D1.2 Techno-economic mapping of SOTA technology options

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D.1.2

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Version	Date	Modified contents	Implemented by
1.0	29.03.2017	Deliverable finalised	Chalmers
2.0	28.05.2017	Deliverable corrected in line with PO comments in BXL	Chalmers
3.0	01.07.2018	SOTA tables for German-speaking markets generated. Please note that a detailed comparison between specific technologies (requested by EC after period 1 review) was not the purpose of this	Chalmers

DOCUMENT HISTORY

Version	Date	Modified contents	Implemented by
		deliverable. The deliverable constitutes a techno-economic mapping (an overview of technologies across a selection of EU markets in terms of technical specifications and costs). Such SOTA tables are needed to perform optimised renovation designs according to DREEAM approach where technological and cost impact of a given renovation design can be taken into consideration at the same time (early stage of renovation design development).	
4.0	13.09.2018	SOTA tables of Techno economic mapping application for German completed for elements	Chalmers

Executive summary

Following on the Deliverable D.1.1, this report describes the techno economic mapping of the SOTA technologies analysed for the purpose of the DREEAM approach. The mapping was done through the completion of SOTA database structure (as presented in D1.1) with technologies from different climatic/regional conditions and the following comparison thereof. The analysis indicates not only examples, but also interesting observations generated in the mapping process regarding both the technology usage as well as the different approaches to the data presentation in different regional contexts.

The SOTA data gathered was used in the renovation concept development process for DREEAM pilots, where the connection between technical aspects (e.g. technology performance) and economic aspects (the tentative costs of a given renovation design) is of key importance.

In the latest deliverable version (3.0), the SOTA databases for the German-speaking markets were generated.

Table of contents

1 Introduction

The aim of this report is to show the **techno-economic mapping** of the SOTA technology options taking the SOTA library that was developed in the first phase and shown in D1.1 as a basis. This was done through an in-depth analysis of both the renovation options and the SOTA technologies for different markets in Europe, namely (Sweden, Spain, France and Germany) with also an initial approach to the markets related to the project (United Kingdom and Italy).

The main improvement in this step of the DREEAM project is the adaptation on each of the previously mentioned countries, considering their particularities as well as an analysis of the main differences in data availability and the data format itself.

2 SOTA database extension to specific markets

Before going into detail on the particular technology differences, a brief summary of relevant information regarding the development state of databases for different countries is shown, pointing at the main differences that can be found across all technologies which define the markets.

It is relevant to mention that the data sources are not aligned. The data for each database comes from different sources which implies that some technologies are presented in non-comparable ways. Cost calculations are still possible, though. Also, it is important to bear in mind that the databases will be continuously developed and the fine-tuning of details will have to happen in a particular use cases with housing company (tend to use their own databases).

2.1 Sweden

- The total cost of the technologies is up to 40 % higher (varying depending on the technology) than the values obtained from Spain, France and Germany.
- The cost difference has largely to do with a direct and indirect overhead included in the available Swedish cost structures, and not applied in the Spanish, French and German solution catalogues.
- No data regarding cooling, as there is normally no need for cooling in the Swedish context
- No information provided regarding maintenance costs.

2.2 Spain

- Lowest labour costs for most technology types.
- Higher additional costs than in France for most technology type.

2.3 France

- The lowest additional costs of all four databases.
- Broadest variety of all technologies.
- Information on technologies in specific sections, such as PV or Batteries, not provided.

2.4 Germany

- Higher labour costs than Sweden, Spain and France.
- High variety of opaque components
- No data regarding cooling, PV and batteries

2.5 United Kingdom

The solution catalogues available in the UK are not really useful for the larger European context. This has largely to do with a completely different approach to building measurement than in Europe – units/rooms instead of square meters. Another difficulty are multiple regional differences in the UK, which increases the complexity of data analysis. The lack of a UK-overarching standardised approach to data description is the main barrier to incorporating the specifics of the UK context in the DREEAM SOTA database.

2.6 Italy

The solution catalogues available for Italy are, similarly as in the UK context, characterised by strong regional differences and a complex price structure. This has so far constituted the main barrier for the adoption of the specific Italian context in the DREEAM database.

3 Comparison at technology level

The different sections in the database were studied and compared in order to establish trends regarding their costs and availability in regional markets. The comparisons are applied through mutual technologies of the four markets using a common monetary unit (Euros). The exchange rate used was 0,1022 SEK/ EUR corresponding to the 29 of November 2016.

3.1 Opaque Components

	France	Spain	Sweden	Germany
Ventilated Façade	V	V	V	X
External Insulation	V	V	V	V

Air Cavity Filling	V	V	X	X
Internal Insulation (wall)	V	V	V	V
Perimeter insulation (exterior)	V	V	V	V
Perimeter insulation (interior)	V	V	V	X
Basement insulation (interior)	V	V	V	V
Ceiling Blown Loose Fill insulation	X	X	V	V
Ceiling Insulation (interior)	V	V	V	V
Ceiling Insulation (exterior)	V	V	X	X
Flat Roof Insulation (interior)	V	V	V	X
Flat Roof insulation (exterior)	V	V	V	V
Roof Blown Loose Fill Insulation	X	X	V	X
Tilted Roof Insulation (core)	V	V	V	X
Tilted Roof Insulation (interior)	V	V	V	X
Tilted Roof Insulation (exterior)	V	V	V	V
Green Roof	X	X	V	V

The opaque components technologies are organized in the following way:

- Outer walls against air
- Outer walls against earth
- Floor against earth
- Floor against unheated

- Ceiling against unheated
- Flat Roof
- Tilted Roof
- Green Roof

3.1.1 Outer Walls Against Air

The main difference regarding the ventilated façade systems can be found in the thickness of insulation in the different countries. Germany and Sweden reach high insulation thicknesses of up to 300 mm which is trible the size of insulation found in Spain and France (100 mm).

It is also noticeable that the thickness of insulation of internal systems go up higher in Germany and Sweden. For example, in the Swedish market it goes up to 195 mm. In comparison, Spain and France have a thickness of only 120 mm.

Furthermore the Spanish and French databases include technologies for cavity fillings which are not present in the Swedish or German database. This might be due to a common usage of double walls with air gap systems, especially in the Spanish market.

Looking at the costs of the systems it is clear that the labour costs are highest in Germany, between 50 and 110 €/m^2. In France and Sweden they are similar, ranging between 20 and 50 €/m^2 per hour, while in Spain they lie in between 5 and 30 €/m^2 per hour.

Another considerable element is the high impact of additional costs on the final costs of the constructive technologies used in the Swedish markets. While accounting for 1-5% in the Spanish and French market, it is 50% of the final cost in Sweden. This also leads to a higher total cost of all the elements in the Swedish database in comparison to the other databases.

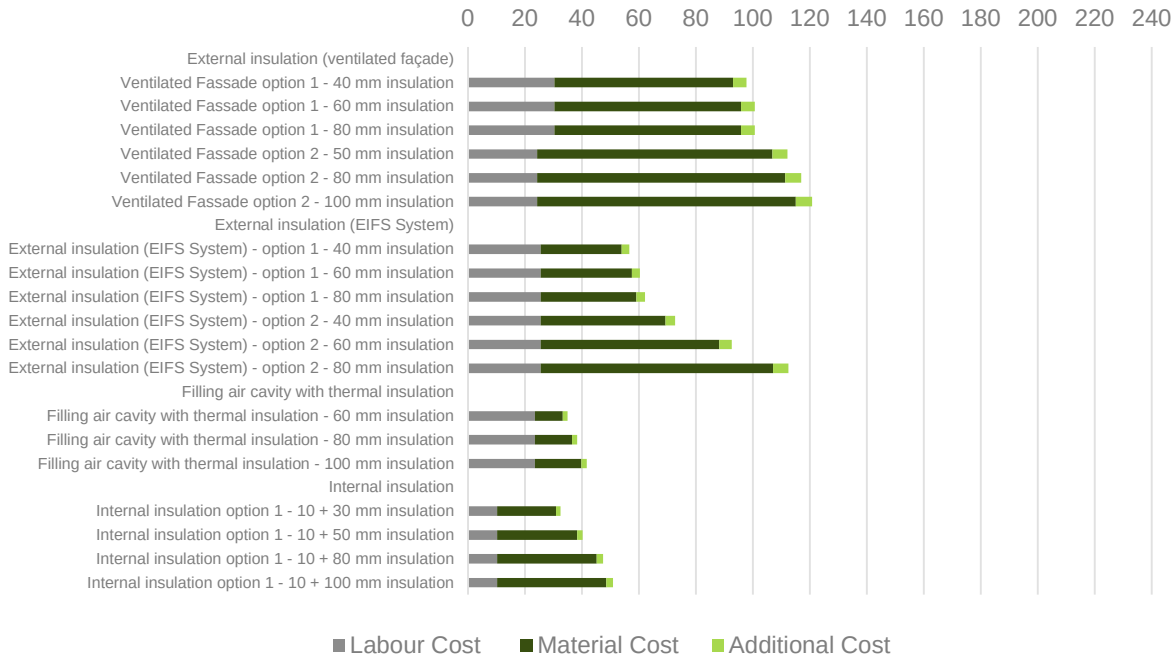

Figure 1 - Component Cost Spain – Outer Walls Against Air (Opaque Components)

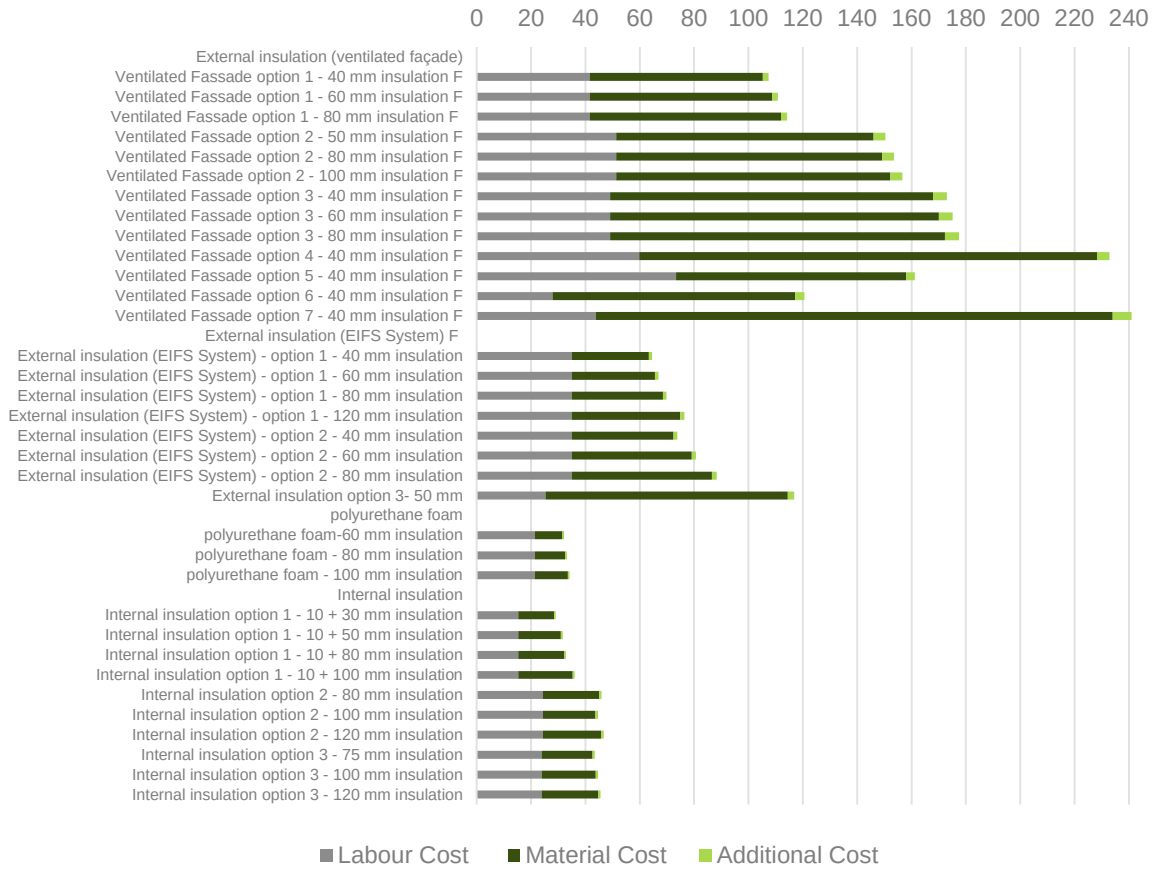

Figure 2- Component Cost France – Outer Walls Against Air (Opaque Components)

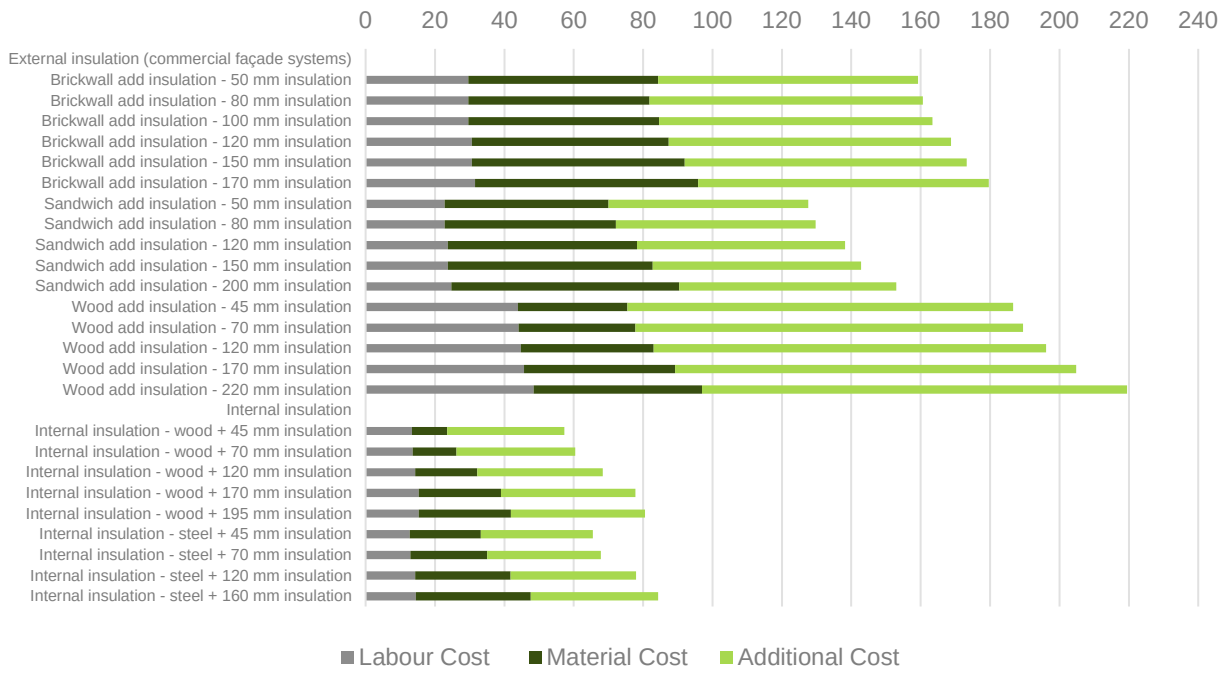

Figure 3 - Component Cost Sweden – Outer Walls Against Air (Opaque Components)

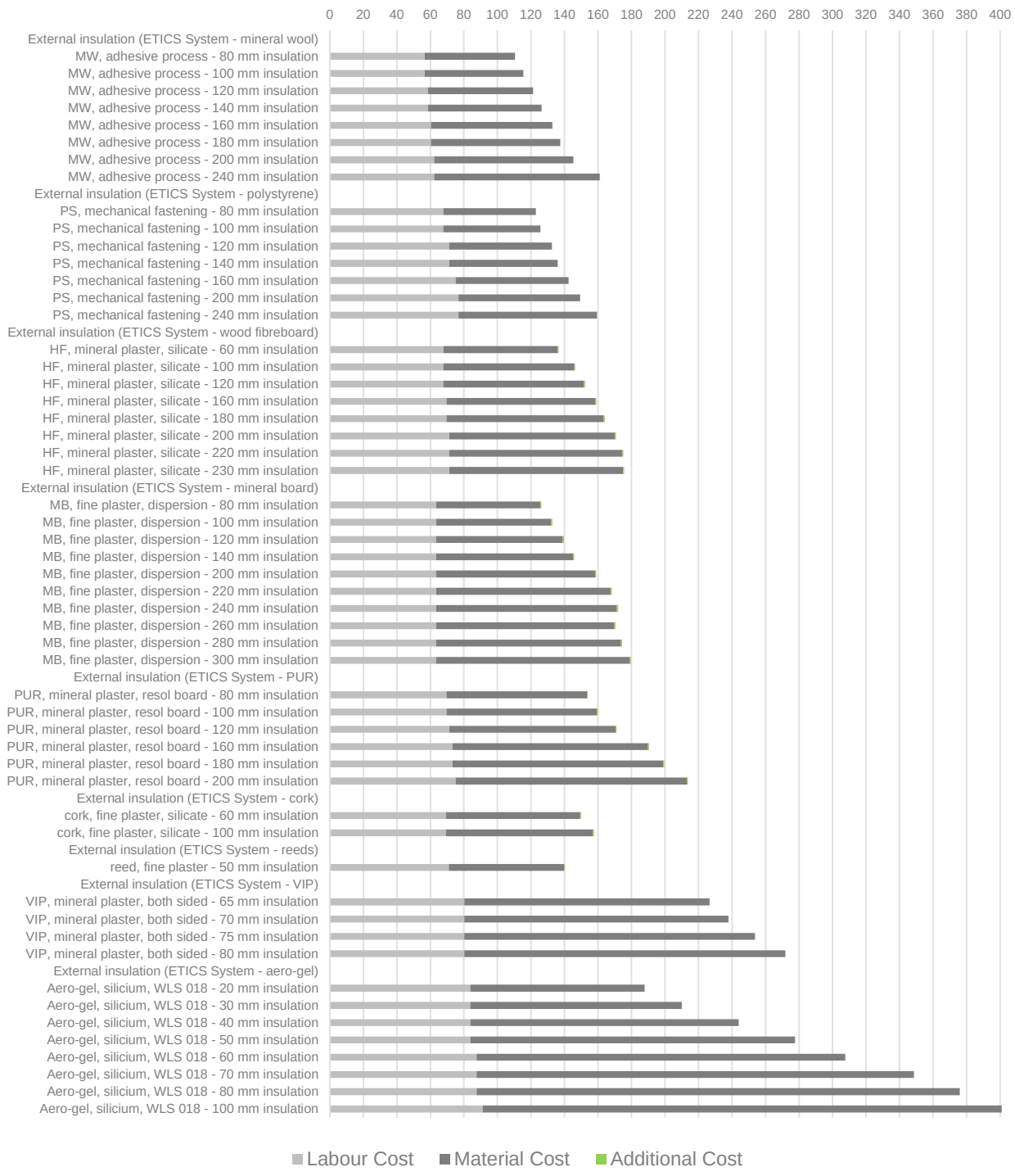

Figure 4 - Component Cost Germany – Outer Walls Against Air (Opaque Components)

3.1.2 Outer Walls Against Earth

Same as the outer walls against air, the insulation thickness is higher in Sweden and Germany than in Spain and France due to the climate conditions. The values go up to 300 mm (in the southern countries 100 mm is used).

Regarding the insulation, the total element costs for Spain and France are similar with higher material costs in Spain and higher labour costs in France.

In the Swedish database the costs are higher mostly due to material and especially additional costs. In Spain and France the additional costs have almost no impact on the total costs.

In Germany the costs go up really high due to the higher thickness of the insulation. There is no information about the additional costs.

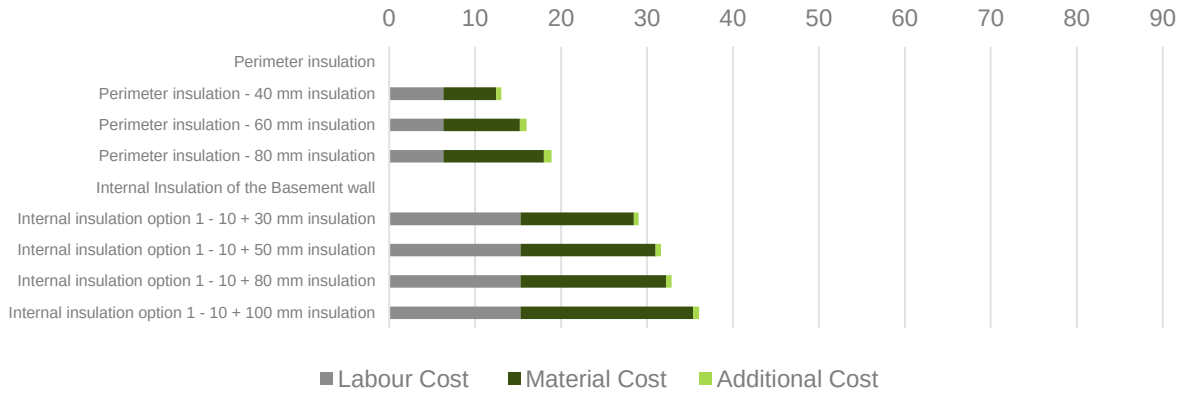

Figure 5 - Component Cost France – Outer Walls Against Earth (Opaque Components)

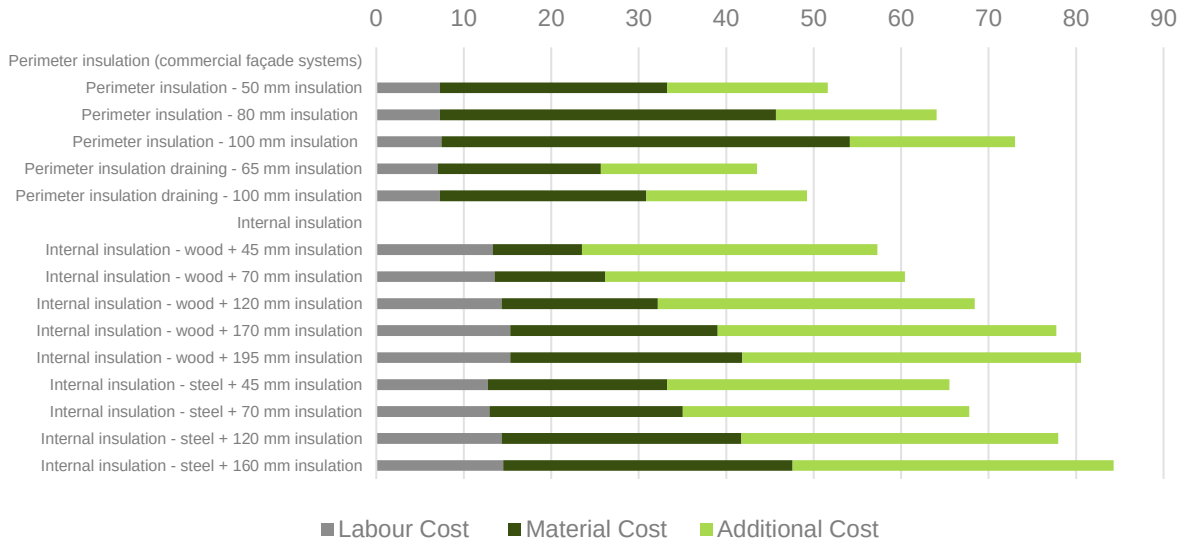

Figure 6 - Component Cost Sweden – Outer Walls Against Earth (Opaque Components)

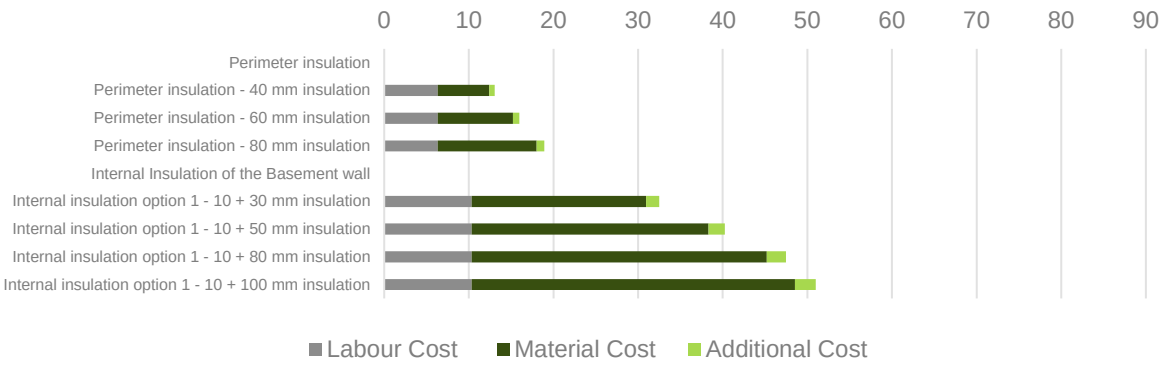

Figure 7 - Component Cost Spain – Outer Walls Against Earth (Opaque Components)

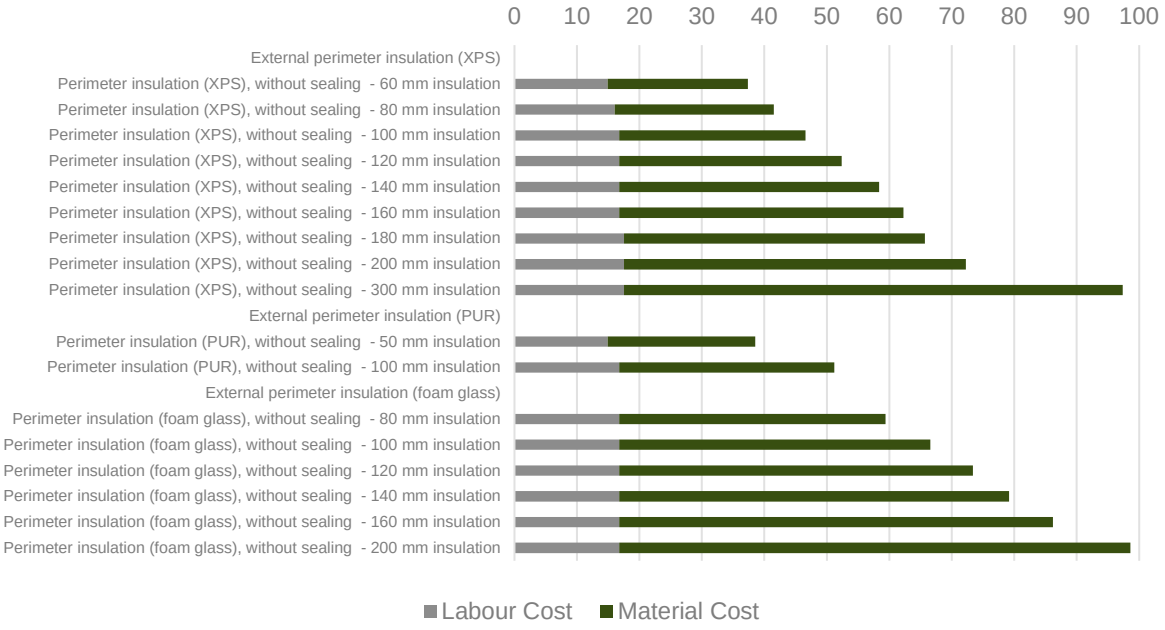

Figure 8 - Component Cost Germany – Outer Walls Against Earth (Opaque Components)

3.1.3 Basement (Floor Against Earth)

When it comes to basement insulation the Swedish and German market offer a wider variety of technologies with higher insulation thicknesses than Spain and France.

