start of the project.

The SEEH for private individuals falls within the ISDE since January 4, 2021.

Status subsidy SEEH: For the homeowner associations, a total of € 12,000,000 is available for implementing energy-saving measures and € 2,000,000 for energy advice, maintenance plans and guidance of the process. As of December 1, 2020, only €4,600,000 was available for implementing the energy-saving measures and just over €1,300,000 for consulting. (Eigenhuis, 2020)

Energy Savings Loan ''Nationaal Warmtefonds''

In February 2020, the Dutch national heat fund became part of the National energy savings fund (NEF). From that moment on, the financing options from the fund were expanded. Such as, the term of the loan for private homeowners has been increased to twenty years; before February 2020, seven, ten and fifteen years were the options. For homeowner associations, those terms stood at ten and fifteen, to which the twenty-year term was also added in February 2020. With the concepts; high end energy efficient package and with zero on the meter (NOM), the term can be increased to thirty years. Moreover, the minimum number of apartments or living units within the association is adjusted from ten to eight units. Since July 22, 2020, the National Energy Savings Fund has continued under the name ''Nationaal Warmtefonds''.

How much and whether you qualify for the energy savings loan depends on a number of factors. There is a distinction between individuals, associations and the degree of energy saving you want to achieve. The minimum loan amount for individuals is € 2,500 and for homeowner association €
25,000. (Warmtefonds, 2021)

- The housing cooperation consists of at least 8 residential units.
- The interest charged is fixed during the term of the Energy Savings Loan.
- Amortization based on monthly annuity.
- The borrowed amount will be deposited in a building fund account.
- Notary fees are for the account of the housing cooperation.

- The loan has a size of at least € 25,000 and a maximum of € 10,000,000 (with a maximum of € 25,000 per apartment right regarding a residential unit). Exceptions to the maximum

  loan amount per apartment right are the high end energy-efficient package (maximum € 50,000) and ZEP + / NOM (maximum € 65,000).

Specified measures granting subsidy

You can receive subsidy for the following 5 measures:

- Cavity wall insulation
- Insulation of the outside wall with side sheeting or against the outside
- Roof insulation or
- Floor or ground floor insulation
- HR++ or triple glass, frame panel or insulating door

Condition for the subsidy is that you take 2 measures, or combine one measure with a heat pump, solar thermal panel or heat network connection.

A requirement for the subsidy is that you take 2 measures, or combine one measure with a heat pump, solar thermal panel or heat network connection.

The ISDE subsidy is a national regulation. It is possible combine the subsidy with other subsidies, such as from the municipality or province.

Furthermore, it is possible to combine the subsidy with an energy savings loan from the ''Nationaal Warmtefonds'' or via an additional loan through your mortgage.

How much subsidy for the specified measures

The amount of the subsidy depends on the insulation measure. To receive a subsidy, a minimum number of square meters has to be insulated. There is also a maximum to the subsidy. (Milieucentraal, 2021)

Measure	**Subsidy per m2 (in euros)**	**Minimum area (in m2)**	**Maximum subsidy reached at (in m2)**
Cavity wall insulation	€ 5	15 m2	170 m2
Roof insulation	€ 20	25 m2	200 m2
Attic floor insulation	€ 5	25 m2	130 m2
Insulation outside wall (side sheeting or outside)	€ 25	15 m2	170 m2
Floor insulation	€ 7	25 m2	130 m2
Ground floor insulation	€ 4	25 m2	130 m2
Insulating Glass	€ 35 (HR++) or € 100 (triple glass with insulating frame)	10 m2	45 m2
Frame panels	€15 or € 75 (depending on insulation value)		
Insulating door	€ 35 or € 100 (depending on insulation value)		

Germany

The general approach is, that all requirements are based on a theoretical reference building of identical geometry, usable building area and orientation like the building at hand. A newly build house or retrofit has to meet certain requirements in relation to this reference building.