Labour costs are similar in the Spanish, French and Swedish market. They are approximately 20 €/ $m^{2,}$ with slightly higher material costs and especially additional costs in Sweden. In Germany they reach up to around 100 €/m^2.

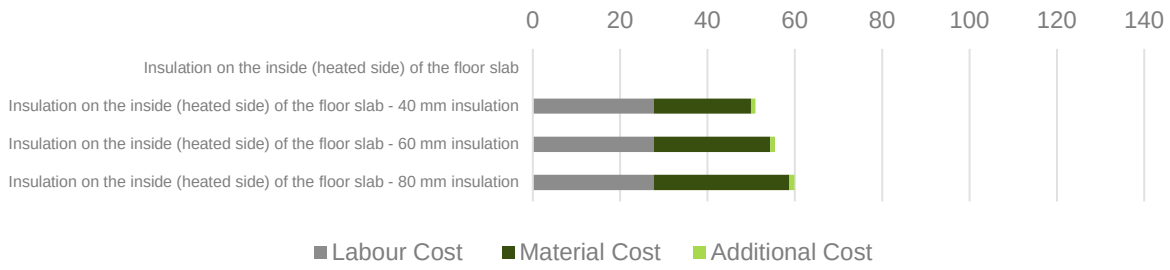

Figure 9 - Component Cost France – Basement (Opaque Components)

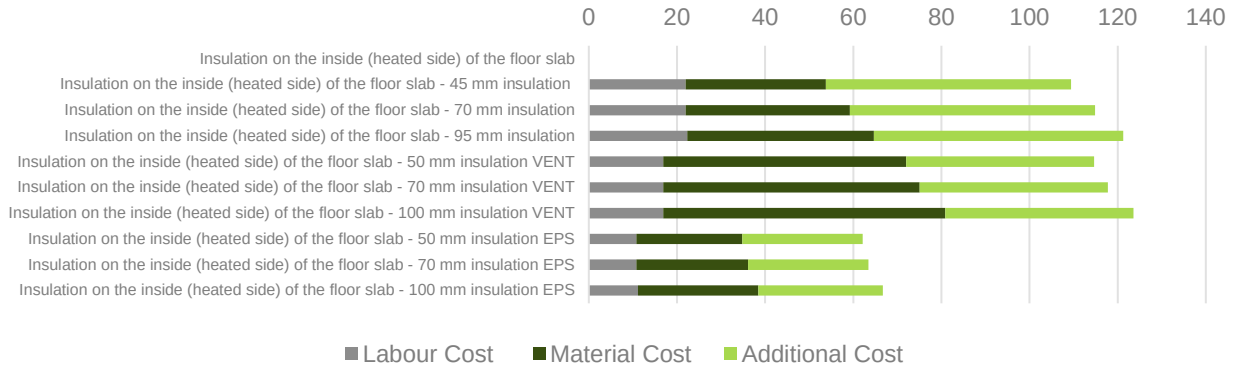

Figure 10 - Component Cost Sweden – Basement (Opaque Components)

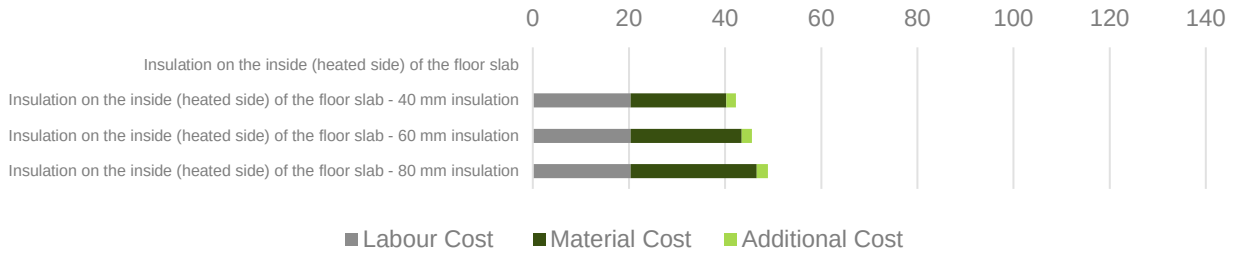

Figure 11 - Component Cost Spain – Basement (Opaque Components)

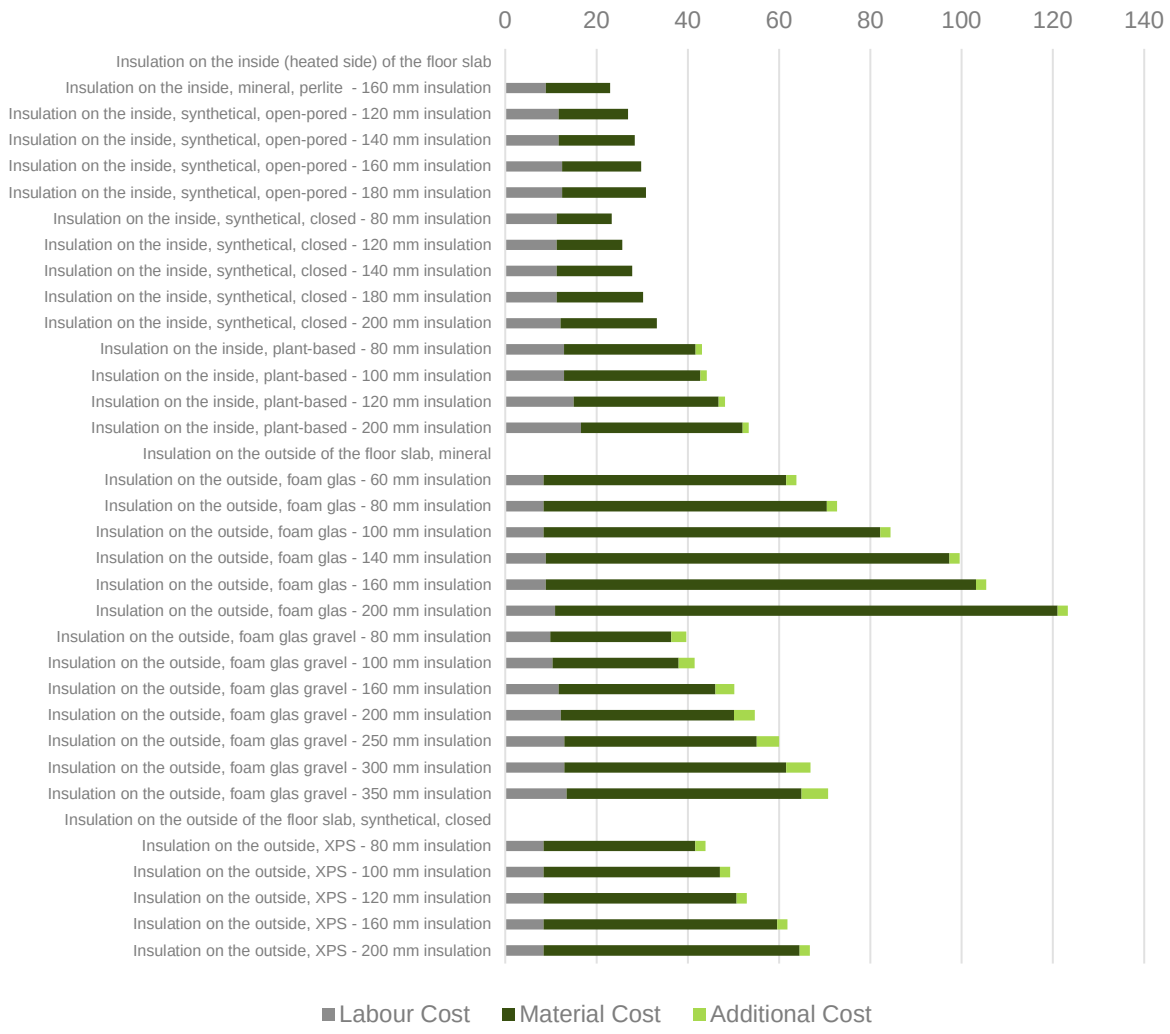

Figure 12 - Component Cost Germany – Basement (Opaque Components)

3.1.4 Floor Against Unheated

The technologies used for floor insulation against unheated surfaces are similar in the three markets. The main difference is again the insulation thickness used in Sweden, which goes up to 300 mm. In France and Spain it is only 100 mm, which is a direct consequence of the climate differences within the three countries.

In this case the total costs for Sweden are lower than for the other markets comparing same thicknesses, but increase exponentially with higher thicknesses.

By looking at material and labour costs, both are higher in France than in Spain (around 5 €/m^2 each). Furthermore the additional costs are lower compared to Sweden.

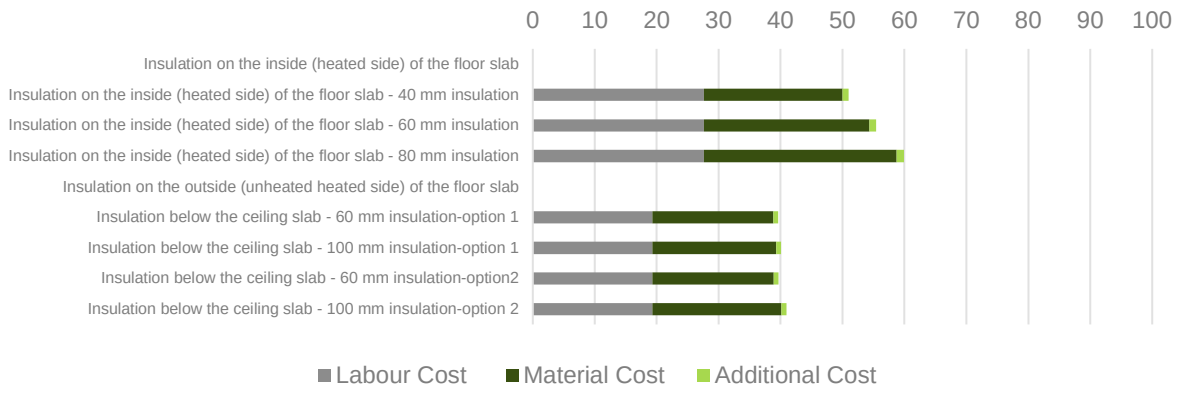

Figure 13 - Component Cost France – Floor Against Unheated (Opaque Components)

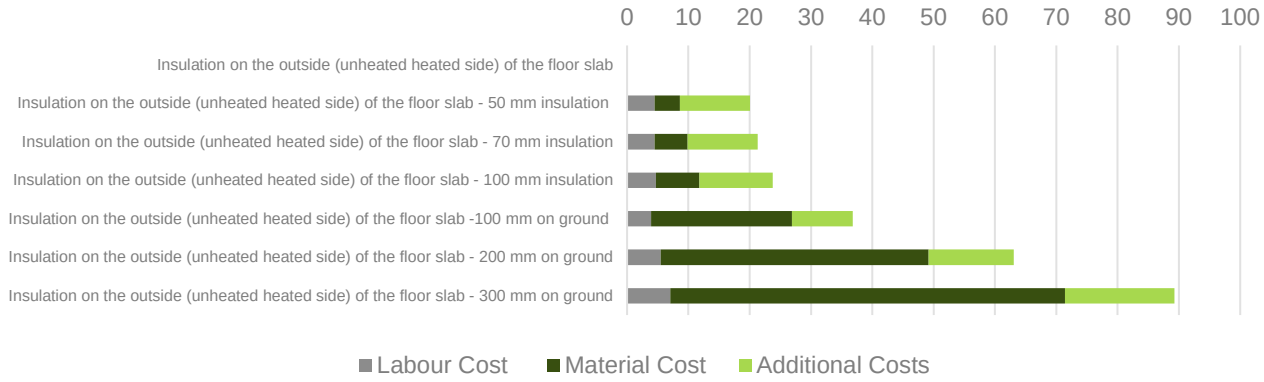

Figure 14 - Component Cost Sweden – Floor Against Unheated (Opaque Components)

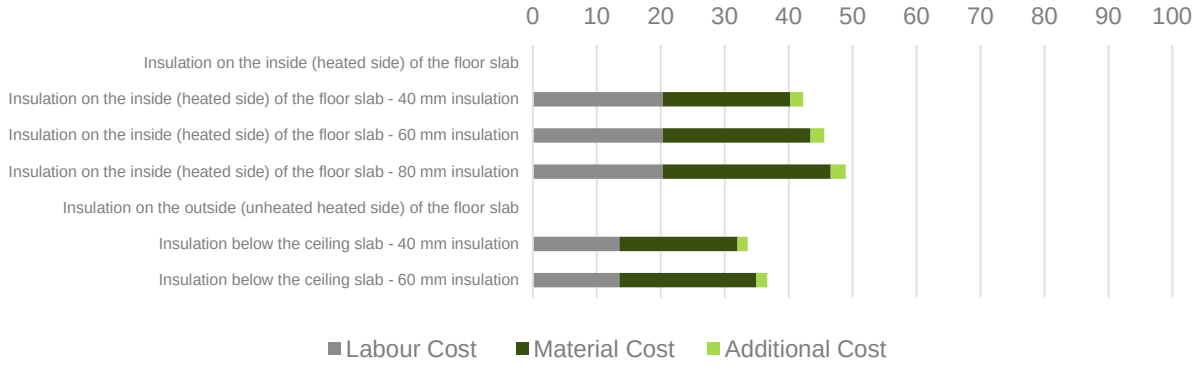

Figure 15 - Component Cost Spain – Floor Against Unheated (Opaque Components)

3.1.5 Ceiling Against Unheated

In Sweden it is common to subcontract the adding of insulation for ceilings against unheated areas. This leads to different prices since the total costs of the technology is reduced to the cost of the subcontracting itself. For the other technologies additional costs account for 50% of the total costs while labour and material costs are lower than in France and Spain.

The technologies presented in the French market have higher insulation thicknesses than the ones in Spain and 20% more expenses due to both material and labour costs.

In Sweden and Germany the insulation thickness is again a lot higher than in Spain and France. But this time the costs are all similar between the countries.

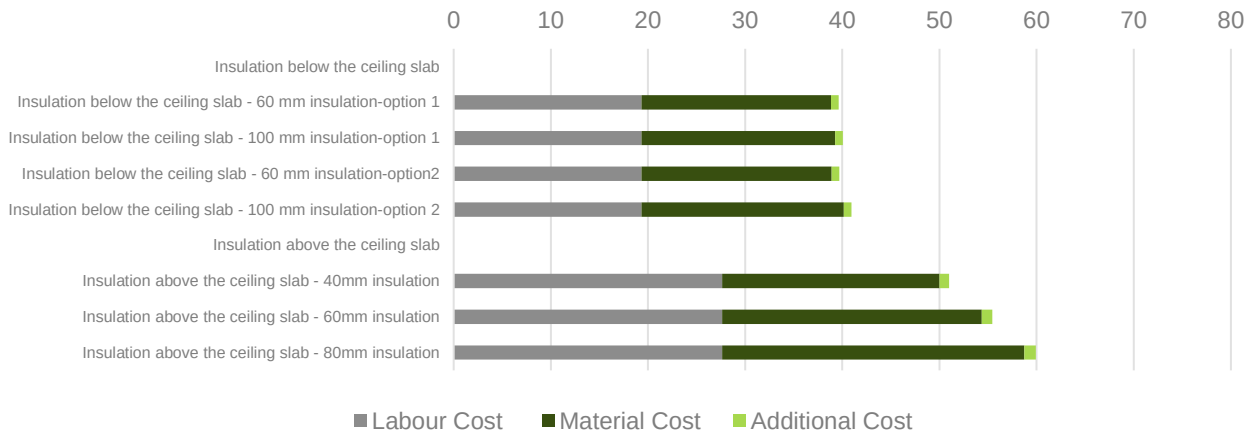

Figure 16 - Component Cost France – Ceiling Against Unheated (Opaque Components)

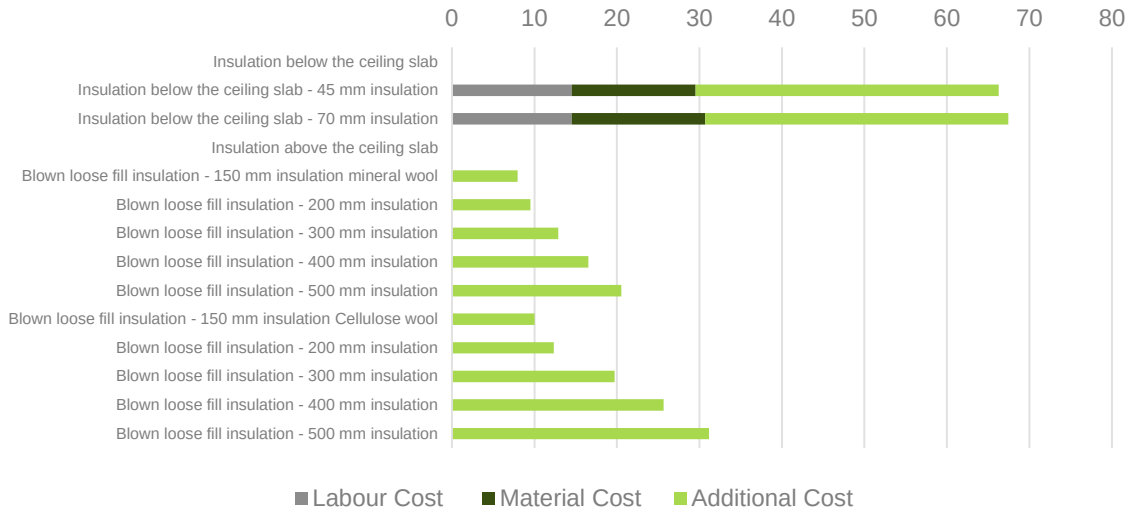

Figure 17 - Component Cost Sweden – Ceiling Against Unheated (Opaque Components)

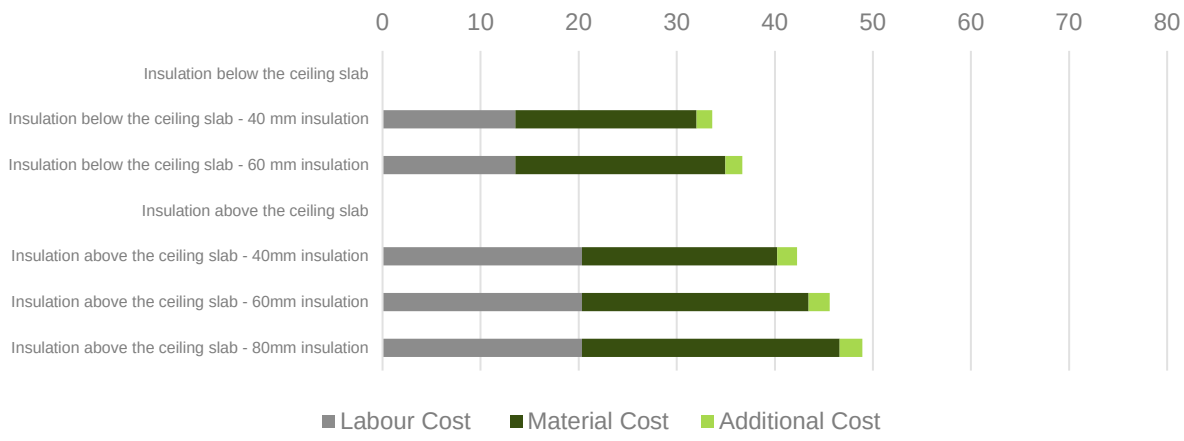

Figure 18 - Component Cost Spain – Ceiling Against Unheated (Opaque Components)

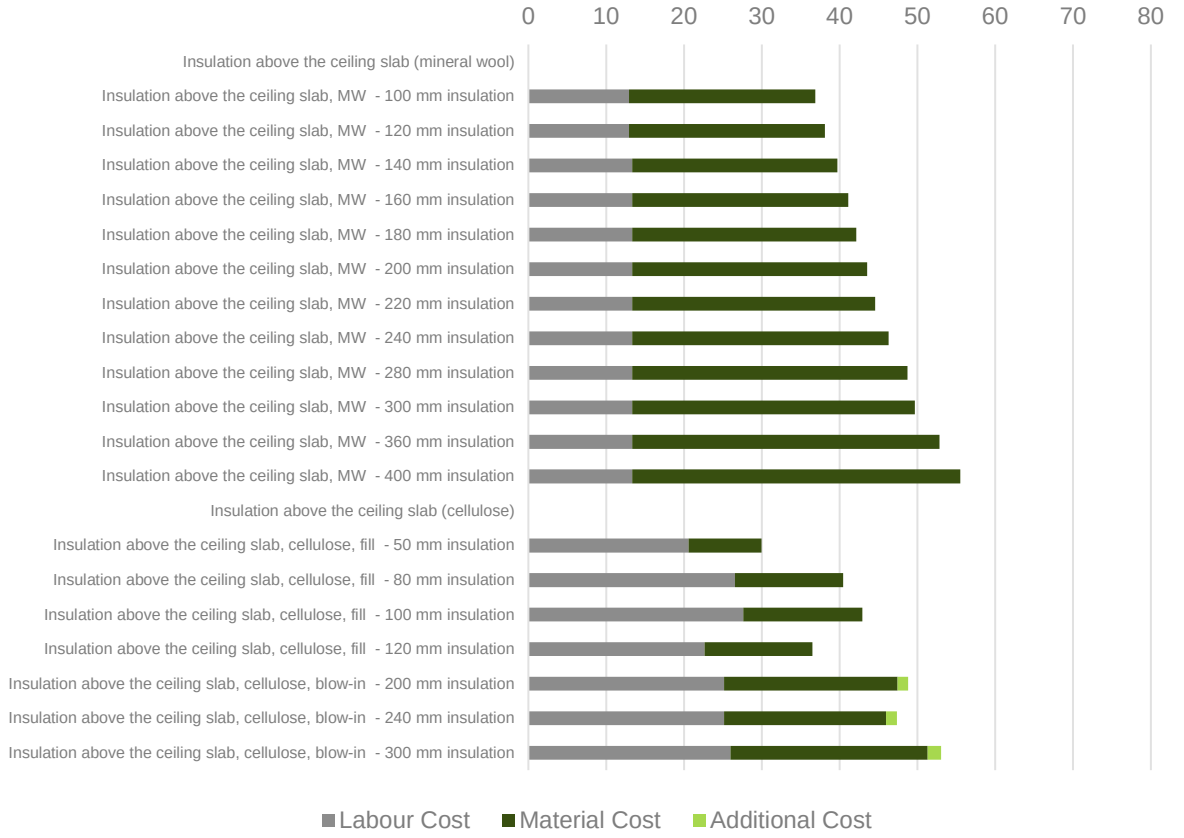

Figure 19 - Component Cost Germany – Ceiling Against Unheated (Opaque Components)

3.1.6 Flat Roof

The technologies used for flat roof insulations have very high values in Germany. In France and Spain they are only ca. ¼ of the prices in Germany. They go up to 300 mm, which is a lot compared to Spain and France where they only have a thickness of 80 mm.

Additional costs are extremely high for the Swedish technologies accounting for up to 75% of the total cost while having material costs in the same range as Spain and France. In Germany the costs mainly consist of the labour and material costs.

Yet again, costs in France are slightly higher compared to Spain due to higher material and labour costs.

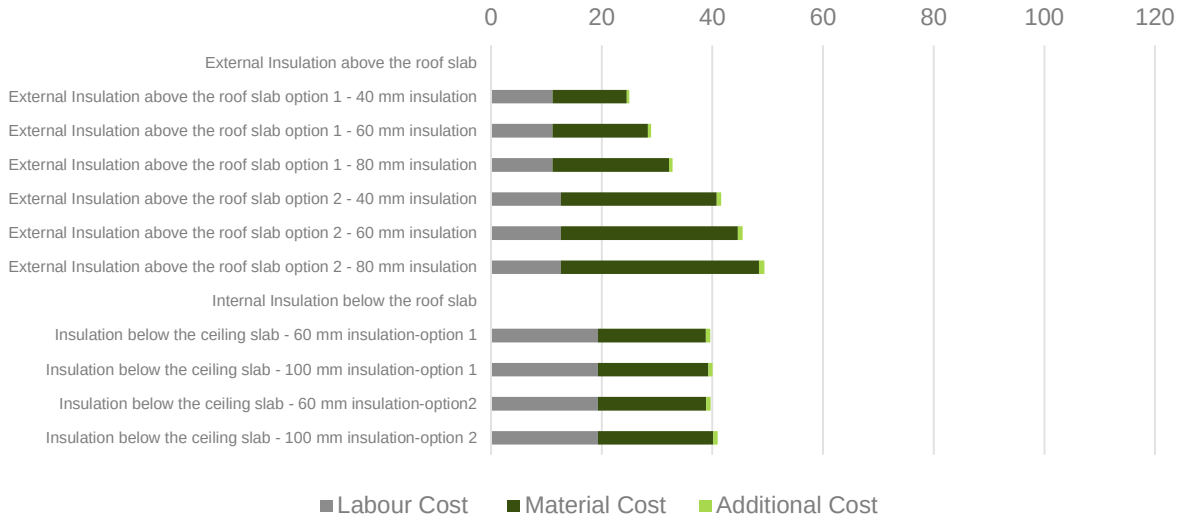

Figure 20 - Component Cost France – Flat Roof (Opaque Components)

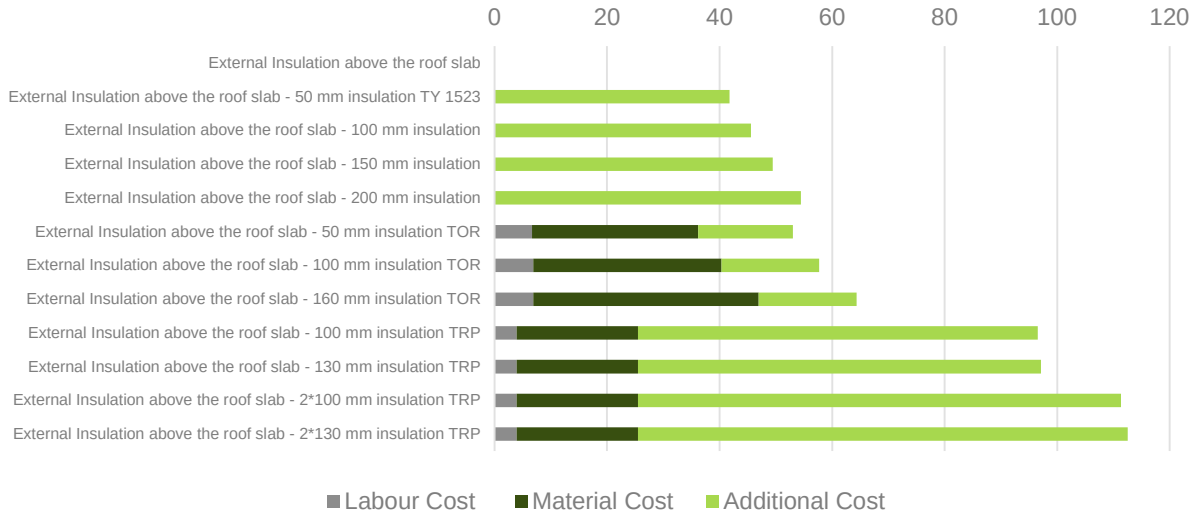

Figure 21 - Component Cost Sweden – Flat Roof (Opaque Components)

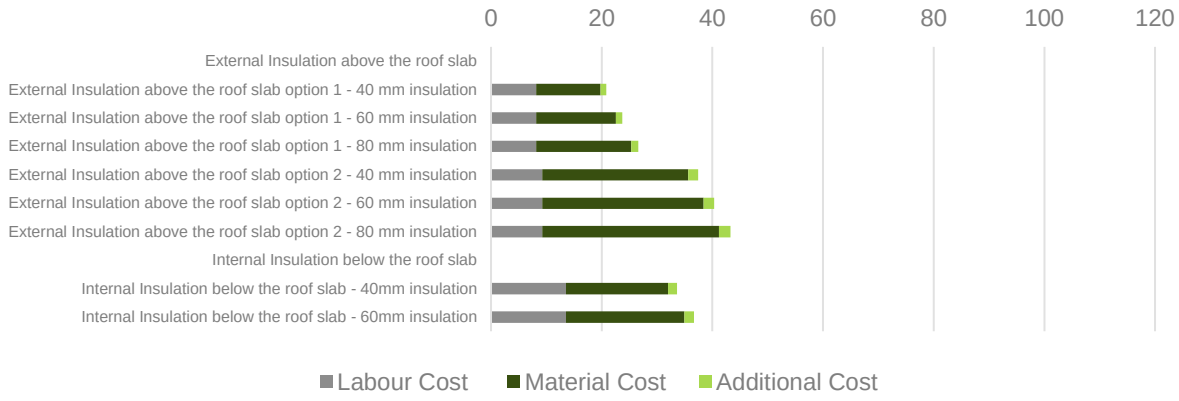

Figure 22 - Component Cost Spain – Flat Roof (Opaque Components)

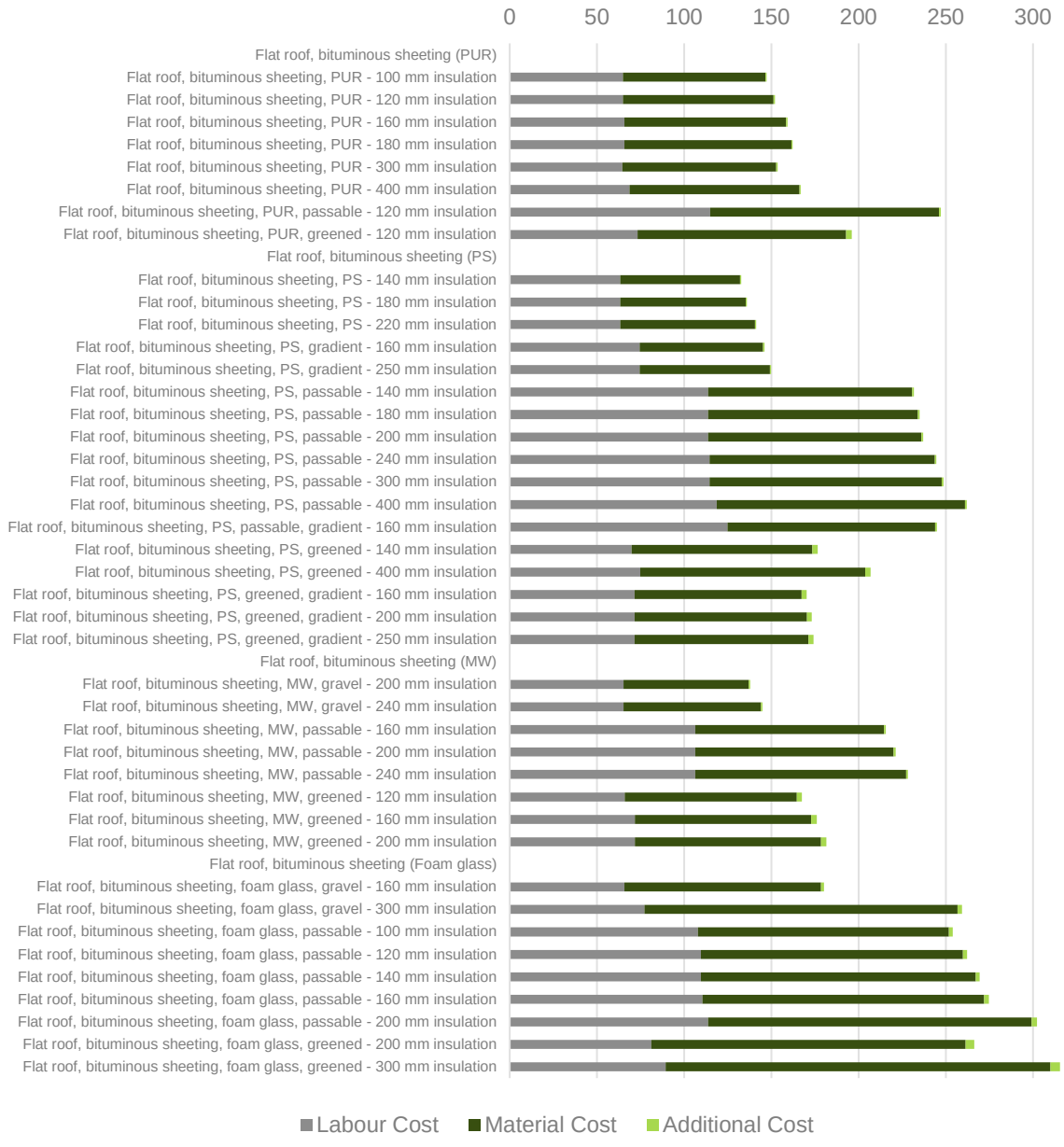

Figure 23 - Component Cost Germany – Flat Roof (Opaque Components)

3.1.7 Tilted Roof

The technologies of the four markets are similar with higher insulation thickness used in the German and Swedish market technologies.

Regarding the insulation applied on tilted roofs the costs are almost the same for Spain and France. In Sweden the costs are again higher because of the additional costs, even though the labour and material costs are lower than in the other two countries. In Germany the costs are lower than in Sweden but higher than the others. However the additional costs are missing here.

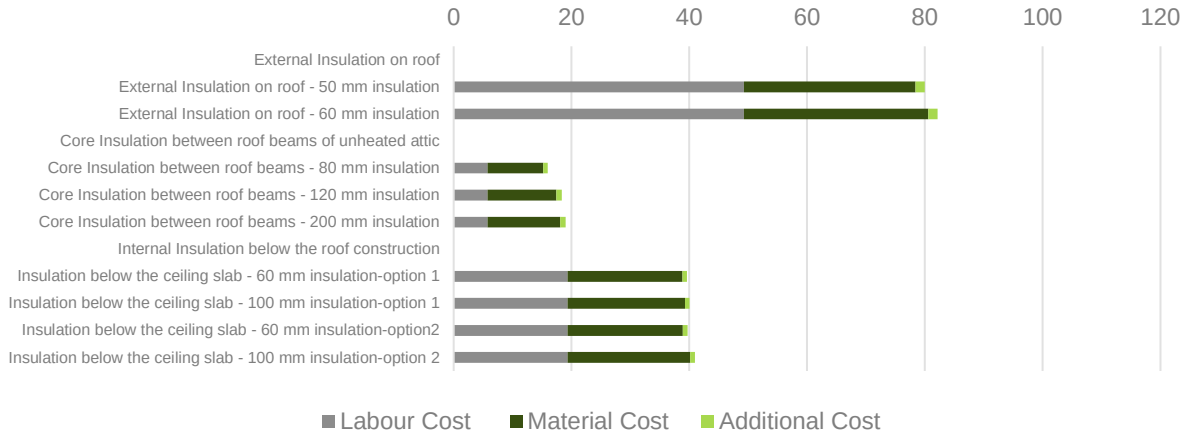

Figure 24 - Component Cost France – Tilted Roof (Opaque Components)

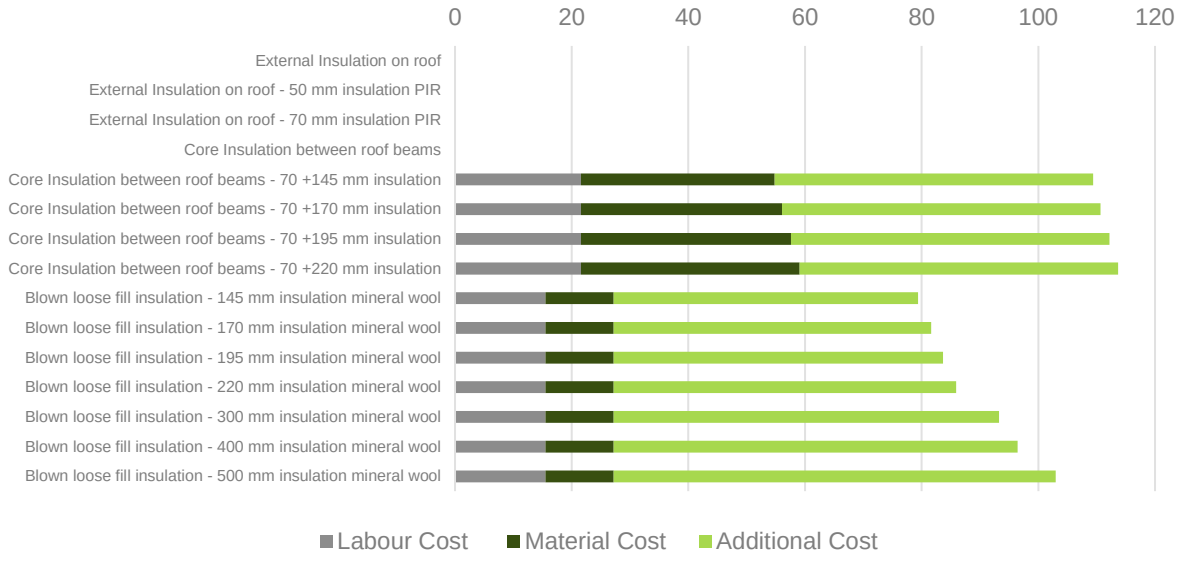

Figure 25 - Component Cost Sweden – Tilted Roof (Opaque Components)

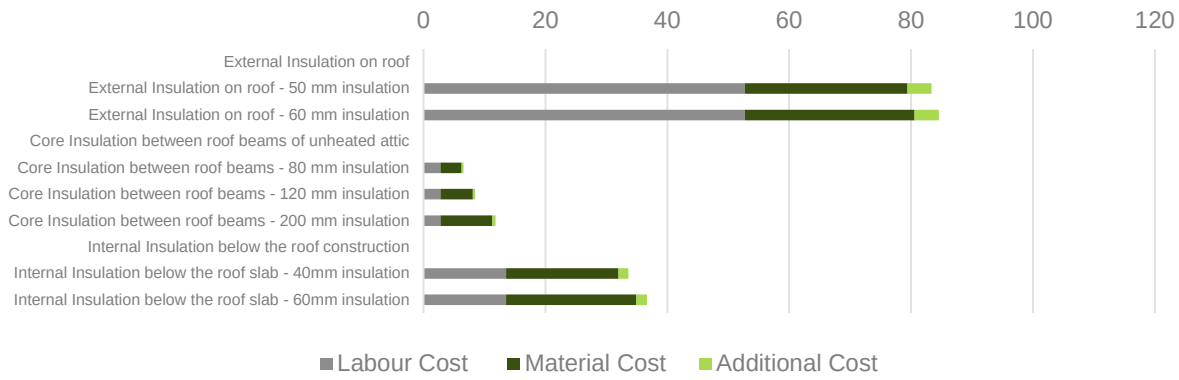

Figure 26 - Component Cost Spain – Tilted Roof (Opaque Components)

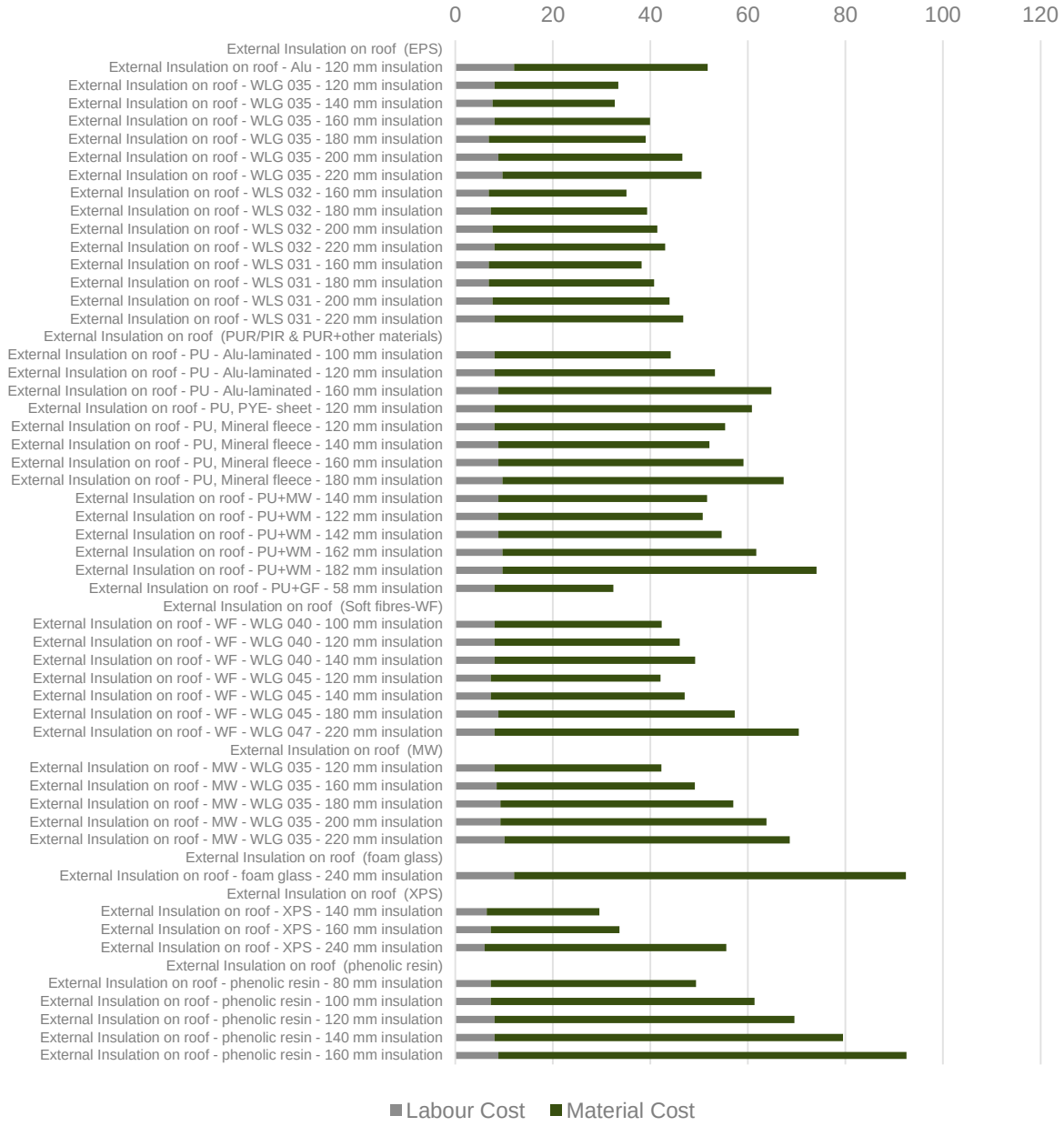

Figure 27 - Component Cost Spain – Tilted Roof (Opaque Components)

3.2 Windows

	France	Spain	Sweden	Germany
Double Glass w/ air cavity	V	V	V	V
Double Glass w/ air cavity integrated blinds	X	X	V	X
Double Glass w/ air cavity and low e-coating	V	V	X	V
Double Glass w/ argon cavity and low e-coating	V	V	X	V
Wooden window frame	V	V	V	V
Aluminium window frame	V	V	V	V
PVC window frame	V	V	V	V
Rotary Manual window in tilted roof	V	X	V	V
Rotary Electric window in tilted roof	V	X	X	V
Rotary Electric window w/ solar in tilted roof	V	X	X	V
Projection Manual window in tilted rood	V	X	X	V
Fixed window in flat roof	V	V	V	V
Manual window in flat roof	V	V	X	V
Electric window in flat roof	V	X	X	V

Comparing the window technologies present in the four countries it can be noticed that the labour costs differ substantially. In France windows with aluminium frames have the highest labour costs, while in Spain labour costs are the lowest independently of the frame type.

There is a relevant impact of additional cost in the Swedish market that increases the total costs of its technologies. This combined with high material costs results in total costs which are double as high as in Spain.

There is a lack of information in the databases regarding triple glazing which are already used in the four markets, particularly in Sweden. Furthermore the next iteration should also consider adding data regarding low e-coating for the Swedish market.

3.2.1 Windows in Wall

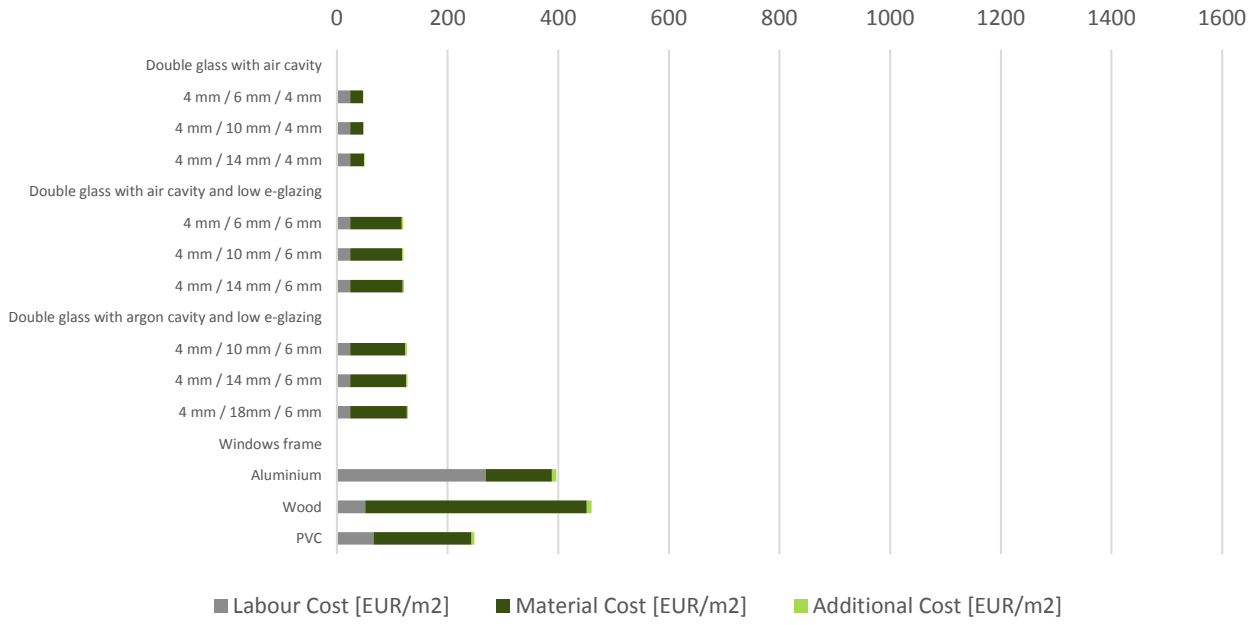

Figure 28 - Component Cost France – Windows in wall (windows)

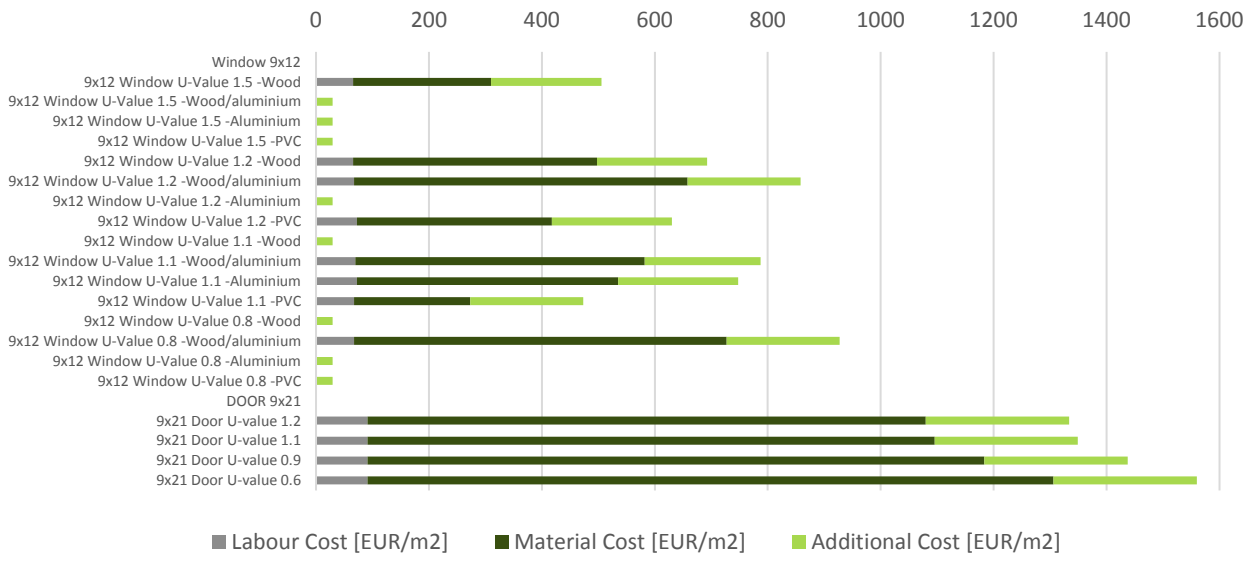

Figure 29 - Component Cost Sweden – Windows in wall (windows)