Efficiency housing standards in new construction

Effizienzhaus	**40**	**55**	**70**	**85**	**100**	**Denkmal**
Q_P in % von $Q_{P\ REF}$	40	55	70	85	100	160
H'_T in % von $H'_{T\ REF}$	55	70	85	100	115	-
EE-Paket	EE-Paket	EE-Paket	EE-Paket	EE-Paket	EE-Paket	EE-Paket

Efficiency housing standards in renovation

Effizienzhaus	**40 Plus**	**40**	**55**
Q_P in % von $Q_{P\ REF}$	40	40	55
H'_T in % von $H'_{T\ REF}$	55	55	70
EE-Paket	EE-Paket	EE-Paket	EE-Paket
NH-Paket		NH-Paket	NH-Paket
Plus-Paket	Plus-Paket		-

Subsidies according to the BEG are then granted to those projects that show better performance than the outcomes of the reference building especially concerning the primary energy demand (Qp) and the transmission heat loss (HT'). For example ''Effizienzhaus 55'' only shows 55 % Qp of the reference building and only 70 % of HT'. Meeting this level, the owner can get 40 % of subsidies on the investment.

The BEG replaces the existing programs CO2 Building Rehabilitation Program (EBS programs), Market Incentive Program for Renewable Energies in the Heat Market (MAP), Energy Efficiency Incentive Program (APEE) and Heating Optimization Program (HZO). Applicants should be able to receive funding for all relevant aspects - energy efficiency, renewable energies, specialist planning and construction support - from one funding program for a refurbishment project on the basis of a single application with BEG. The BEG deliberately pursues a technology-open approach. In addition, from 2023, funding will be provided in each category either as a direct investment grant from the German Federal Office of Economics and Export Control (BAFA) or as a low-interest development loan with a repayment subsidy from the so called, Kreditanstalt für Wiederaufbau (KfW).

Energy renovation of residential buildings

An "Effizienzhaus EE" class is achieved when renewable energies provide a share of at least 55 percent of the energy required to supply the building with heating and cooling. However, achieving an "Effizienzhaus EE" class requires that the renewable energy-based heating or cooling generator is first installed as part of the

refurbishment and was not previously present in the building or involved in heat generation in the building. In addition, electricity-generating equipment based on renewable energies, such as photovoltaic systems, wind turbines, combined heat and power plants, and electricity storage for self-supply, are also eligible if no subsidy is claimed for these systems under the Renewable Energy Sources Act. Electricity generation plants for which a subsidy under the Renewable Energy Sources Act is to be claimed do not receive any subsidy under this guideline.

Recipient

Eligibility to apply goes for owners, lessees or tenants of the land, part of the land, building or part of the building on or in which the measure is to be implemented, as well as contractors. The eligibility of lessees, tenants or contractors additionally requires that they can prove that they have written permission from the owner of the respective plot of land, part of the plot of land, building or part of the building, or a corresponding contractual arrangement with the owner, to carry out the measure.

Type of funding, specific eligibility requirements and funding amount

Type of promotion

Funding is provided, at the applicant's option, as project funding on an expenditure basis in the form of share funding either through a non-repayable investment subsidy (grant) or in the form of a loan with an interest subsidy from federal funds as well as partial debt forgiveness from federal funds (repayment subsidy).

Eligible costs

Eligible costs are the gross costs (including VAT) actually borne by the applicant for the energy measure; if the applicant is entitled to deduct input tax for parts of the investment project, only the net costs (excluding VAT) can be taken into account.

Maximum limit of eligible costs

The costs specified eligible for funding by way of a loan or grant, are up to maximum amounts of 120,000 euros per residential unit, in the case of achieving an "Efficiency House EE" class, an "Efficiency House NH" class or an "Efficiency House 40 Plus" standard, the limit is 150,000 euros per residential unit. For single-family and two-family houses to up to 10,000 euros per commitment/grant notice and calendar year. For multi-family dwellings with three or more residential units, the limit for eligible costs is 4,000 euros per residential unit, up to a total of 40,000 euros per commitment/notification of grant and calendar year. In this context, the costs for specialist planning, construction support services and sustainability certification may each be assessed separately up to the stated maximum limits. If, after achieving an Efficiency House level, costs are incurred in for the refurbishment to a higher Efficiency House level, these are again eligible for funding in total up to the above-mentioned maximum limits.

Subsidy

The amount of the subsidy is calculated as a percentage of the total eligible costs incurred for the project. The percentage is determined by the efficiency house level achieved.

Credit amount

A credit may be granted up to a maximum of one hundred percent of the respective maximum limit of eligible costs.