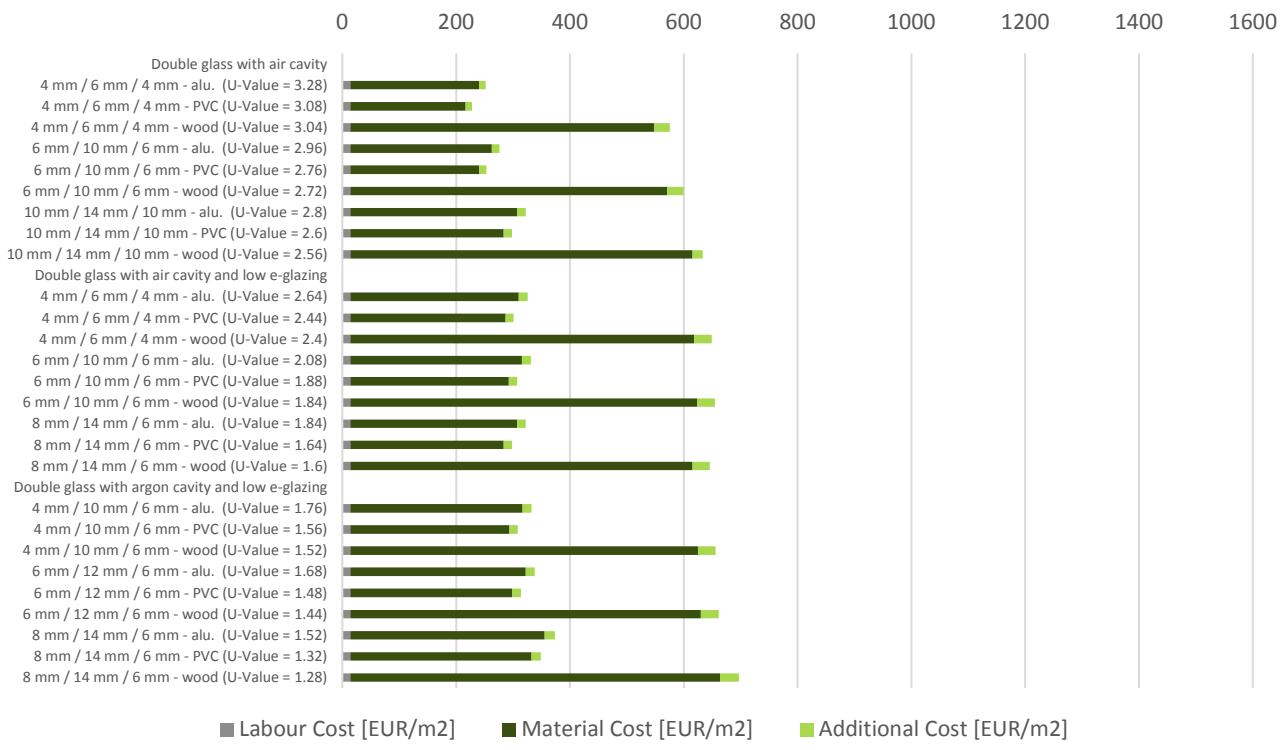

Figure 30 - Component Cost Spain – Windows in wall (windows)

3.2.2 Windows in Tilted Roof

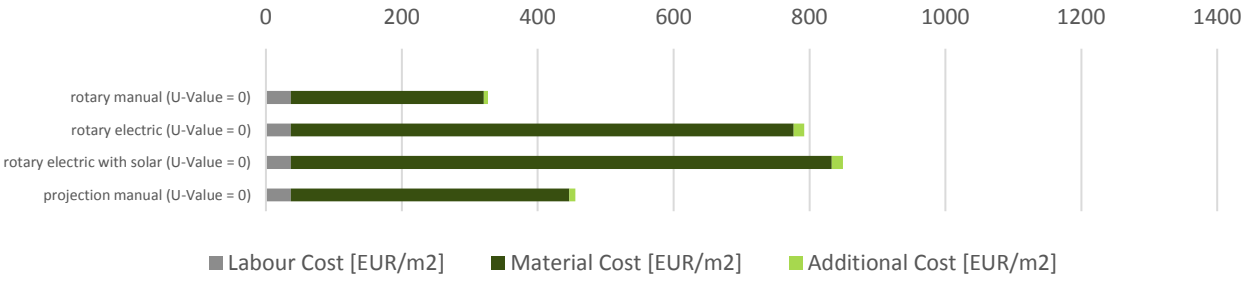

Figure 31 - Component Cost France – Windows in tilted roof (windows)

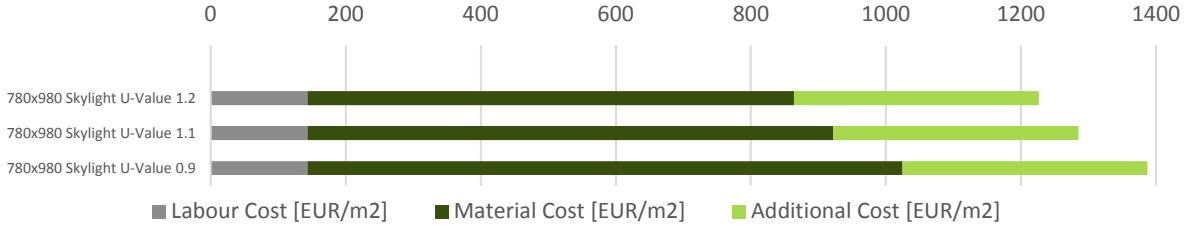

Figure 32 - Component Cost Sweden– Windows in tilted roof (windows)

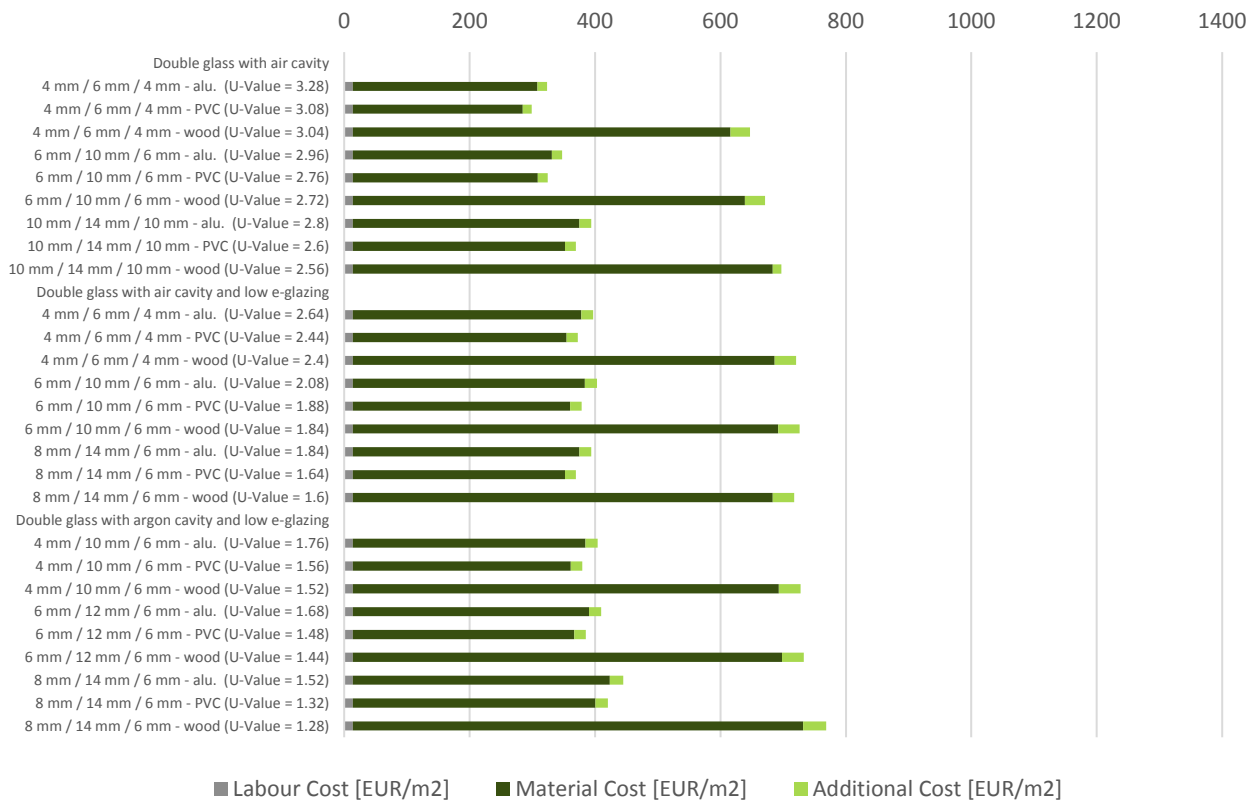

Figure 33 - Component Cost Spain– Windows in tilted roof (windows)

3.2.3 Windows in Flat Roof

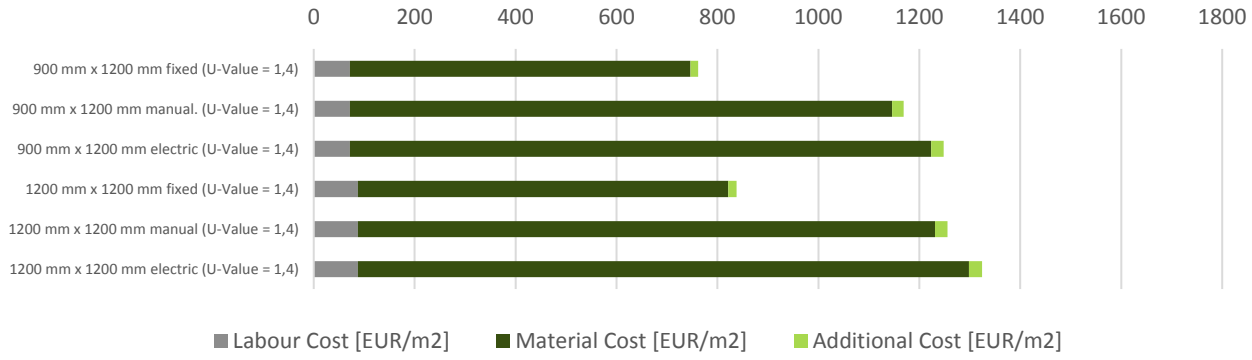

Figure 34 - Component Cost France – Windows in flat roof (windows)

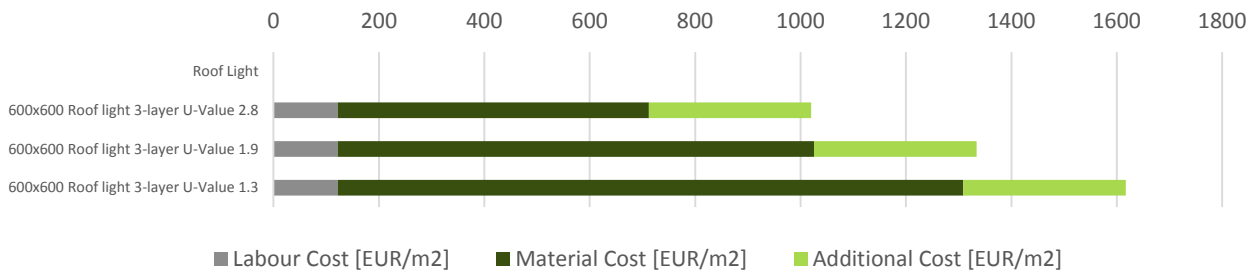

Figure 35 - Component Cost Sweden – Windows in flat roof (windows)

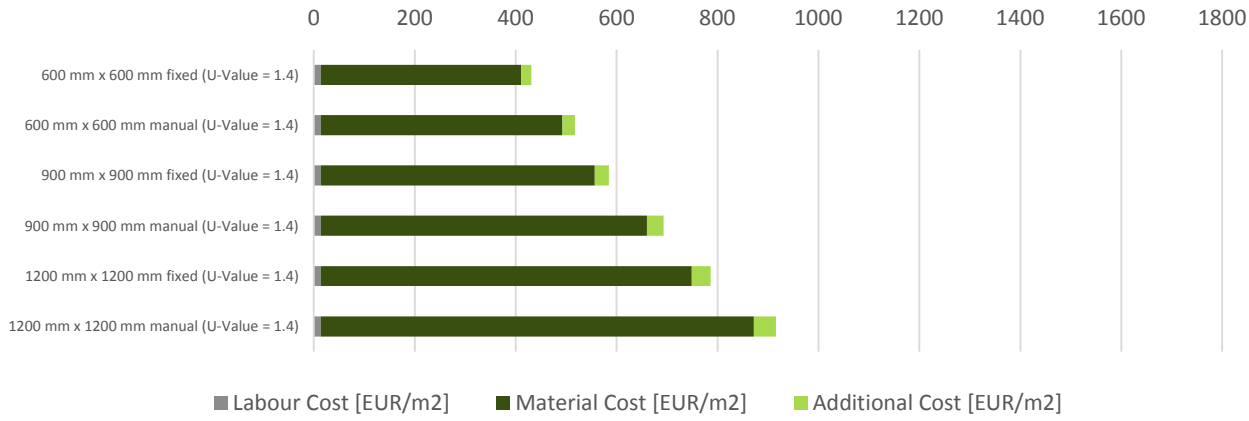

Figure 36 - Component Cost Spain – Windows in flat roof (windows)

3.3 Heating Systems

	France	Spain	Sweden	Germany
Conventional Oil Boiler	V	V	V	V
Conventional Gas Boiler	V	V	V	V
Individual Condensing Oil Boiler	V	V	X	V
Collective Condensing Oil Boiler	V	V	X	V
Individual Condensing Gas Boiler	V	V	X	V
Collective Condensing Gas Boiler	V	V	X	V
District Heating	X	X	V	V
Air Heat Pump	V	V	V	V

Ground Heat Pump	V	V	X	V
Biomass stove	V	V	V	V

In the Swedish and German market you can find multi-family heating systems, like the district heating, which are not listed in commonly available solution catalogues for the other two markets. Individual systems are rather uncommon.

Most information can be found in the German database.

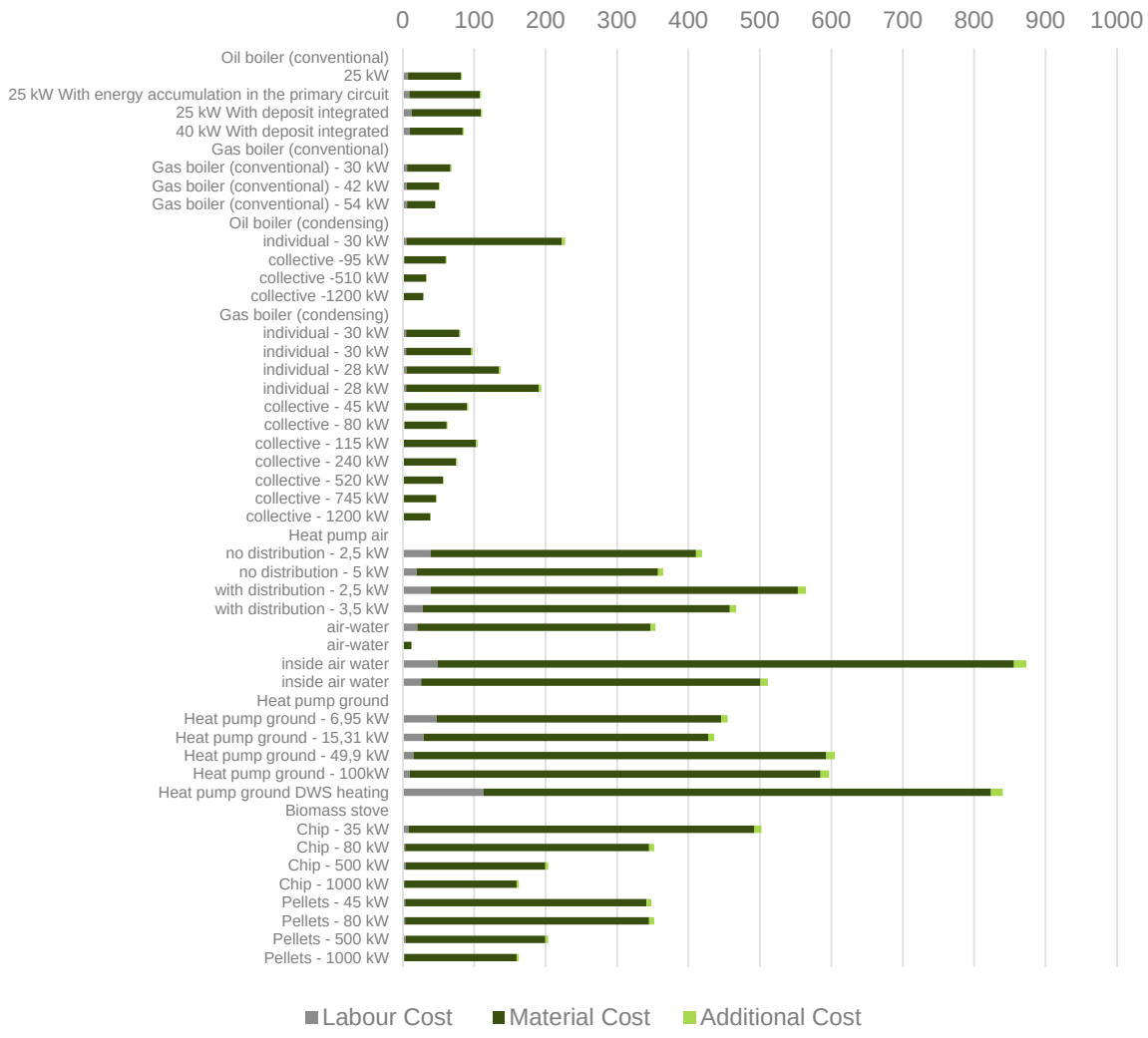

Figure 37 - Component Cost France (EUR/kWh) – Heating Systems

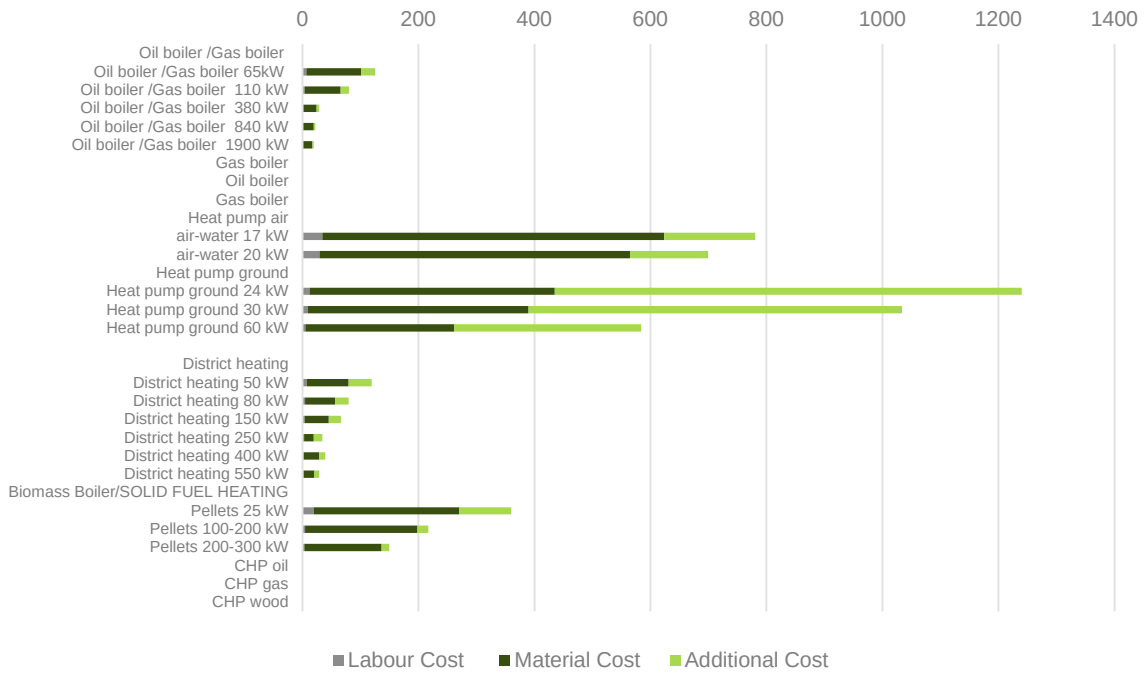

Figure 38 - Component Cost Sweden (EUR/kWh) – Heating Systems

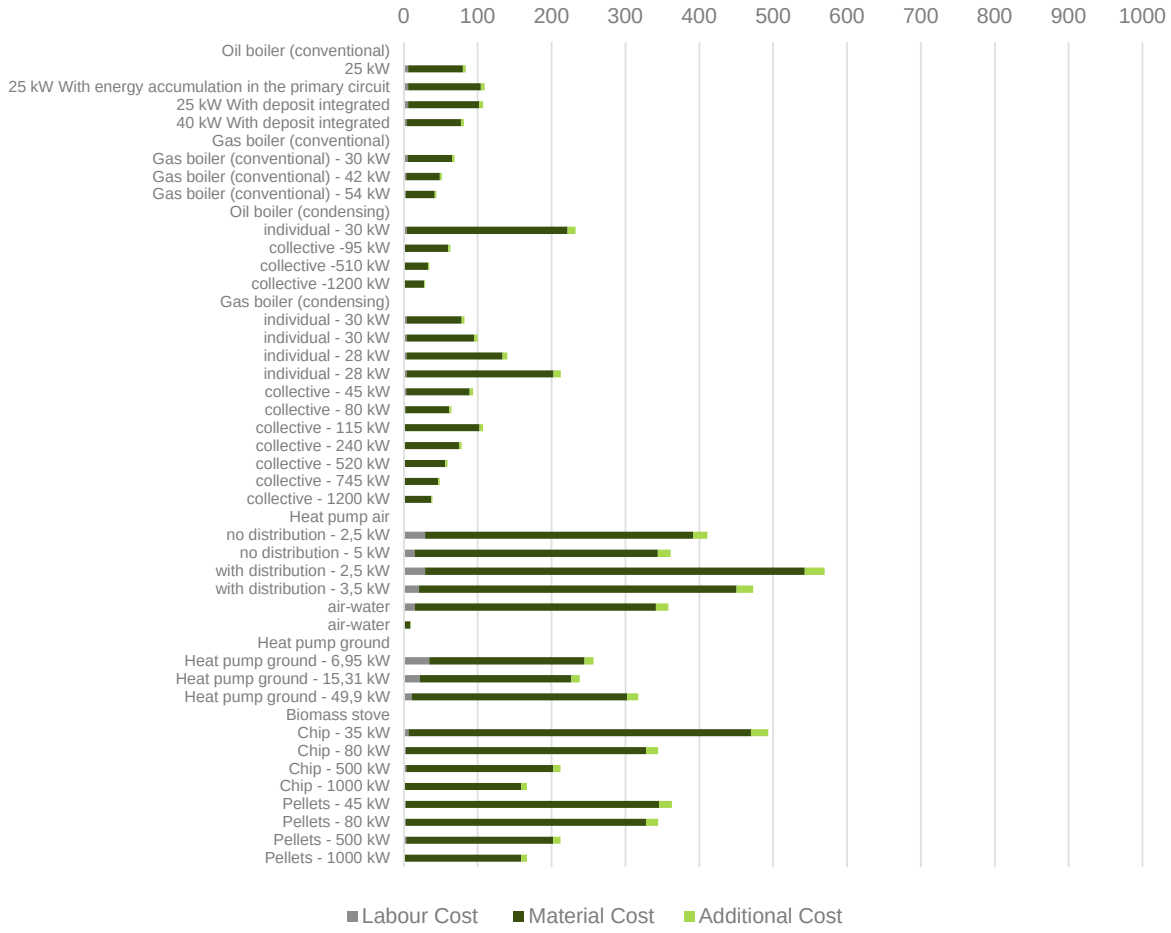

Figure 39 - Component Cost Spain – Heating Systems

3.4 Heat Distribution

	France	Spain	Sweden	Germany
Radiator Heating (brine)	V	V	V	V
Radiator Heating (electrical)	X	V	X	V
Floor Heating (brine)	V	V	V	V
Floor Heating (electrical)	X	V	X	V
Ceiling Heating	V	V	X	X

Analysing the heating distribution systems, prices are similar for all countries. Ceiling heating appears to be the most expensive technology and is only present in France.

Labour costs in Sweden are lower for all technologies which is compensated through higher additional and material costs compared to France and Spain. In Germany the costs consist mainly of labour and material costs.

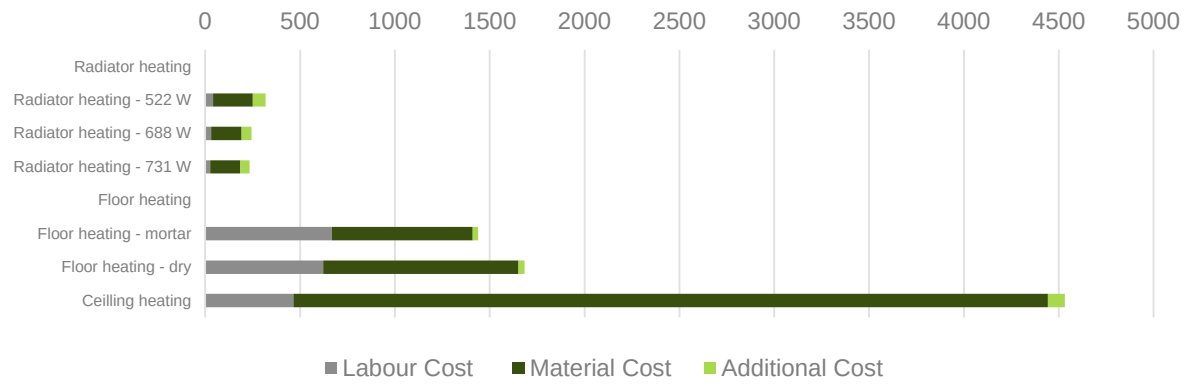

Figure 40 – Component Cost France – Heat Distribution

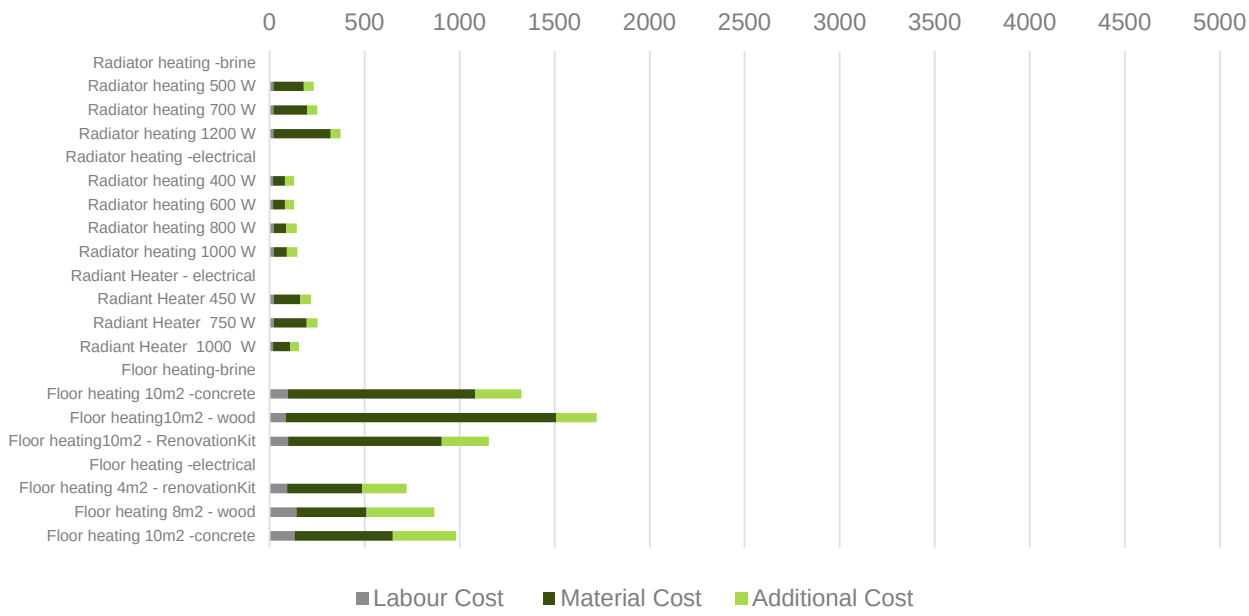

Figure 41 – Component Cost Sweden – Heat Distribution

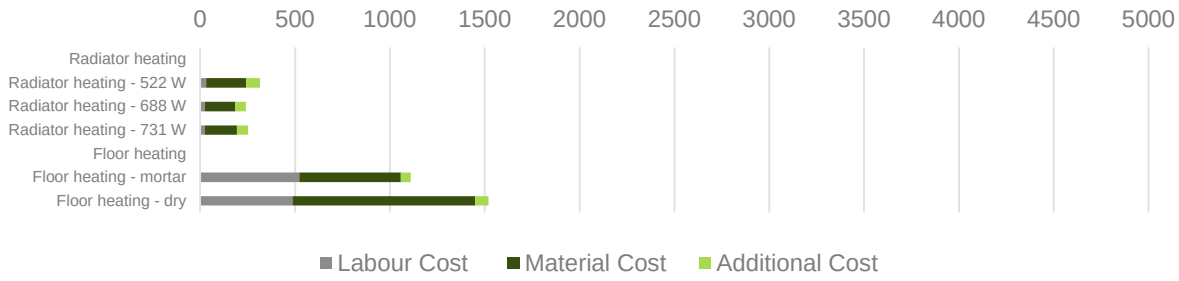

Figure 42 – Component Cost Spain – Heat Distribution

3.5 Ventilation

	France	Spain	Sweden	Germany
Natural ventilation systems	V	X	V	V
Exhaust Air ventilation systems	V	X	V	V
Heat Recovery ventilation systems	V	V	V	V
Decentralized ventilation systems	X	X	V	V

The databases have different formats for the ventilation systems. France considers prices of different components while Sweden offers prices for complete systems. In Spain and Germany there is little information on ventilation systems.

The comparable technologies (namely heat recovery) have similar costs in France and Spain, but are almost double when looking at Sweden; assuming costs per apartment and square meter.

Further steps regarding ventilation will involve increasing the data on ventilation systems for Spain and Germany as natural ventilation systems and decentralized ventilation systems are rather common in this markets.

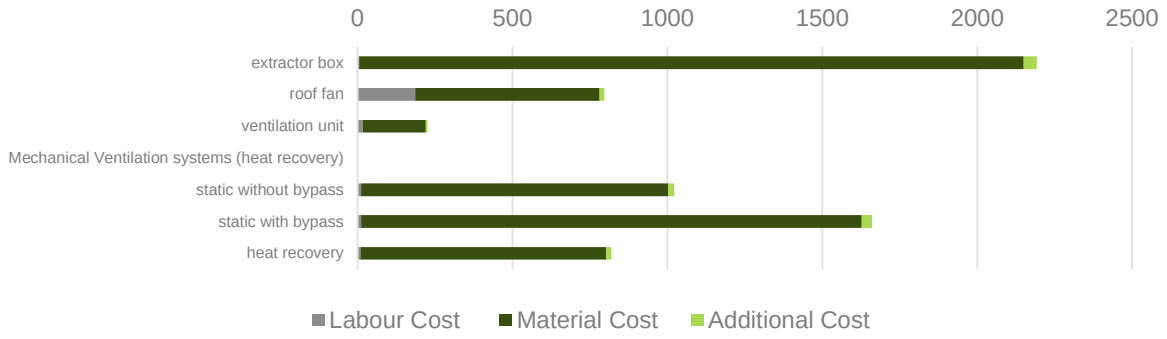

Figure 43 – Component Cost France - Ventilation

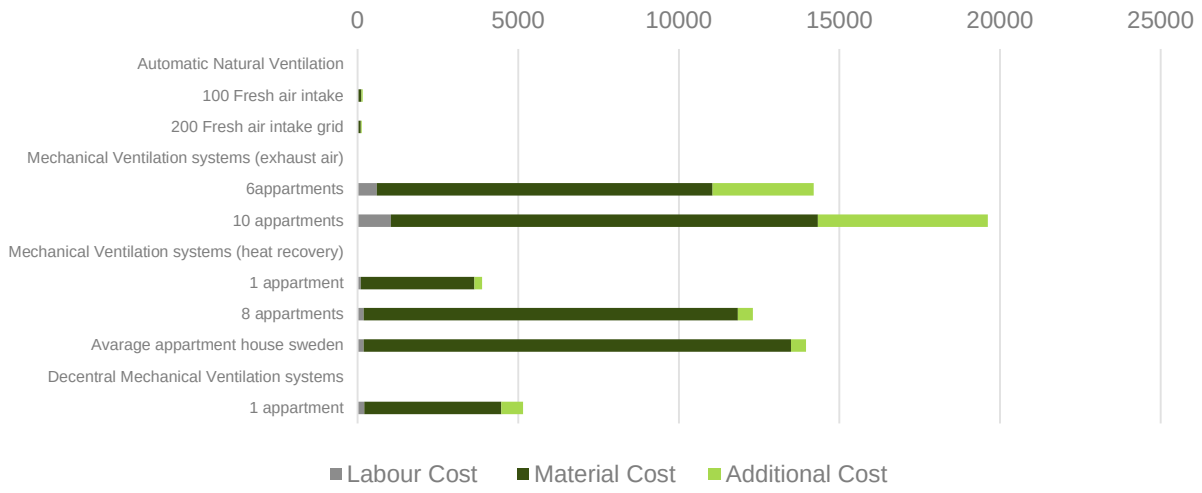

Figure 44 – Component Cost Sweden- Ventilation

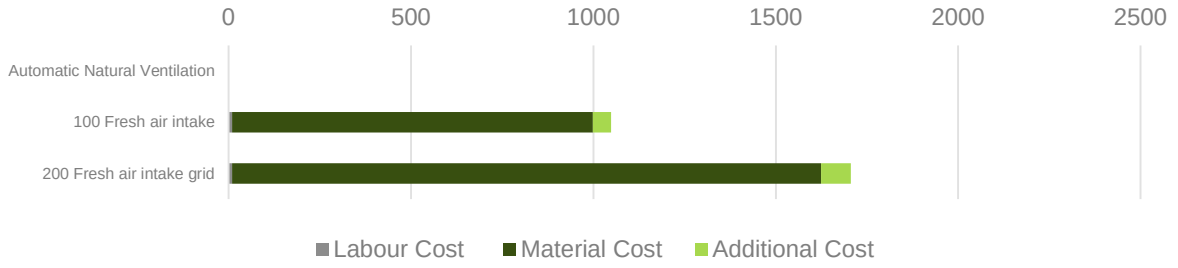

Figure 45– Component Cost Spain- Ventilation

3.6 Cooling

	France	Spain	Sweden	Germany
Decentralized air conditioning units one split	V	V	X	X
Decentralized air conditioning units multi splits	V	X	X	X
Chillers	V	V	X	X

Cooling technologies are not commonly used in Sweden and Germany, due to climate conditions in the countries. Regarding the other two markets total costs for decentralized conditioning units are higher due to higher material costs compared to chillers.

Next iterations on the databases should aim to include decentralized air conditioning multi split units for the Spanish market.

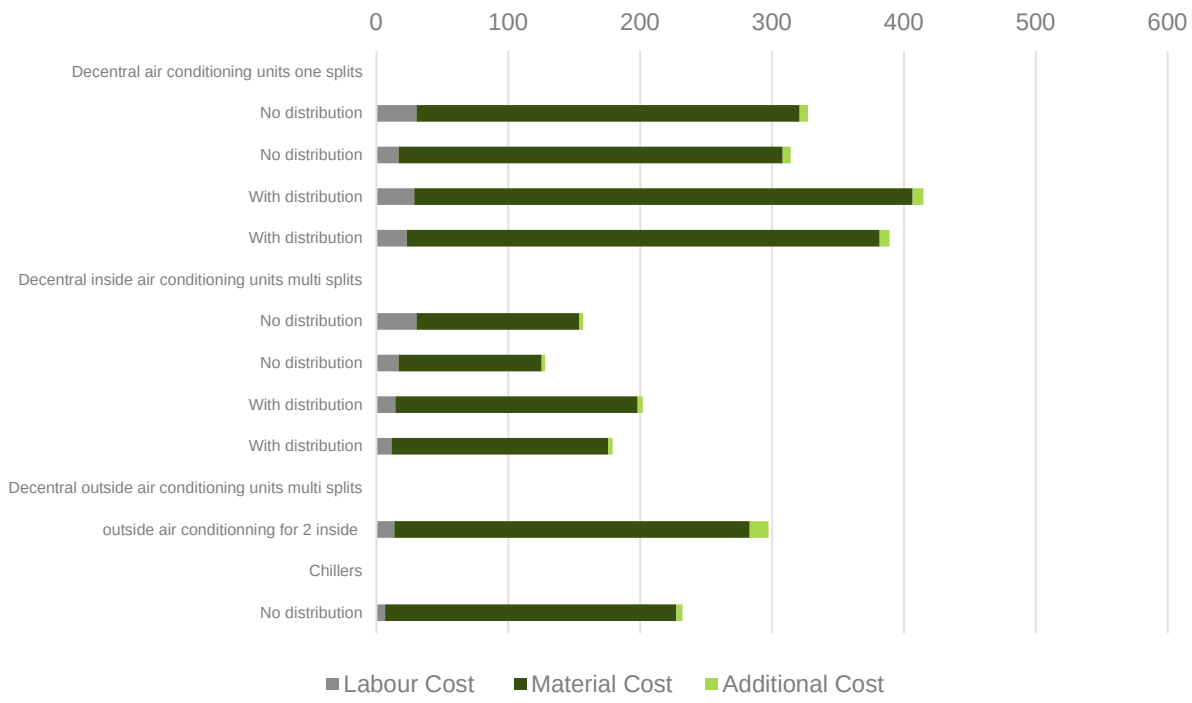

Figure 46 – Component Cost France – Cooling

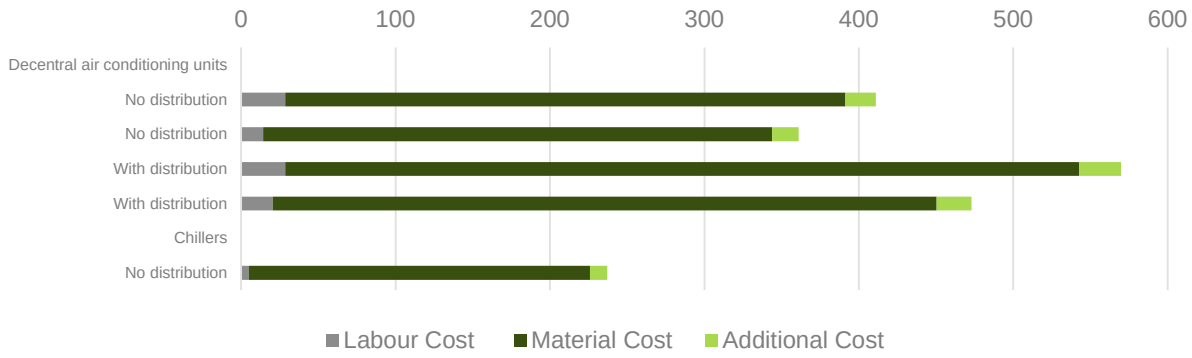

Figure 47 - – Component Cost Spain – Cooling

3.7 Lighting

	France	Spain	Sweden	Germany
Fluorescent	V	V	V	V
LED	V	V	V	V

Within lighting technologies, it is noticeable that fluorescent lighting is cheaper in Sweden (almost 7 times cheaper) while LED technology has almost the same price in the four countries.

Looking at the labour costs one can see that they are higher in the German and French markets, reaching almost double the costs of Spain and Sweden.

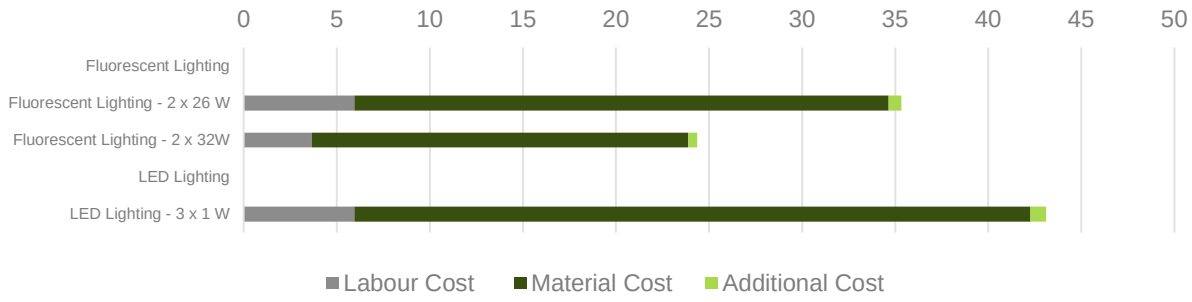

Figure 48 – Component Cost France – Lighting

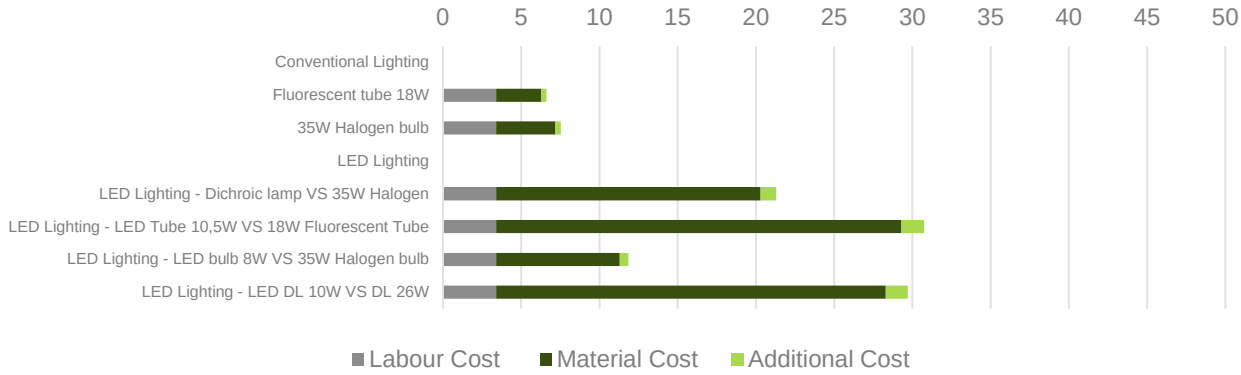

Figure 49– Component Cost Sweden – Lighting

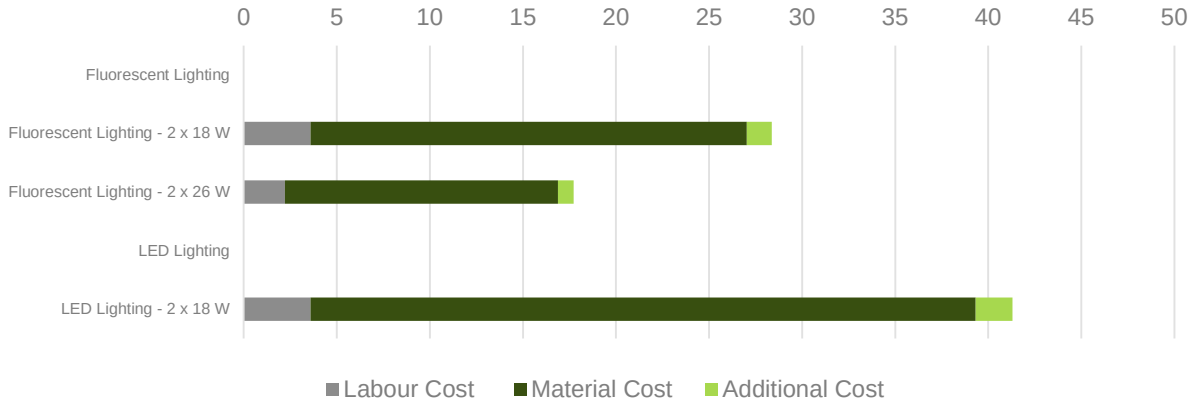

Figure 50– Component Cost Spain – Lighting

3.8 Shading

	France	Spain	Sweden	Germany
Drop arm awnings installation	V	V	V	V
External window blinds	V	V	V	V
Automated	V	V	V	V
Solar control vinyl films	V	V	V	V
Internal Blinds	X	X	V	V

The shading technologies show similar costs in the French and Spanish markets, with Spain having higher additional costs but lower labour costs.

The Swedish market uses subcontractors but still has higher costs than the other two countries, both in manual drop arm awnings and in solar control films.

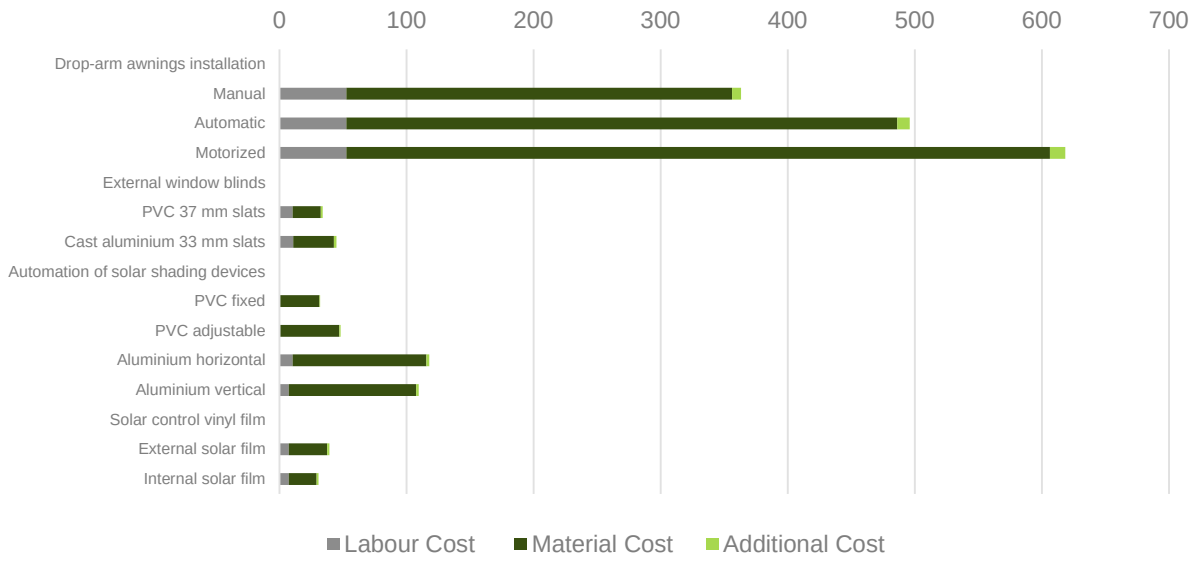

Figure 51 – Component Cost France – Shading

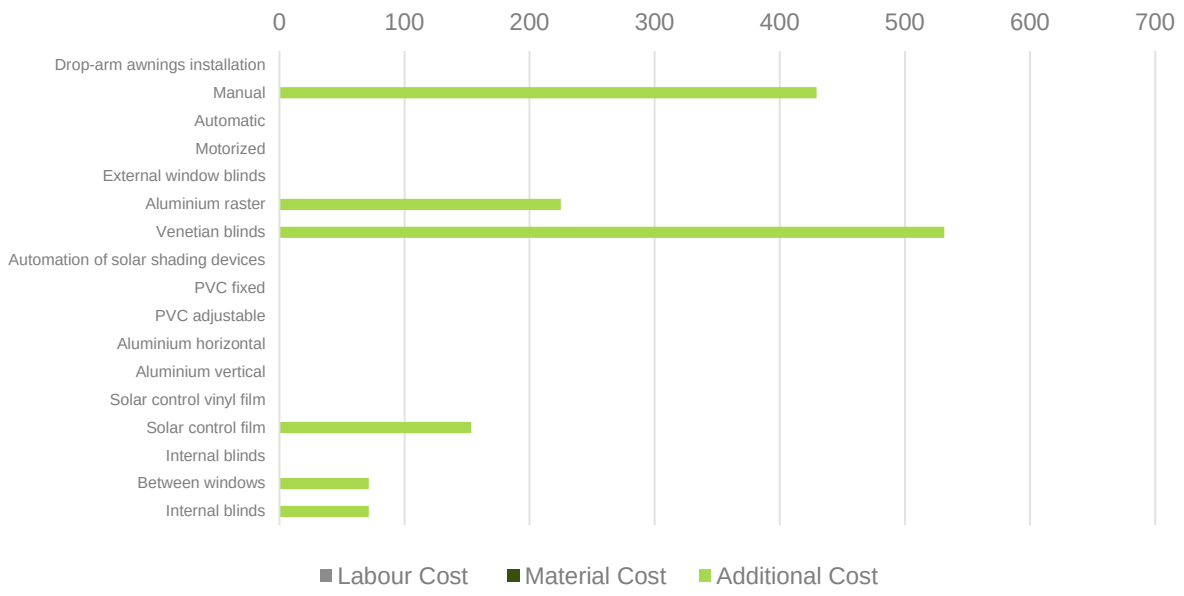

Figure 52 – Component Cost Sweden – Shading

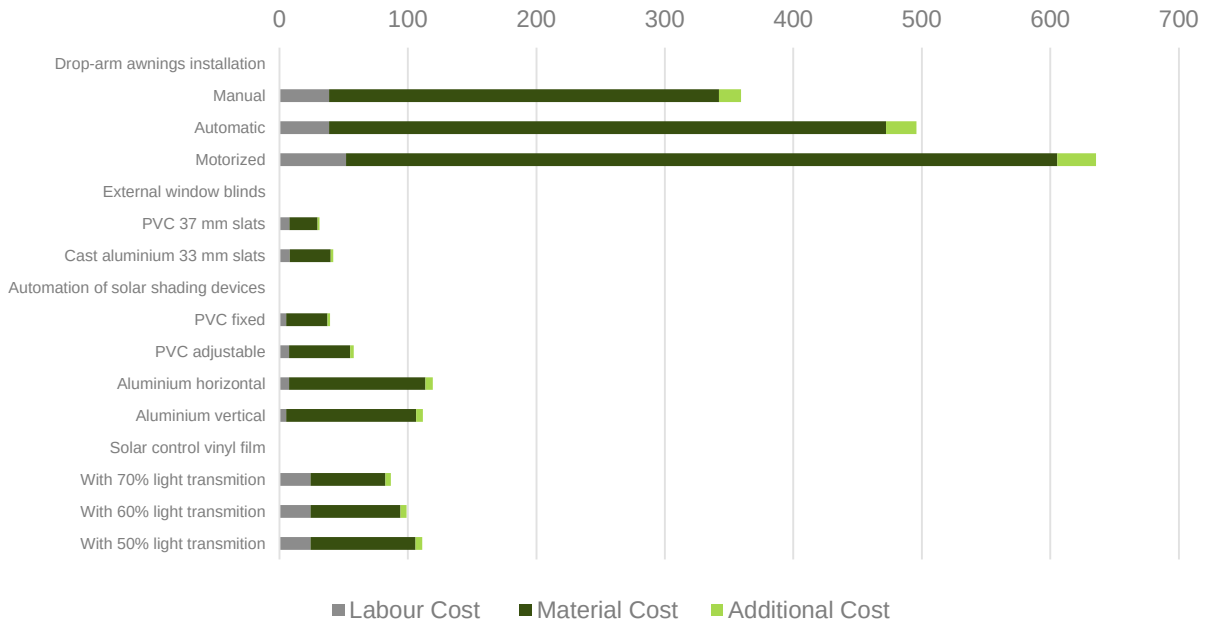

Figure 53 – Component Cost Spain – Shading

3.9 Solar Thermal

	France	Spain	Sweden	Germany
Flat Solar Collector (individual)	V	V	V	V
Flat Solar Collector (collective)	V	V	X	X
Vacuum tube Solar Collector (individual)	V	V	V	V
Vacuum tube Solar Collector (collective)	V	V	X	X

Costs for solar thermal technologies lay within the same range for France and Spain, having lower labour costs and higher additional costs in Spain.