Repayment subsidies

A repayment subsidy is granted if, after completion of the measures listed, proof of the efficiency house level achieved is provided in accordance with the commitment. The amount of the repayment subsidy is calculated as a percentage of the loan amount taken out. The respective percentage is determined by the efficiency house level achieved.

Prohibition of accumulation, combination with other funding programs

Simultaneous claiming of a subsidy under this guideline and a subsidy under the ErneuerbareEnergien-Gesetz (Renewable Energy Sources Act) (EEG) for the same eligible costs is not possible. Simultaneous claiming of support under the Kraft-Wärme-Kopplungsgesetz (Combined Heat and Power Act) (KWKG) is possible in accordance with the guidelines; in these cases, a declaration of the investment support already received will have to be submitted as part of an application for support under the KWKG. In this case, the subsidy granted according to these guidelines must be reduced in such a way that a subsidy quota of a maximum of 60 percent is achieved. Only one application may be submitted to either KfW or BAFA for the same measure; a double application is excluded. Similarly, accumulation with the tax incentive for energy-efficient building refurbishment is ruled out. Applicants must undertake not to apply for tax incentives for the same measure.

Procedure

Responsibility for implementing the loan and grant variant in the BEG WG subprogram will initially lie exclusively with KfW from the start of the program on July 1, 2021, up to and including December 31, 2022. With effect from January 1, 2023, responsibility for implementing the grant variant will be transferred to BAFA.

BAFA and KfW provide detailed information on the funding program and on their funding practices on their websites at www.bafa.de and www.kfw.de as well as in suitable other formats, regularly using the name "Bundeförderung für effiziente Gebäude" (Federal Funding for Efficient Buildings) or BEG funding program.

Grant funding

Applications will be submitted by the grantee or an authorized representative in accordance with the respective application procedures of the implementing agencies. Applicants submit the application including necessary attachments directly to KfW.

Involvement of an energy efficiency expert

An energy efficiency expert must be involved in the application for funding and monitoring of the project. After completion of the project, the energy efficiency expert quantifies and confirms compliance with the minimum technical requirements listed in the appendix and the savings in primary and final energy and CO2. He also confirms the eligible costs incurred for the measures. The energy efficiency expert is to be commissioned independently for the building project on a project-related basis.

Credit support

The loan must be drawn down within 12 months of loan approval (drawdown period). This period is extended by up to 24 months for loan amounts not yet disbursed without a separate application. The call period may be extended by a further 12 months if the call could not be made by the applicant within the original period for reasons beyond the applicant's control. The maximum callup period and approval period is thus 48 months

Annex: subsidy levels Germany

According to paragraph 8.3 from the Bundesministerium für Wirtschaft und Energie rapport the maximum funding amount is put on 120.000, - or 150.000 euro per housing unit for the renovation of existing buildings depending on the achieved energy efficiency value.

The costs for ancillary services (including: specialized planning and construction support services) are supported up to EUR 10,000 for single and two-family houses (per year) and for multi-family homes with three or more residential units this is EUR 4,000 per housing unit and a maximum of EUR 40,000 per year.

In renovation, the following home efficiency levels are required to qualify for a given persentage of subsidy:

- Effizienzhaus Denkmal: 25 %
- Effizienzhaus 100: 27,5 %
- Effizienzhaus 85: 30 %
- Effizienzhaus 70: 35 %
- Effizienzhaus 55: 40 %
- Effizienzhaus 40: 45 %

Effizienzhaus	**40**	**55**	**70**	**85**	**100**	**Denkmal**
QP in % von QP REF	40	55	70	85	100	160
H'T in % von H'T REF	55	70	85	100	115	-
EE-Paket	EE-Paket	EE-Paket	EE-Paket	EE-Paket	EE-Paket	EE-Paket

When the "Efficiency House EE" class is reached, the Funding Percentage increases by another five percentage points.

These subsidies can be applied form July 21, 2021 and onwards. For more indept information see the Richtlinie für die Bundesförderung für effiziente Gebäude report form Bundesministerium für Wirtschaft und Energie. (Bundesministerium für Wirtschaft und Energie, 2020)


Interreg
North Sea Region
INDU-ZERO
European Regional Development Fund
EUROPEAN UNION