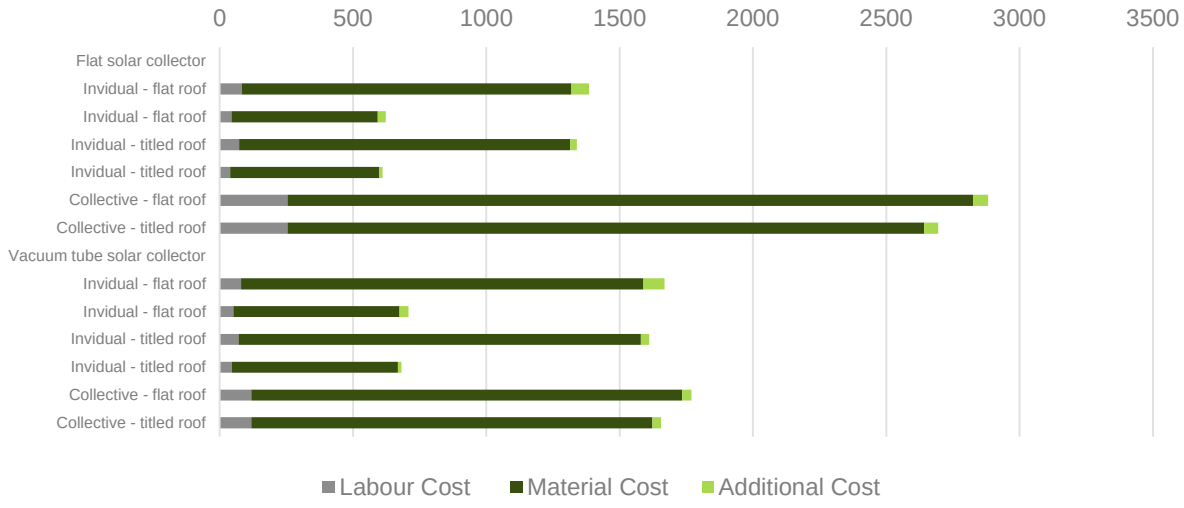

Figure 54 – Component Cost France – Solar Thermal

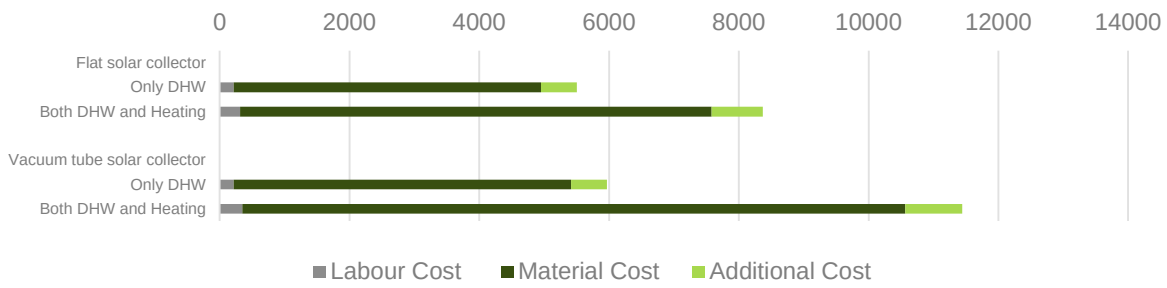

Figure 55 – Component Cost Sweden – Solar Thermal

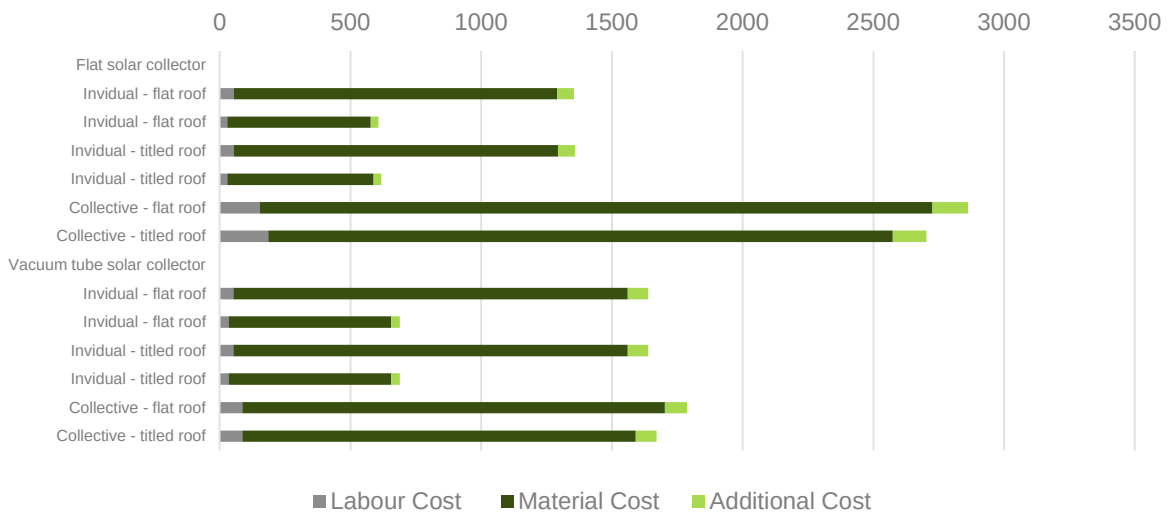

Figure 56 - Component Cost Spain – Solar Thermal

3.10 Storage Tank

	France	Spain	Sweden	Germany
Hotwater Tank	V	V	V	V
Hotwater Tank e/ electrical Boiler	V	V	V	X
Hotwater tank from thermo solar	V	V	X	X

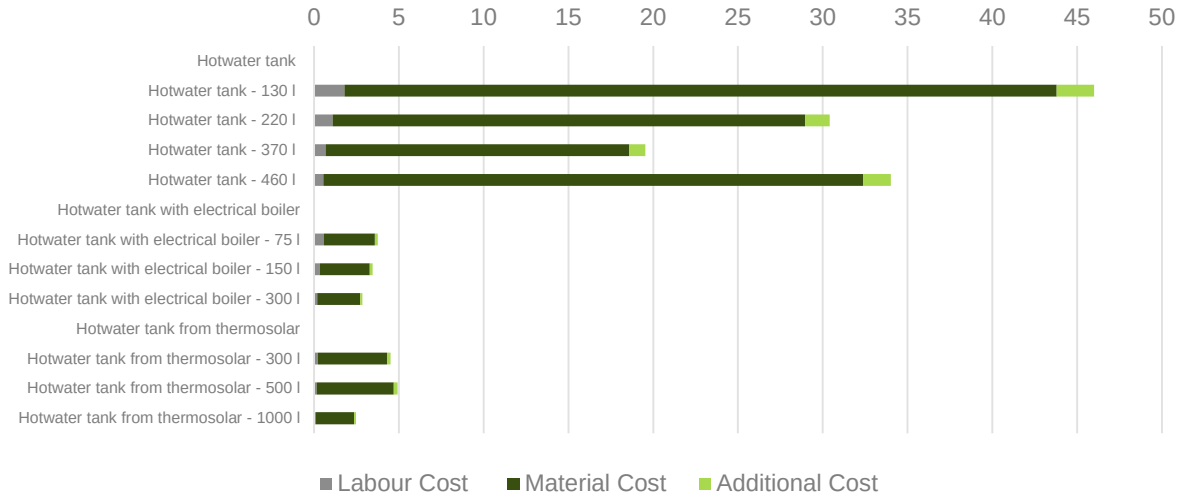

Figure 57 – Component Cost France – Solar Thermal

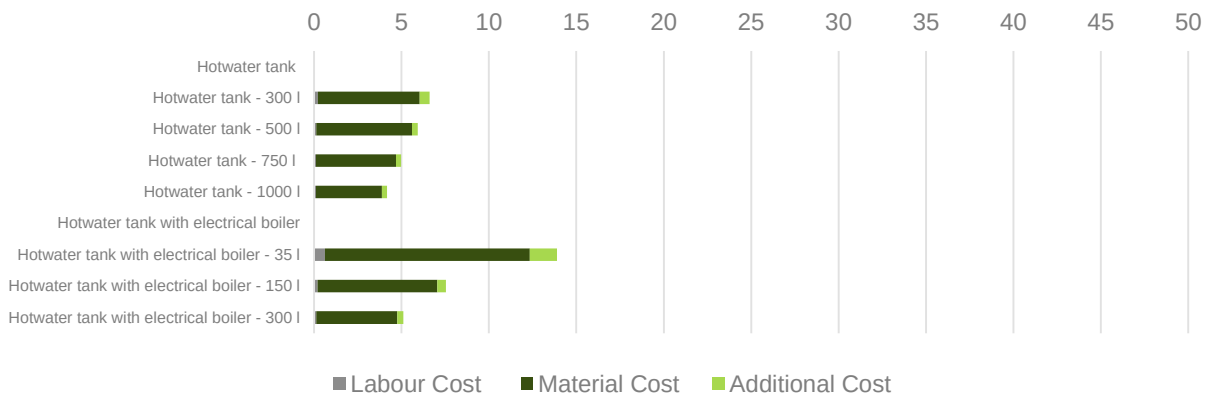

Figure 58 – Component Cost Sweden – Solar Thermal

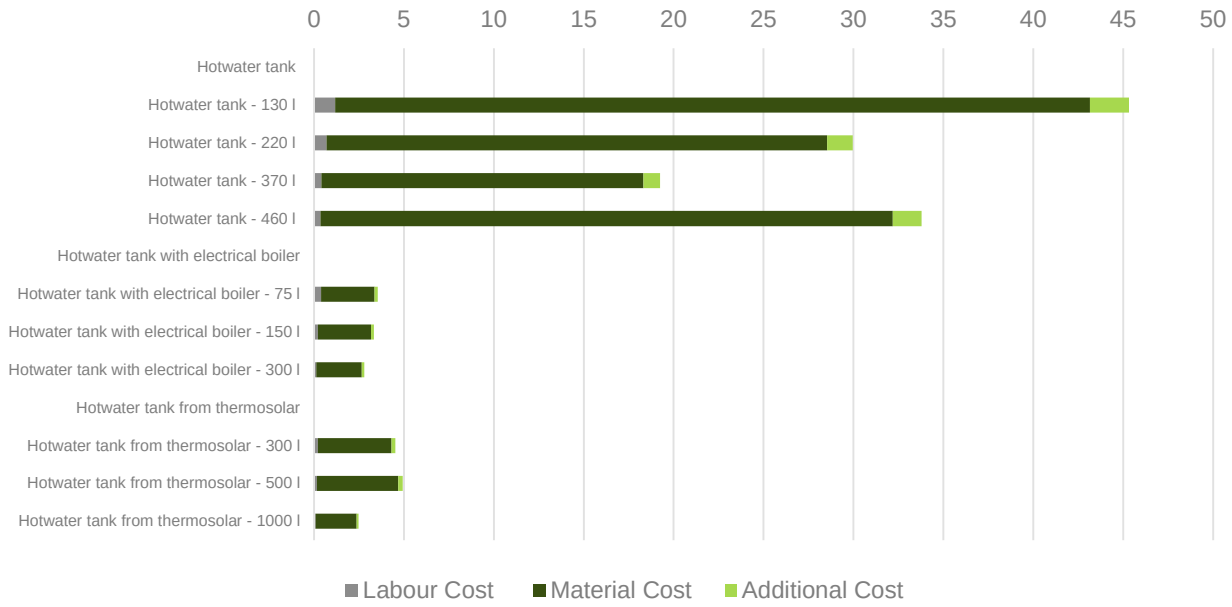

Figure 59 – Component Cost Spain – Solar Thermal

3.11 Photovoltaic

	France	Spain	Sweden	Germany
Amorph silica module	X	V	X	X
CIS module	X	V	X	X
Monocrystalline silica module	X	V	X	X
Polycrystalline silica module	X	V	X	X

The treatment of PV within the different databases varies, since in Sweden the complete system cost is show while for Spain a component approach is used.

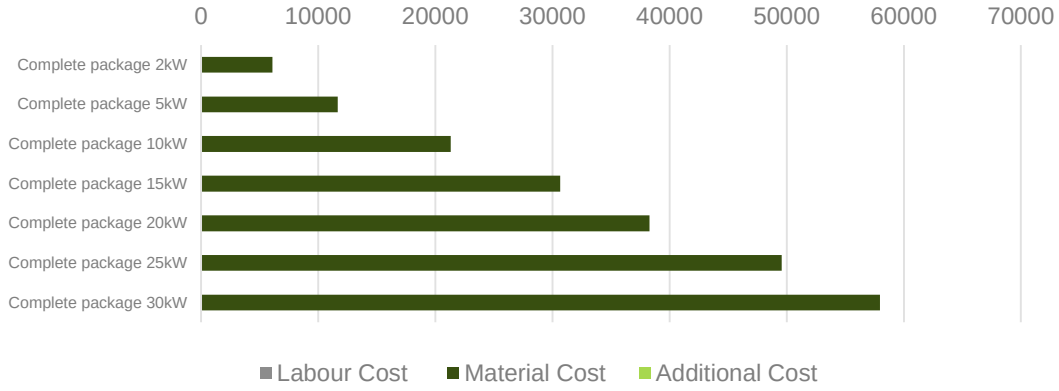

Figure 60 – Component Cost Sweden – Photovoltaic

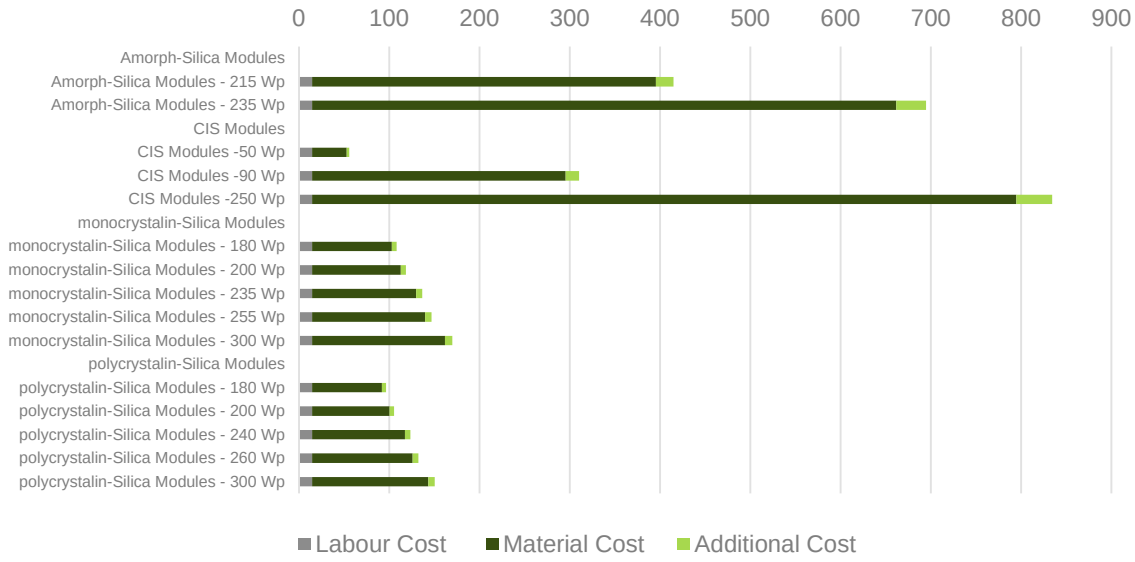

Figure 61 – Component Cost Spain – Photovoltaic

3.12 Control Systems

	France	Spain	Sweden	Germany
Climatic control system for heating/cooling	V	V	V	X
Indoor thermostatic control system	V	V	X	X
Climatic indoor thermostatic system	V	V	X	X
Occupancy sensors for lighting	V	V	V	X
Automatic daylight dimming systems	V	V	X	X
Solar thermal control systems	V	V	X	X

Costs for control systems are similar for Spain and France, having Spain with lower labour costs but higher additional costs.

The Swedish database offers values for holistic systems that are not comparable with the other two databases. The German database lists no specific control systems.

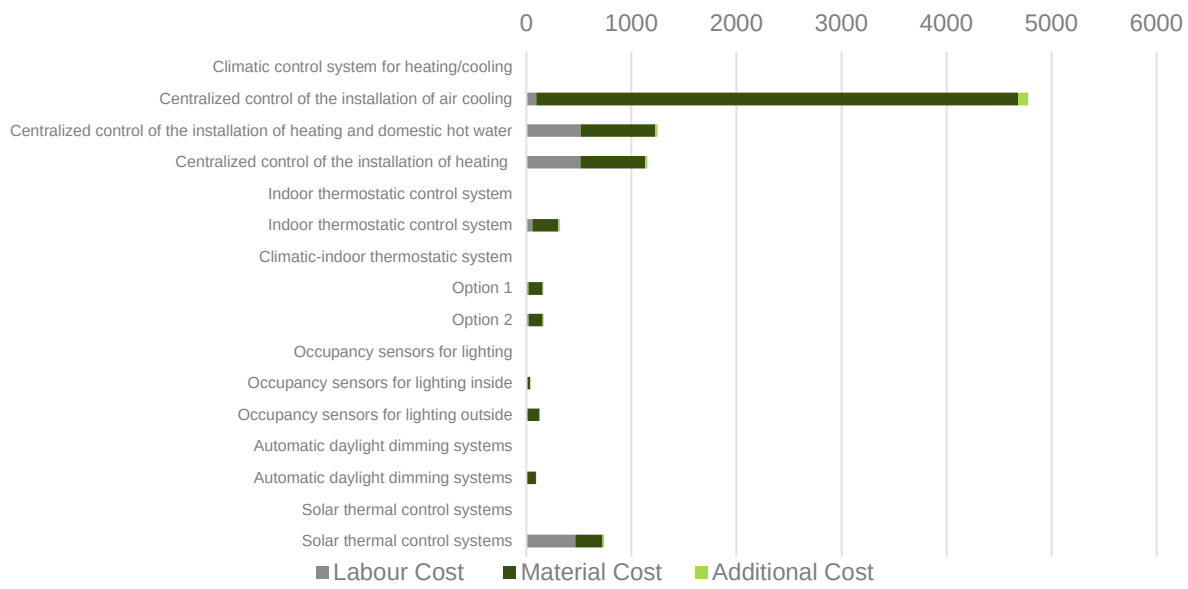

Figure 62 – Component Cost France – Control Systems

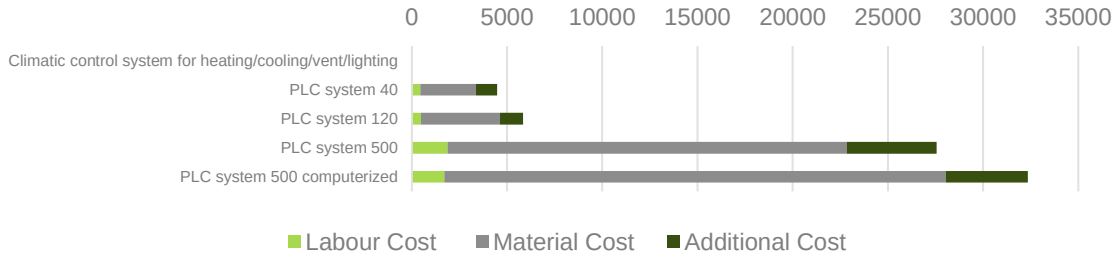

Figure 63 – Component Cost Sweden– Control Systems

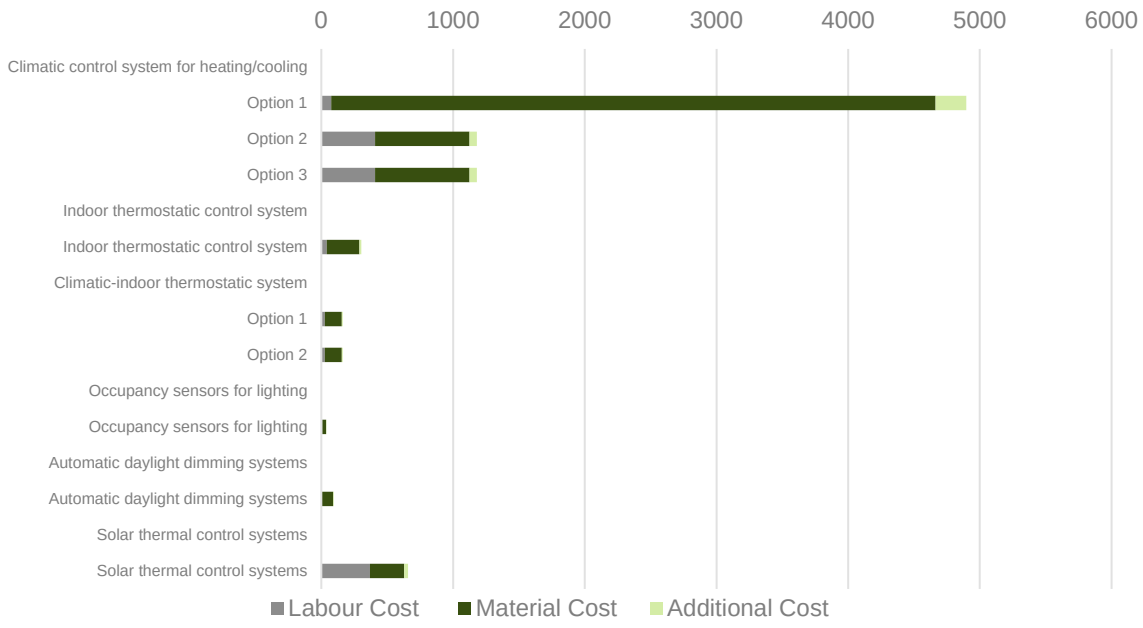

Figure 64 – Component Cost Spain– Control Systems

3.13 Battery

	France	Spain	Sweden	Germany
Lead Battery	X	V	X	X
Li-Ion Battery	X	V	X	X

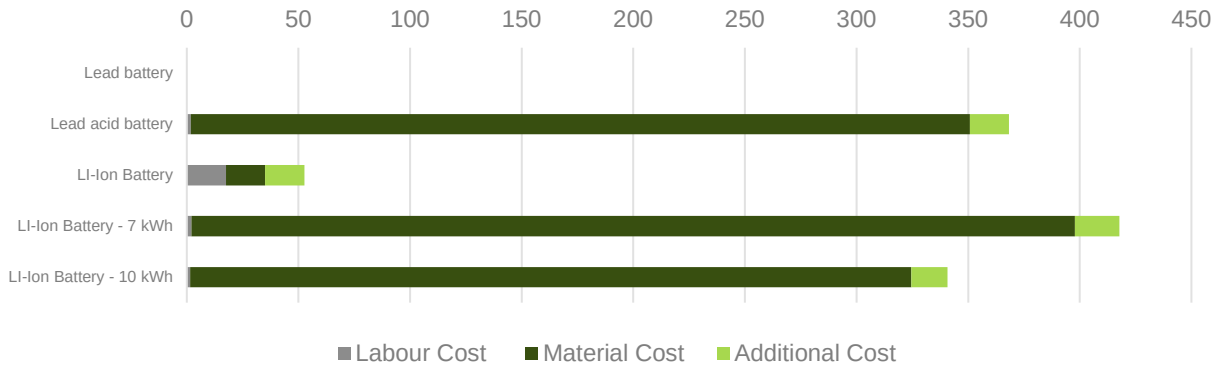

Figure 65 – Component Cost Spain– Battery

4 Techno economic mapping application

During a meeting with the technical partners a selection of feasible renovation technologies was made for both Landskrona (Sweden) and Padiham (United Kingdom). The main building typologies present in each pilot site were considered with a special consideration on its particularities.

The iterative process was focused on the different elements that are fundamental for energy efficiency in buildings and in renovation works regarding both the building envelope as well as the heating and ventilation systems. The SOTA technology options were used as a basis from which the different technical partners offered their professional expertise regarding constructive and economic feasibility paired with a multi scale point of view to optimize the renovation measures.

From these discussions a selection of technologies remained, which were in a later stage analysed with a holistic point of view to detect potential synergies between them that could improve the results of the renovation process and generate a minimal cost for the goals established.

5 Databases

5.1 Database Sweden

5.1.1 Opaque components

Reference				Component/Technology	Insulation Thickness	Labour Intensity [h/m2]	Labour Cost [SEK/m2]	Material Cost [SEK/m2]	Additional Cost [SEK/m2]	Total Cost [SEK/m2]
	1			Outer walls against air						
1.1.	1	1		External insulation (commercial façade systems)						
1.1.1	1	1	1	Brickwall add insulation - 50 mm insulation	50	1,51	289,92	534,95	733,50	1558,37
1.1.1	1	1	1	Brickwall add insulation - 80 mm insulation	80	1,51	289,92	511,00	771,45	1572,37
1.1.1	1	1	1	Brickwall add insulation - 100 mm insulation	100	1,51	289,92	538,00	771,45	1599,37
1.1.1	1	1	1	Brickwall add insulation - 120 mm insulation	120	1,56	299,52	556,00	795,74	1651,26
1.1.1	1	1	1	Brickwall add insulation - 150 mm insulation	150	1,56	299,52	601,00	795,74	1696,26
1.1.1	1	1	1	Brickwall add insulation - 170 mm insulation	170	1,61	309,12	629,00	820,02	1758,14
1.1.2	1	1	2	Sandwich add insulation - 50 mm insulation	50	1,16	222,72	462,97	563,48	1249,17
1.1.2	1	1	2	Sandwich add insulation - 80 mm insulation	80	1,16	222,72	482,97	563,48	1269,17
1.1.2	1	1	2	Sandwich add insulation - 120 mm insulation	120	1,21	232,32	532,97	587,77	1353,06
1.1.2	1	1	2	Sandwich add insulation - 150 mm insulation	150	1,21	232,32	577,97	587,77	1398,06
1.1.2	1	1	2	Sandwich add insulation - 200 mm insulation	200	1,26	241,92	642,95	612,06	1496,93
1.1.3	1	1	3	Wood add insulation - 45 mm insulation	45	2,24	430,08	308,40	1088,10	1826,58
1.1.3	1	1	3	Wood add insulation - 70 mm insulation	70	2,25	432,00	329,55	1092,96	1854,51
1.1.3	1	1	3	Wood add insulation - 120 mm insulation	120	2,28	437,76	374,60	1107,53	1919,89
1.1.3	1	1	3	Wood add insulation - 170 mm insulation	170	2,33	447,36	425,58	1131,82	2004,76

1.1.3	1	1	3	Wood add insulation - 220 mm insulation	220	2,47	474,24	474,45	1199,83	2148,52
1.2.	1	2		Internal insulation						
1.2.1	1	2	1	Internal insulation - wood + 45 mm insulation	45	0,68	130,56	99,75	330,32	560,63
1.2.1	1	2	1	Internal insulation - wood + 70 mm insulation	70	0,69	132,48	123,75	335,17	591,40
1.2.1	1	2	1	Internal insulation - wood + 120 mm insulation	120	0,73	140,16	174,70	354,60	669,46
1.2.1	1	2	1	Internal insulation - wood + 170 mm insulation	170	0,78	149,76	232,10	378,89	760,75
1.2.1	1	2	1	Internal insulation - wood + 195 mm insulation	195	0,78	149,76	259,80	378,89	788,45
1.2.2	1	2	2	Internal insulation - steel + 45 mm insulation	45	0,65	124,80	200,58	315,74	641,12
1.2.2	1	2	2	Internal insulation - steel + 70 mm insulation	70	0,66	126,72	216,25	320,60	663,57
1.2.2	1	2	2	Internal insulation - steel + 120 mm insulation	120	0,73	140,16	268,45	354,60	763,21
1.2.2	1	2	2	Internal insulation - steel + 160 mm insulation	160	0,74	142,08	323,58	359,46	825,12
	2			**Outer walls against earth**						
2.1.	2	1		Perimeter insulation (commercial façade systems)						
2.1.1	2	1	1	Perimeter insulation - 50 mm insulation	50	0,37	71,04	254,50	179,73	505,27
2.1.1	2	1	1	Perimeter insulation - 80 mm insulation	80	0,37	71,04	376,30	179,73	627,07
2.1.1	2	1	1	Perimeter insulation - 100 mm insulation	100	0,38	72,96	457,10	184,59	714,65
2.1.2	2	1	2	Perimeter insulation draining - 65 mm insulation	65	0,36	69,12	182,20	174,87	426,19
2.1.2	2	1	2	Perimeter insulation draining - 100 mm insulation	100	0,37	71,04	231,20	179,73	481,97
2.2.	2	2		Internal Insulation of the Basement wall			same as 1.2			
	3			**Basement (floor against earth)**						
3.1.	3	1		Insulation on the inside (heated side) of the floor slab						
3.1.1	3	1	1	Insulation on the inside (heated side) of the floor slab - 45 mm insulation	45	1,12	215,04	311,62	544,05	1070,71
3.1.1	3	1	1	Insulation on the inside (heated side) of the floor slab - 70 mm insulation	70	1,12	215,04	365,07	544,05	1124,16
3.1.1	3	1	1	Insulation on the inside (heated side) of the floor slab - 95 mm insulation	95	1,14	218,88	414,38	553,77	1187,03
3.1.2	3	1	2	Insulation on the inside (heated side) of the floor slab - 50 mm insulation VENT	50	0,86	165,12	539,55	417,75	1122,42
3.1.2	3	1	2	Insulation on the inside (heated side) of the floor slab - 70 mm insulation VENT	70	0,86	165,12	569,55	417,75	1152,42
3.1.2	3	1	2	Insulation on the inside (heated side) of the floor slab - 100 mm insulation VENT	100	0,86	165,12	626,55	417,75	1209,42

3.1.3	3	1	3	Insulation on the inside (heated side) of the floor slab - 50 mm insulation EPS	50		0,55	105,60	235,30	267,17	608,07
3.1.3	3	1	3	Insulation on the inside (heated side) of the floor slab - 70 mm insulation EPS	70		0,55	105,60	247,90	267,17	620,67
3.1.3	3	1	3	Insulation on the inside (heated side) of the floor slab - 100 mm insulation EPS	100		0,57	109,44	267,00	276,88	653,32
	4			**Floors against unheated**							
4.1.	4	1		Insulation on the inside (heated side) of the floor slab				same as 3.1.			
4.2.	4	2		Insulation on the outside (unheated heated side) of the floor slab							
4.2.1	4	2	1	Insulation on the outside (unheated heated side) of the floor slab - 50 mm insulation	50		0,23	44,16	40,4	111,72	196,28
4.2.1	4	2	1	Insulation on the outside (unheated heated side) of the floor slab - 70 mm insulation	70		0,23	44,16	52,6	111,72	208,48
4.2.1	4	2	1	Insulation on the outside (unheated heated side) of the floor slab - 100 mm insulation	100		0,24	46,08	69,6	116,58	232,26
4.2.2	4	2	2	Insulation on the outside (unheated heated side) of the floor slab - 100 mm on ground	100		0,2	38,40	224,95	97,15	360,50
4.2.2	4	2	2	Insulation on the outside (unheated heated side) of the floor slab - 200 mm on ground	200		0,28	53,76	427,35	136,01	617,12
4.2.2	4	2	2	Insulation on the outside (unheated heated side) of the floor slab - 300 mm on ground	300		0,36	69,12	629,75	174,87	873,74
	5			**Ceiling against unheated**							
5.1.	5	1		Insulation below the ceiling slab							
5.1.1	5	1	1	Insulation below the ceiling slab - 45 mm insulation	45		0,74	142,08	147,05	359,46	648,59
5.1.1	5	1	1	Insulation below the ceiling slab - 70 mm insulation	70		0,74	142,08	158,40	359,46	659,94
5.2.	5	2		Insulation above the ceiling slab							
5.2.1	5	2	1	Blown loose fill insulation - 150 mm insulation mineral wool	150					78	78,00
5.2.1	5	2	1	Blown loose fill insulation - 200 mm insulation	200					93	93,00
5.2.1	5	2	1	Blown loose fill insulation - 300 mm insulation	300					126	126,00
5.2.1	5	2	1	Blown loose fill insulation - 400 mm insulation	400					162	162,00
5.2.1	5	2	1	Blown loose fill insulation - 500 mm insulation	500					201	201,00
5.2.2	5	2	2	Blown loose fill insulation - 150 mm insulation Cellulose wool	150					98	98,00
5.2.2	5	2	2	Blown loose fill insulation - 200 mm insulation	200					121	121,00
5.2.2	5	2	2	Blown loose fill insulation - 300 mm insulation	300					193	193,00

5.2.2	5	2	2	Blown loose fill insulation - 400 mm insulation	400				251	251,00
5.2.2	5	2	2	Blown loose fill insulation - 500 mm insulation	500				305	305,00
	6			**Flat roof**						
6.1.	6	1		External Insulation above the roof slab						
6.1.1	6	1	1	External Insulation above the roof slab - 50 mm insulation TY 1523	50		0,00		409,00	409,00
6.1.1	6	1	1	External Insulation above the roof slab - 100 mm insulation	100		0,00		446,00	446,00
6.1.1	6	1	1	External Insulation above the roof slab - 150 mm insulation	150		0,00		484,00	484,00
6.1.1	6	1	1	External Insulation above the roof slab - 200 mm insulation	200		0,00		533,00	533,00
6.1.2	6	1	2	External Insulation above the roof slab - 50 mm insulation TOR	50	0,34	65,28	288,80	165,16	519,24
6.1.2	6	1	2	External Insulation above the roof slab - 100 mm insulation TOR	100	0,35	67,20	327,50	170,02	564,72
6.1.2	6	1	2	External Insulation above the roof slab - 160 mm insulation TOR	160	0,35	67,20	392,45	170,02	629,67
6.1.3	6	1	3	External Insulation above the roof slab - 100 mm insulation TRP	100	0,20	38,40	211,20	695,15	944,75
6.1.3	6	1	3	External Insulation above the roof slab - 130 mm insulation TRP	130	0,20	38,40	211,20	701,15	950,75
6.1.3	6	1	3	External Insulation above the roof slab - 2*100 mm insulation TRP	200	0,20	38,40	211,20	840,15	1089,75
6.1.3	6	1	3	External Insulation above the roof slab - 2*130 mm insulation TRP	260	0,20	38,40	211,20	852,15	1101,75
6.2.4	6	2	4	Internal Insulation below the roof slab			same as 5.1.			
	7			**Tilted roof**						
7.1.	7	1		External Insulation on roof						
7.1.1	7	1	1	External Insulation on roof - 50 mm insulation PIR	50		0,00		0,00	0,00
7.1.1	7	1	1	External Insulation on roof - 70 mm insulation PIR	70		0,00		0,00	0,00
7.2.	7	2		Core Insulation between roof beams						
7.2.1	7	2	1	Core Insulation between roof beams - 70 +145 mm insulation	215	1,10	211,20	324,95	534,34	1070,49
7.2.1	7	2	1	Core Insulation between roof beams - 70 +170 mm insulation	240	1,10	211,20	337,45	534,34	1082,99
7.2.1	7	2	1	Core Insulation between roof beams - 70 +195 mm insulation	265	1,10	211,20	352,50	534,34	1098,04
7.2.1	7	2	1	Core Insulation between roof beams - 70 +220 mm insulation	290	1,10	211,20	367,15	534,34	1112,69
7.2.2	7	2	2	Blown loose fill insulation - 145 mm insulation mineral wool	145	0,79	151,68	114,50	510,75	776,93
7.2.2	7	2	2	Blown loose fill insulation - 170 mm insulation mineral wool	170	0,79	151,68	114,50	532,75	798,93
7.2.2	7	2	2	Blown loose fill insulation - 195 mm insulation mineral wool	195	0,79	151,68	114,50	552,75	818,93
7.2.2	7	2	2	Blown loose fill insulation - 220 mm insulation mineral wool	220	0,79	151,68	114,50	574,75	840,93
7.2.2	7	2	2	Blown loose fill insulation - 300 mm insulation mineral wool	300	0,79	151,68	114,50	646,75	912,93
7.2.2	7	2	2	Blown loose fill insulation - 400 mm insulation mineral wool	400	0,79	151,68	114,50	677,75	943,93

7.2.2	7	2	2	Blown loose fill insulation - 500 mm insulation mineral wool	500	0,79	151,68	114,50	741,75	1007,93
7.3.	7	3		Internal Insulation below the roof construction			same as 5.1.			
				Green roof						
.1.		1								
.1.1		1	1	Sedum		0,39	74,88	245,30	911,45	1231,63
.1.1		1	1	Moss		0,39	74,88	245,30	732,45	1052,63

5.1.2 Windows

Reference				Component/Technology	U-Value[W/Km2]	Labour Intensity [h/m2]	Labour Cost [SEK/m2]	Material Cost [SEK/m2]	Additional Cost [SEK/m2]	Total Cost [SEK/m2]
	8			**Windows in Wall**						
8.1.	8	1		Window 9x12						
8.1.1	8	1	1	9x12 Window U-Value 1.5 -Wood	1,5	3,34	641,28	2395,03	1910,44	4946,75
8.1.1	8	1	1	9x12 Window U-Value 1.5 -Wood/aluminium	1,5		0,00		288,00	288,00
8.1.1	8	1	1	9x12 Window U-Value 1.5 -Aluminium	1,5		0,00		288,00	288,00
8.1.1	8	1	1	9x12 Window U-Value 1.5 -PVC	1,5		0,00		288,00	288,00
8.1.2	8	1	2	9x12 Window U-Value 1.2 -Wood	1,2	3,34	641,28	4227,03	1910,44	6778,75
8.1.2	8	1	2	9x12 Window U-Value 1.2 -Wood/aluminium	1,2	3,44	660,48	5782,03	1959,01	8401,52
8.1.2	8	1	2	9x12 Window U-Value 1.2 -Aluminium	1,2		0,00		288,00	288,00
8.1.2	8	1	2	9x12 Window U-Value 1.2 -PVC	1,2	3,69	708,48	3380,03	2080,45	6168,96
8.1.3	8	1	3	9x12 Window U-Value 1.1 -Wood	1,1		0,00		288,00	288,00
8.1.3	8	1	3	9x12 Window U-Value 1.1 -Wood/aluminium	1,1	3,54	679,68	5018,03	2007,59	7705,30
8.1.3	8	1	3	9x12 Window U-Value 1.1 -Aluminium	1,1	3,69	708,48	4530,03	2080,45	7318,96
8.1.3	8	1	3	9x12 Window U-Value 1.1 -PVC	1,1	3,44	660,48	2010,03	1959,01	4629,52
8.1.4	8	1	4	9x12 Window U-Value 0.8 -Wood	0,8		0,00		288,00	288,00
8.1.4	8	1	4	9x12 Window U-Value 0.8 -Wood/aluminium	0,8	3,44	660,48	6454,03	1959,01	9073,52
8.1.4	8	1	4	9x12 Window U-Value 0.8 -Aluminium	0,8		0,00		288,00	288,00
8.1.4	8	1	4	9x12 Window U-Value 0.8 -PVC	0,8		0,00		288,00	288,00
8.2.	8	2		DOOR 9x21						

8.2.1	8	2	1	9x21 Door U-value 1.2	1,2	4,64	890,88	9678,63	2481,93	13051,44
8.2.1	8	2	1	9x21 Door U-value 1.1	1,1	4,64	890,88	9831,63	2481,93	13204,44
8.2.1	8	2	1	9x21 Door U-value 0.9	0,9	4,64	890,88	10694,63	2481,93	14067,44
8.2.1	8	2	1	9x21 Door U-value 0.6	0,6	4,64	890,88	11892,63	2481,93	15265,44
	9			**Windows in Tilted Roof**						
9.1.	9	1								
9.1.1	9	1	1	780x980 Skylight U-Value 1.2	1,2	7,31	1403,52	7050,13	3550,91	12004,56
9.1.1	9	1	1	780x980 Skylight U-Value 1.1	1,1	7,31	1403,52	7622,00	3550,91	12576,43
9.1.1	9	1	1	780x980 Skylight U-Value 0.9	0,9	7,31	1403,52	8622,13	3550,91	13576,56
	10			**Windows in Flat Roof**						
10.1.	10	1		Roof Light						
10.1.1	10	1	1	600x600 Roof light 3-layer U-Value 2.8	2,8	6,21	1192,32	5777,13	3016,57	9986,02
10.1.1	10	1	1	600x600 Roof light 3-layer U-Value 1.9	1,9	6,21	1192,32	8847,13	3016,57	13056,02
10.1.1	10	1	1	600x600 Roof light 3-layer U-Value 1.3	1,3	6,21	1192,32	11618,13	3016,57	15827,02

5.1.3 Heating System

Reference				Component/Technology	Power capacity	Labour Intensity	Labour Cost	Material Cost	Additional Cost	Total Cost
					kW	[h]	[SEK]	[SEK]	[SEK]	[SEK]
	11			**Heating System**						
11.1.	11	1		Oil boiler /Gas boiler						
11.1.1	11	1	1	Oil boiler /Gas boiler	65	21,71	4168,32	60142,84	15616,25	79927,41
11.1.1	11	1	1	Oil boiler /Gas boiler	110	21,71	4168,32	66442,84	15616,25	86227,41
11.1.1	11	1	1	Oil boiler /Gas boiler	380	25,81	4955,52	85342,84	17607,87	107906,23
11.1.1	11	1	1	Oil boiler /Gas boiler	840	35,36	6789,12	153942,84	22246,87	182978,83
11.1.1	11	1	1	Oil boiler /Gas boiler	1900	60,36	11589,12	312142,84	34390,87	358122,83
11.2.	11	2		Gas boiler						

11.3.	11	3		Oil boiler							
11.4.	11	4		Gas boiler							
11.5.	11	5		Heat pump air							
11.5.1	11	5	1	air-water	17	29,74	5710,08	98008,33	26113,70	129832,11	
11.5.1	11	5	1	air-water	20	30,19	5796,48	104704,33	26332,29	136833,10	
11.6.	11	6		Heat pump ground							
11.6.1	11	6	1	Heat pump ground	24	15	2880,00	99282,56	189087,40	291249,96	
11.6.1	11	6	1	Heat pump ground	30	15	2880,00	111482,56	189087,40	303449,96	
11.6.1	11	6	1	Heat pump ground	60	15	2880,00	150782,56	189087,40	342749,96	
11.7.	11	7									
11.8.	11	8		District heating							
11.8.1	11	8	1	District heating	50	19,22	3690,24	35397,90	19437,11	58525,25	
11.8.1	11	8	1	District heating	80	18,11	3477,12	40751,41	17993,11	62221,64	
11.8.1	11	8	1	District heating	150	29,29	5623,68	60971,69	30604,91	97200,28	
11.8.1	11	8	1	District heating	250	35,62	6839,04	40498,77	36488,77	83826,58	
11.8.1	11	8	1	District heating	400	43,92	8432,64	104000,15	42580,58	155013,37	
11.8.1	11	8	1	District heating	550	45,3	8697,60	102062,09	44649,93	155409,62	
11.9.	11	9		Biomass Boiler/SOLID FUEL HEATING							
11.9.1	11	9	1	Pellets	25,0	24,76	4753,92	61473,51	21805,62	83279,13	
11.9.1	11	9	1	Pellets	100-200	36,61	7029,12	284201,51	27561,87	311763,38	
11.9.1	11	9	1	Pellets	200-300	44,61	8565,12	325701,51	31447,95	357149,46	
11.10.	11	10		CHP oil							
11.11.	11	11		CHP gas							
11.12.	11	12		CHP wood							

5.1.4 Heat Distribution

Reference	Component/Technology	Nominal Power	Labour Intensity	Labour Cost	Material Cost	Additional Cost	Total Cost
		W	[h]	[SEK]	[SEK]	[SEK]	[SEK]
12	**Heat distribution**						

12.1.	12	1		Radiator heating -brine						
12.1.1	12	1	1	Radiator heating	500	1,05	201,60	1562,40	510,05	2274,05
12.1.1	12	1	1	Radiator heating	700	1,05	201,60	1746,00	510,05	2457,65
12.1.1	12	1	1	Radiator heating	1200	1,05	201,60	2952,00	510,05	3663,65
12.2.	12	2		Radiator heating -electrical						
12.2.1	12	2	1	Radiator heating	400	0,97	186,24	610,60	471,19	1268,03
12.2.1	12	2	1	Radiator heating	600	0,97	186,24	610,60	471,19	1268,03
12.2.1	12	2	1	Radiator heating	800	1,12	215,04	643,45	544,05	1402,54
12.2.1	12	2	1	Radiator heating	1000	1,12	215,04	678,49	544,05	1437,58
12.2.	12	2		Radiant Heater - electrical						
12.2.2	12	2	2	Radiant Heater	450	1,15	220,80	1362,78	558,62	2142,20
12.2.2	12	2	2	Radiant Heater	750	1,15	220,80	1687,08	558,62	2466,50
12.2.2	12	2	2	Radiant Heater	1000	0,93	178,56	878,46	451,76	1508,78
12.3.	12	3		Floor heating-brine						
12.3.1	12	3	1	Floor heating 10m2 -concrete	70	4,9	940,80	9652,65	2380,22	12973,67
12.3.1	12	3	1	Floor heating10m2 - wood	70	4,3	825,60	13928,96	2088,77	16843,33
12.3.1	12	3	1	Floor heating10m2 - RenovationKit	70	5	960,00	7900,00	2428,80	11288,80
12.4.	12	4		Floor heating -electrical						
12.4.1	12	4	1	Floor heating 4m2 - renovationKit	400	4,69	900,48	3865,71	2278,21	7044,40
12.4.1	12	4	1	Floor heating 8m2 - wood	800	7,2	1382,40	3604,56	3497,47	8484,43
12.4.1	12	4	1	Floor heating 10m2 -concrete	1000	6,72	1290,24	5052,51	3264,31	9607,06

5.1.5 Ventilation

Reference				Component/Technology	Max flow rate [l / h]	Labour Intensity [h]	Labour Cost [SEK]	Material Cost [SEK]	Additional Cost [SEK]	Total Cost [SEK]
	13			**Ventilation**						
13.1.	13	1		Automatic Natural Ventilation						
13.1.1	13	1	1	100 Fresh air intake		0,64	122,88	1076,00	310,89	1509,77
14.1.1	14	1	1	200 Fresh air intake grid		0,61	117,12	846,92	296,31	1260,35

14.2.	14	2		Mechanical Ventilation systems (exhaust air)							
14.2.1	14	2	1	6appartments		100	30,47	5850,24	102270,12	30802,77	138923,13
14.2.1	14	2	1	10 appartments		500	52,68	10114,56	130054,31	51802,37	191971,24
14.3.	14	3		Mechanical Ventilation systems (heat recovery)							
14.3.1	14	3	1	1 appartment		40	4,78	917,76	34699,21	2321,93	37938,90
14.3.1	14	3	1	8 appartments		200	9,54	1831,68	113989,00	4634,15	120454,83
14.3.1	14	3	1	Avarage appartment house sweden		500	9,54	1831,68	130176,00	4634,15	136641,83
14.4.	14	4		Decentral Mechanical Ventilation systems							
14.4.1	14	4	1	1 appartment		40	10,42	2000,64	41770,80	6669,02	50440,46

5.1.6 Lighting

Reference				Component/Technology	Life Cicle [h]	Nominal power [W]	Lighted surface [m2]	Luminous efficacy [lm/W]	Labour Intensity [h]	Labour Cost [EUR]	Material Cost [EUR]	Additional Cost [EUR]	Total Cost [EUR]
	15			**Lighting**									
15.1.	15	1		Conventional Lighting									
15.1.1	15	1	1	Fluorescent tube 18W	12.000	18	2	72	0,2	3,39	2,90	0,31	6,61
15.1.2	15	1	2	35W Halogen bulb	2.000	35	1,5	5,3	0,2	3,39	3,79	0,36	7,54
15.2.	15	2		LED Lighting									
15.2.1	15	2	1	LED Lighting - Dichroic lamp VS 35W Halogen	40.000	3	4	aprox. 70	0,2	3,39	16,90	1,01	21,31
15.2.2	15	2	2	LED Lighting - LED Tube 10,5W VS 18W Fluorescent Tube	50.000	10,5	2	100	0,2	3,39	25,90	1,46	30,76
15.2.3	15	2	3	LED Lighting - LED bulb 8W VS 35W Halogen bulb	40.000	8	1,5	53,75	0,2	3,39	7,90	0,56	11,86
15.2.4	15	2	4	LED Lighting - LED DL 10W VS DL 26W	50.000	10	2	60	0,2	3,39	24,90	1,41	29,71
15.2.	15	2		Renovation costs									
15.2.1	15	2	1	1 room appartment					17,31	3323,52	10537,00	8408,51	22269,03
15.2.2	15	2	2	2 room appartment					25,13	4824,96	13657,61	12207,15	30689,72
15.2.3	15	2	3	3 room appartment					30,72	5898,24	15229,36	14922,55	36050,15
15.2.4	15	2	4	4 room appartment					39,76	7633,92	18413,93	19313,82	45361,67

5.1.7 Shading

Reference				Component/Technology	Labour Intensity [h]	Labour Cost [SEK]	Material Cost [SEK]	Additional Cost [SEK]	Total Cost [SEK]
	16			**Shading**					
16.1.	**16**	**1**		**Drop-arm awnings installation**					
16.1.1	16	1	1	Manual		0,00		4200,00	4200,00
16.1.2	16	1	2	Automatic		0,00		0,00	0,00
16.1.3	16	1	3	Motorized		0,00		0,00	0,00
16.2.	**16**	**2**		**External window blinds**					
16.2.1	16	2	1	Aluminium raster		0,00		2200,00	2200,00
16.2.2	16	2	2	Venetian blinds		0,00		5200,00	5200,00
16.3.	**16**	**3**		**Automation of solar shading devices**					
16.3.1	16	3	1	PVC fixed		0,00		0,00	0,00
16.3.2	16	3	2	PVC adjustable		0,00		0,00	0,00
16.3.3	16	3	3	Aluminium horizontal		0,00		0,00	0,00
16.3.4	16	3	4	Aluminium vertical		0,00		0,00	0,00
16.4.	**16**	**4**		**Solar control vinyl film**					
16.4.1	16	4	1	Solar control film		0,00		1500,00	1500,00
16.5.	**16**	**5**		**Internal blinds**					
16.5.1	16	5	1	Between windows		0,00		700,00	700,00
16.5.1	16	5	1	Internal blinds		0,00		700,00	700,00

5.1.8 Solar Thermal Collectors

Reference				Component/Technology	Collector Area	Primary loss coeficcient	Tank Capacity	Labour Intensity	Labour Cost	Material Cost	Additional Cost	Total Cost
					m2		l	[h]	[SEK]	[SEK]	[SEK]	[SEK]
	17			**Solarthermal Collectors**								
17.1.	17	1		**Flat solar collector**								
17.1.1	17	1	1	Only DHW	7,5		0	11,05	2121,60	46338,00	5367,65	53827,25
17.1.2	17	1	2	Both DHW and Heating	15		0	15,85	3043,20	71138,00	7699,30	81880,50
17.2.	17	2		**Vacuum tube solar collector**								
17.2.1	17	2	1	Only DHW	7,5		0	11,05	2121,60	50877,00	5367,65	58366,25
17.2.1	17	2	1	Both DHW and Heating	15		0	17,65	3388,80	99998,00	8573,66	111960,46

5.1.9 Storage Tank

Reference				Component/Technology	Capacity	Nominal power	Labour Intensity	Labour Cost	Material Cost	Additional Cost	Total Cost
					[l]	[kW]	[h]	[SEK]	[SEK]	[SEK]	[SEK]
	18			**Storage Tank**							
18.1.	18	1		Hotwater tank							
18.1.1	18	1	1	Hotwater tank - 300 l	300		3,4	652,80	17068,40	1651,58	19376,18
18.1.1	18	1	1	Hotwater tank - 500 l	500		3,3	633,60	26800,00	1603,01	29039,91
	18	1	1	Hotwater tank - 750 l	750		4,3	825,60	33630,00	2088,77	36548,67
18.1.1	18	1	1	Hotwater tank - 1000 l	1000		5,8	1113,60	36900,00	2817,41	40836,81
18.2.	18	2		Hotwater tank with electrical boiler							
18.2.1	18	2	1	Hotwater tank with electrical boiler - 35 l	35	3	1,1	211,20	4014,96	534,34	4761,60

18.2.1	18	2	1	Hotwater tank with electrical boiler - 150 l	160	3	1,6	307,20	10725,64	777,22	11811,66
18.2.1	18	2	1	Hotwater tank with electrical boiler - 300 l	300	3	2,1	403,20	13581,64	1020,10	15007,04

5.1.10 Photovoltaic

Reference				Component/Technology	Power [kW]	Area Panel [m2]	Labour Intensity [h]	Labour Cost [SEK]	Material Cost [SEK]	Additional Cost [SEK]	Total Cost [SEK]
	19			**Photovoltaic**							
19.1.	19	1		Complete package	2	13,5	0	0,00	59528,56	0,00	59528,56
19.1.1	19	1	1	Complete package	5	30	0	0,00	114223,26	0,00	114223,26
19.1.1	19	1	1	Complete package	10	60	0	0,00	208472,62	0,00	208472,62
19.2.	19	2		Complete package	15	92,6	0	0,00	299948,09	0,00	299948,09
19.2.1	19	2	1	Complete package	20	124,7	0	0,00	374733,04	0,00	374733,04
19.2.1	19	2	1	Complete package	25	155	0	0,00	484946,42	0,00	484946,42
19.2.1	19	2	1	Complete package	30	188,7	0	0,00	567197,61	0,00	567197,61

5.1.11 Control Systems

Reference				Component/Technology	Reference Unit	Labour Intensity [h]	Labour Cost [SEK]	Material Cost [SEK]	Additional Cost [SEK]	Total Cost [SEK]
	20			**Control Systems**						
20.1.	**20**	**1**		**Climatic control system for heating/cooling/vent/lighting**						
20.1.1	20	1	1	PLC system 40	1,00	22,40	4300,80	28683,40	10881,02	43865,22
20.1.1	20	1	1	PLC system 120	1,00	24,60	4723,20	40529,15	11949,70	57202,05
20.1.1	20	1	1	PLC system 500	1,00	95,01	18241,92	205239,63	46152,06	269633,61
20.1.1	20	1	1	PLC system 500 computerized	1,00	86,46	16600,32	257887,28	41998,81	316486,41

5.2 Database France

5.2.1 Opaque components

Reference				Component/Technology	Insulation Thickness mm	Labour Intensity [h/m2]	Labour Cost [EUR/m2]	Material Cost [EUR/m2]	Additional Cost [EUR/m2]	Total Cost [EUR/m2]	Maintenance Cost [EUR/ year]
	1			**Outer walls against air**							
1.1.	1	1		External insulation (ventilated façade)							
1.1.1	1	1	1	Ventilated Fassade option 1 - 40 mm insulation	40 mm	1,79	41,49	63,83	2,11	107,43	1,11
1.1.1	1	1	1	Ventilated Fassade option 1 - 60 mm insulation	60 mm	1,79	41,49	67,18	2,17	110,84	1,14
1.1.1	1	1	1	Ventilated Fassade option 1 - 80 mm insulation	80 mm	1,79	41,49	70,46	2,24	114,19	1,18
1.1.2	1	1	2	Ventilated Fassade option 2 - 50 mm insulation	50 mm	2,21	51,27	94,73	4,38	150,37	2,56
1.1.2	1	1	2	Ventilated Fassade option 2 - 80 mm insulation	80 mm	2,21	51,27	97,89	4,47	153,63	2,61
1.1.2	1	1	2	Ventilated Fassade option 2 - 100 mm insulation	100 mm	2,21	51,27	100,84	4,56	156,67	2,66
1.1.3	1	1	3	Ventilated Fassade option 3 - 40 mm insulation	40 mm	2,12	49,13	118,78	5,04	172,96	1,35
1.1.3	1	1	3	Ventilated Fassade option 3 - 60 mm insulation	60 mm	2,12	49,13	120,87	5,10	175,11	1,37
1.1.3	1	1	3	Ventilated Fassade option 3 - 80 mm insulation	80 mm	2,12	49,13	123,22	5,17	177,52	1,39
1.1.4	1	1	4	Ventilated Fassade option 4 - 40 mm insulation	40 mm	2,58	59,83	168,44	4,57	232,84	5,36
1.1.5	1	1	5	Ventilated Fassade option 5 - 40 mm insulation	40 mm	3,15	73,35	84,74	3,16	161,25	0,81
1.1.6	1	1	6	Ventilated Fassade option 6 - 40 mm insulation	40 mm	1,20	27,88	89,24	3,51	120,63	1,09
1.1.7	1	1	7	Ventilated Fassade option 7 - 40 mm insulation	40 mm	1,89	43,81	190,18	7,02	241,01	4,10
1.2.	1	2		External insulation (EIFS System)							
1.2.1	1	2	1	External insulation (EIFS System) - option 1 - 40 mm insulation	40 mm	1,53	34,90	28,39	1,27	64,56	0,50
1.2.1	1	2	1	External insulation (EIFS System) - option 1 - 60 mm insulation	60 mm	1,53	34,90	30,66	1,31	66,87	0,52
1.2.1	1	2	1	External insulation (EIFS System) - option 1 - 80 mm insulation	80 mm	1,53	34,90	33,59	1,37	69,86	0,55
1.2.1	1	2	1	External insulation (EIFS System) - option 1 - 120 mm insulation	120 mm	1,53	34,90	40,03	1,50	76,43	0,60
1.2.2	1	2	2	External insulation (EIFS System) - option 2 - 40 mm insulation	40 mm	1,53	34,90	37,45	1,45	73,80	0,58
1.2.2	1	2	2	External insulation (EIFS System) - option 2 - 60 mm insulation	60 mm	1,53	34,90	44,20	1,58	80,69	0,63
1.2.2	1	2	2	External insulation (EIFS System) - option 2 - 80 mm insulation	80 mm	1,53	34,90	51,70	1,73	88,33	0,69

1.2.3	1	2	3	External insulation option 3- 50 mm	50 mm	1,09	25,29	89,21	2,29	116,78	0,77
1.3.	1	3		polyurethane foam							
1.3.1	1	3	1	polyurethane foam-60 mm insulation	60 mm	1,02	21,39	10,12	0,63	32,15	0,61
1.3.1	1	3	1	polyurethane foam - 80 mm insulation	80 mm	1,02	21,39	11,12	0,65	33,16	0,66
1.3.1	1	3	1	polyurethane foam - 100 mm insulation	100 mm	1,02	21,39	12,11	0,67	34,17	0,68
1.4.	1	4		Internal insulation							
1.4.1	1	4	1	Internal insulation option 1 - 10 + 30 mm insulation	10 + 30 mm	0,64	15,27	13,17	0,57	29,01	0,67
1.4.1	1	4	1	Internal insulation option 1 - 10 + 50 mm insulation	10 + 50 mm	0,64	15,27	15,72	0,62	31,61	0,73
1.4.1	1	4	1	Internal insulation option 1 - 10 + 80 mm insulation	10 + 80 mm	0,64	15,27	16,96	0,64	32,87	0,76
1.4.1	1	4	1	Internal insulation option 1 - 10 + 100 mm insulation	10 + 100 mm	0,64	15,27	20,09	0,71	36,06	0,84
1.4.2	1	4	2	Internal insulation option 2 - 80 mm insulation	80 mm	1,03	24,38	20,65	0,90	45,93	1,26
1.4.2	1	4	2	Internal insulation option 2 - 100 mm insulation	100 mm	1,03	24,38	19,31	0,87	44,56	1,23
1.4.2	1	4	2	Internal insulation option 2 - 120 mm insulation	120 mm	1,03	24,38	21,42	0,92	46,72	1,28
1.4.3	1	4	3	Internal insulation option 3 - 75 mm insulation	75 mm	1,01	23,87	18,73	0,85	43,45	1,37
1.4.3	1	4	3	Internal insulation option 3 - 100 mm insulation	100 mm	1,01	23,87	19,90	0,88	44,65	1,41
1.4.3	1	4	3	Internal insulation option 3 - 120 mm insulation	120 mm	1,01	23,87	20,84	0,89	45,61	1,44
	2			**Outer walls against earth**							
2.1.	2	1		Perimeter insulation							
2.1.1	2	1	1	Perimeter insulation - 40 mm insulation	40 mm	0,37	6,31	6,12	0,62	13,05	
2.1.1	2	1	1	Perimeter insulation - 60 mm insulation	60 mm	0,37	6,31	8,90	0,76	15,97	
2.1.1	2	1	1	Perimeter insulation - 80 mm insulation	80 mm	0,37	6,31	11,69	0,90	18,91	
2.2.	2	2		Internal Insulation of the Basement wall			same as 1.4.				
2.2.1	2	2	1	Internal insulation option 1 - 10 + 30 mm insulation	10 + 30 mm	0,64	15,27	13,17	0,57	29,01	
2.2.1	2	2	1	Internal insulation option 1 - 10 + 50 mm insulation	10 + 50 mm	0,64	15,27	15,72	0,62	31,61	
2.2.1	2	2	1	Internal insulation option 1 - 10 + 80 mm insulation	10 + 80 mm	0,64	15,27	16,96	0,64	32,87	
2.2.1	2	2	1	Internal insulation option 1 - 10 + 100 mm insulation	10 + 100 mm	0,64	15,27	20,09	0,71	36,06	
	3			**Basement (floor against earth)**							
3.1.	3	1		Insulation on the inside (heated side) of the floor slab							
3.1.1	3	1	1	Insulation on the inside (heated side) of the floor slab - 40 mm insulation	40 mm	1,22	27,65	22,34	1,00	50,99	0,32

3.1.1	3	1	1	Insulation on the inside (heated side) of the floor slab - 60 mm insulation	60 mm	1,22	27,65	26,71	1,09	55,45	0,35
3.1.1	3	1	1	Insulation on the inside (heated side) of the floor slab - 80 mm insulation	80 mm	1,22	27,65	31,09	1,17	59,91	0,38
	4			**Floors against unheated**							
4.1.	4	1		Insulation on the inside (heated side) of the floor slab	same as 3.1.						
4.1.1	4	1	1	Insulation on the inside (heated side) of the floor slab - 40 mm insulation	40 mm	1,22	27,65	22,34	1,00	50,99	0,32
4.1.1	4	1	1	Insulation on the inside (heated side) of the floor slab - 60 mm insulation	60 mm	1,22	27,65	26,71	1,09	55,45	0,35
4.1.1	4	1	1	Insulation on the inside (heated side) of the floor slab - 80 mm insulation	80 mm	1,22	27,65	31,09	1,17	59,91	0,38
4.2.	4	2		Insulation on the outside (unheated heated side) of the floor slab	same as 5.1.						
4.2.1	4	2	1	Insulation below the ceiling slab - 60 mm insulation-option 1	60 mm	0,82	19,33	19,52	0,78	39,63	0,81
4.2.1	4	2	1	Insulation below the ceiling slab - 100 mm insulation-option 1	100 mm	0,82	19,33	19,95	0,79	40,06	0,82
4.2.2	4	2	2	Insulation below the ceiling slab - 60 mm insulation-option2	60 mm	0,82	19,33	19,59	0,78	39,69	1,11
4.2.2	4	2	2	Insulation below the ceiling slab - 100 mm insulation-option 2	100 mm	0,82	19,33	20,82	0,80	40,95	1,15
	5			**Ceiling against unheated**							
5.1.	5	1		Insulation below the ceiling slab							
5.1.1	5	1	1	Insulation below the ceiling slab - 60 mm insulation-option 1	60 mm	0,82	19,33	19,52	0,78	39,63	0,81
5.1.1	5	1	1	Insulation below the ceiling slab - 100 mm insulation-option 1	100 mm	0,82	19,33	19,95	0,79	40,06	0,82
5.1.2	5	1	2	Insulation below the ceiling slab - 60 mm insulation-option2	60 mm	0,82	19,33	19,59	0,78	39,69	1,11
5.1.2	5	1	2	Insulation below the ceiling slab - 100 mm insulation-option 2	100 mm	0,82	19,33	20,82	0,80	40,95	1,15
5.2.	5	2		Insulation above the ceiling slab	same as 3.1.						
5.2.1	5	2	1	Insulation above the ceiling slab - 40mm insulation	40 mm	1,22	27,65	22,34	1,00	50,99	0,32
5.2.1	5	2	1	Insulation above the ceiling slab - 60mm insulation	60 mm	1,22	27,65	26,71	1,09	55,45	0,35
5.2.1	5	2	1	Insulation above the ceiling slab - 80mm insulation	80 mm	1,22	27,65	31,09	1,17	59,91	0,38
	6			**Flat roof**							
6.1.	6	1		External Insulation above the roof slab							

6.1.1	6	1	1	External Insulation above the roof slab option 1 - 40 mm insulation	40 mm	0,48	11,10	13,42	0,49	25,01	1,65
6.1.1	6	1	1	External Insulation above the roof slab option 1 - 60 mm insulation	60 mm	0,48	11,10	17,24	0,57	28,91	1,91
6.1.1	6	1	1	External Insulation above the roof slab option 1 - 80 mm insulation	80 mm	0,48	11,10	21,07	0,64	32,82	2,16
6.1.2	6	1	2	External Insulation above the roof slab option 2 - 40 mm insulation	40 mm	0,55	12,60	28,17	0,82	41,58	0,42
6.1.2	6	1	2	External Insulation above the roof slab option 2 - 60 mm insulation	60 mm	0,55	12,60	31,99	0,89	45,48	0,46
6.1.2	6	1	2	External Insulation above the roof slab option 2 - 80 mm insulation	80 mm	0,55	12,60	35,82	0,97	49,39	0,49
6.2.	6	2		Internal Insulation below the roof slab			same as 5.1.				
6.2.1	6	2	1	Insulation below the ceiling slab - 60 mm insulation-option 1	60 mm	0,82	19,33	19,52	0,78	39,63	0,81
6.2.1	6	2	1	Insulation below the ceiling slab - 100 mm insulation-option 1	100 mm	0,82	19,33	19,95	0,79	40,06	0,82
6.2.2	6	2	2	Insulation below the ceiling slab - 60 mm insulation-option2	60 mm	0,82	19,33	19,59	0,78	39,69	1,11
6.2.2	6	2	2	Insulation below the ceiling slab - 100 mm insulation-option 2	100 mm	0,82	19,33	20,82	0,80	40,95	1,15
	7			**Tilted roof**							
7.1.	7	1		External Insulation on roof							
7.1.1	7	1	1	External Insulation on roof - 50 mm insulation	50 mm	2,22	49,30	29,11	1,57	79,97	0,00
7.1.1	7	1	1	External Insulation on roof - 60 mm insulation	60 mm	2,22	49,30	31,26	1,61	82,17	0,00
7.2.	7	2		Core Insulation between roof beams of unheated attic							
7.2.1	7	2	1	Core Insulation between roof beams - 80 mm insulation	80 mm	0,25	5,74	9,46	0,77	15,97	0,10
7.2.1	7	2	1	Core Insulation between roof beams - 120 mm insulation	120 mm	0,25	5,74	11,71	0,88	18,33	0,11
7.2.1	7	2	1	Core Insulation between roof beams - 200 mm insulation	200 mm	0,25	5,74	12,36	0,92	19,01	0,12
7.3.	7	3		Internal Insulation below the roof construction			same as 5.1.				
7.3.1	7	3	1	Insulation below the ceiling slab - 60 mm insulation-option 1	60 mm	0,82	19,33	19,52	0,78	39,63	0,81
7.3.1	7	3	1	Insulation below the ceiling slab - 100 mm insulation-option 1	100 mm	0,82	19,33	19,95	0,79	40,06	0,82
7.3.2	7	3	2	Insulation below the ceiling slab - 60 mm insulation-option2	60 mm	0,82	19,33	19,59	0,78	39,69	1,11
7.3.2	7	3	2	Insulation below the ceiling slab - 100 mm insulation-option 2	100 mm	0,82	19,33	20,82	0,80	40,95	1,15

5.2.2 Windows

Reference				Component/Technology	U-Value[W/Km2]	Labour Intensity [h/m2]	Labour Cost [EUR/m2]	Material Cost [EUR/m2]	Additional Cost [EUR/m2]	Total Cost [EUR/m2]	Maintenance Cost [EUR/m2 year]
	8			**Windows in Wall**							
8.1.	8	1		Double glass with air cavity							
8.1.1	8	1	1	4 mm / 6 mm / 4 mm	3,3	0,99	24,23	22,81	0,94	47,98	1,01
8.1.2	8	1	2	4 mm / 10 mm / 4 mm	3	0,99	24,23	23,42	0,95	48,60	1,02
8.1.3	8	1	3	4 mm / 14 mm / 4 mm	2,8	0,99	24,23	24,71	0,98	49,92	1,05
8.2.	8	2		Double glass with air cavity and low e-glazing							
8.2.1	8	2	1	4 mm / 6 mm / 6 mm	2,5	0,99	24,23	92,86	2,34	119,43	2,51
8.2.1	8	2	1	4 mm / 10 mm / 6 mm	1,8	0,99	24,23	93,46	2,35	120,04	2,52
8.2.1	8	2	1	4 mm / 14 mm / 6 mm	1,5	0,99	24,23	94,76	2,38	121,37	2,55
8.3.	8	3		Double glass with argon cavity and low e-glazing							
8.3.1	8	3	1	4 mm / 10 mm / 6 mm	1,4	0,99	24,23	99,50	2,47	126,20	2,65
8.3.1	8	3	1	4 mm / 14 mm / 6 mm	1,1	0,99	24,23	100,80	2,50	127,52	2,68
8.3.1	8	3	1	4 mm / 18mm / 6 mm	1,1	0,99	24,23	101,91	2,52	128,66	2,70
8.4.	8	4		Windows frame							
8.4.1	8	4	1	Aluminium	1,43	11,72	269,30	119,25	7,77	396,33	5,55
8.4.2	8	4	2	Wood	1,1	2,23	51,31	399,98	9,03	460,31	11,51
8.4.3	8	4	3	PVC	2,1	2,83	66,37	177,12	4,87	248,36	2,73
	9			**Windows in Tilted Roof**							
9.1.	9	1		Double glass with air cavity							
9.1.1	9	1	1	rotary manual	0	1,55	36,68	283,78	6,41	326,87	11,44
9.1.1	9	1	1	rotary electric	0	1,55	36,68	739,93	15,53	792,14	27,73
9.1.1	9	1	1	rotary electric with solar	0	1,55	36,68	796,04	16,65	849,37	29,73
9.1.2	9	1	2	projection manual	0	1,55	36,68	409,65	8,93	455,25	15,93
	10			**Windows in Flat Roof**							
10.1.1	10	1	1	900 mm x 1200 mm fixed	1,4	3,01	71,36	675,20	14,93	761,49	18,38
10.1.1	10	1	1	900 mm x 1200 mm manual.	1,4	3,01	71,36	1074,38	22,91	1168,66	46,75
10.1.2	10	1	2	900 mm x 1200 mm electric	1,4	3,01	71,36	1152,06	24,47	1247,89	49,92

10.1.2	10	1	2	1200 mm x 1200 mm fixed	1,4	3,68	87,24	733,89	16,42	837,56	33,50
10.1.3	10	1	3	1200 mm x 1200 mm manual	1,4	3,68	87,24	1143,80	24,62	1255,67	50,23
10.1.3	10	1	3	1200 mm x 1200 mm electric	1,4	3,68	87,24	1210,75	25,96	1323,95	52,96

5.2.3 Heating System

Reference				Component/Technology	Nominal Power kW	Labour Intensity [h]	Labour Cost [EUR]	Material Cost [EUR]	Additional Cost [EUR]	Total Cost [EUR]	Maintenance Cost [EUR/year]
	11			**Heating System**							
11.1.	11	1		Oil boiler (conventional)							
11.1.1	11	1	1	25 kW	25	8	185,08	1850,92	40,72	2076,72	228,44
11.1.1	11	1	1	25 kW With energy accumulation in the primary circuit	25	10	231,35	2462,02	53,87	2747,24	302,20
11.1.1	11	1	1	25 kW With deposit integrated	25	14	323,89	2403,82	54,55	2782,26	306,05
11.1.1	11	1	1	40 kW With deposit integrated	40	17	393,30	2956,72	67,00	3417,02	375,87
11.2.	11	2		Gas boiler (conventional)							
11.2.2	11	2	2	Gas boiler (conventional) - 30 kW	30	8	185,08	1816,68	40,04	2041,80	193,97
11.2.2	11	2	2	Gas boiler (conventional) - 42 kW	42	10	231,35	1903,98	42,71	2178,04	206,91
11.2.2	11	2	2	Gas boiler (conventional) - 54 kW	54	14	323,89	2117,38	48,83	2490,10	236,56
11.3.	11	3		Oil boiler (condensing)							
11.3.1	11	3	1	individual - 30 kW	30	6,76	156,39	6525,73	133,64	6815,77	749,74
11.3.2	11	3	2	collective -95 kW	95	8,19	189,48	5539,69	114,58	5843,75	642,81
11.3.2	11	3	2	collective -510 kW	510	9,02	208,68	16578,37	335,74	17122,79	1883,51
11.3.2	11	3	2	collective -1200 kW	1200	10,4	240,60	34321,17	691,24	35253,01	3877,83
11.4.	11	4		Gas boiler (condensing)							
11.4.1	11	4	1	individual - 30 kW	30	6	138,81	2238,32	47,54	2424,67	230,34
11.4.1	11	4	1	individual - 30 kW	30	6	138,81	2742,35	57,62	2938,78	2791,84
11.4.1	11	4	1	individual - 28 kW	28	6	138,81	3634,75	75,47	3849,03	365,66
11.4.1	11	4	1	individual - 28 kW	30	6	138,81	5564,18	114,06	5817,05	552,62
11.4.2	11	4	2	collective - 45 kW	45	8,09	187,16	3867,09	81,09	4135,34	392,86
11.4.2	11	4	2	collective - 80 kW	80	8,16	188,78	4744,59	98,67	5032,04	478,04

11.4.2	11	4	2	collective - 115 kW	115	8,23	190,40	11620,43	236,22	12047,05	1144,47
11.4.2	11	4	2	collective - 240 kW	240	8,48	196,18	17738,10	358,69	18292,97	1737,83
11.4.2	11	4	2	collective - 520 kW	520	9,04	209,14	29100,33	586,19	29895,66	2840,09
11.4.2	11	4	2	collective - 745 kW	745	9,49	219,55	34490,35	694,20	35404,10	3363,39
11.4.2	11	4	2	collective - 1200 kW	1150	10,3	238,29	44080,55	886,38	45205,22	4294,50
11.5.	11	5		Heat pump air							
11.5.1	11	5	1	no distribution - 2,5 kW	2,5	4,222	97,68	929,18	20,54	1047,39	53,10
11.5.1	11	5	1	no distribution - 5 kW	5	4,222	97,68	1688,70	35,73	1822,10	92,38
11.5.2	11	5	2	with distribution - 2,5 kW	2,5	4,222	97,68	1285,00	27,65	1410,33	71,65
11.5.2	11	5	2	with distribution - 3,5 kW	3,5	4,222	97,68	1505,00	32,05	1634,73	83,04
11.5.3	11	5	3	air-water	21,8	19,246	445,26	7113,53	151,18	7709,96	493,44
11.5.3	11	5	3	air-water	63,4	63,4	32,08	742,12	15,48	789,69	1136,08
11.5.4	11	5	4	inside air water	6,7	14,114	326,53	5408,41	114,70	5849,64	493,44
11.5.4	11	5	4	inside air water	17,2	19,246	445,26	8171,13	172,33	8788,71	562,48
11.6.	11	6		Heat pump ground							
11.6.1	11	6	1	Heat pump ground - 6,95 kW	6,95	14,114	326,53	2772,64	61,98	3161,15	202,31
11.6.1	11	6	1	Heat pump ground - 15,31 kW	15,31	19,246	445,26	6102,18	130,95	6678,38	428,00
11.6.1	11	6	1	Heat pump ground - 49,9 kW	49,9	32,078	742,12	28848,31	591,81	30182,24	1931,66
11.6.1	11	6	1	Heat pump ground - 100kW	100	41,346	956,54	57553,62	1170,20	59680,36	3819,54
11.6.2	11	6	2	Heat pump ground DWS heating	14	68,434	1583,22	9945,47	230,57	11759,26	752,59
11.9.	11	9		Biomass stove							
11.9.1	11	9	1	Chip - 35 kW	35,00	12	277,62	16957,21	344,70	17579,53	
11.9.1	11	9	1	Chip - 80 kW	80,00	12	277,62	27328,29	552,12	28158,03	
11.9.1	11	9	1	Chip - 500 kW	500,00	90	2082,15	97728,16	1996,21	101806,52	
11.9.1	11	9	1	Chip - 1000 kW	1000,00	90	2082,15	157392,32	3189,49	162663,96	
11.9.2	11	9	2	Pellets - 45 kW	45,00	6,8	157,32	15203,19	307,21	15667,72	
11.9.2	11	9	2	Pellets - 80 kW	80,00	12	277,62	27328,29	552,12	28158,03	
11.9.2	11	9	2	Pellets - 500 kW	500,00	90	2082,15	97728,16	1996,21	101806,52	
11.9.2	11	9	2	Pellets - 1000 kW	1000,00	90	2082,15	157392,32	3189,49	162663,96	

5.2.4 Heat Distribution

Reference				Component/Technology	Nominal Power	Labour Intensity	Labour Cost	Material Cost	Additional Cost	Total Cost	Maintenance Cost
					W	[h]	[EUR]	[EUR]	[EUR]	[EUR]	[EUR/year]
	12			**Heat distribution**							
12.1.	12	1		Radiator heating							
12.1.1	12	1	1	Radiator heating - 522 W		522	0,92	21,28	109,75	35,38	166,41	1,87
12.1.1	12	1	1	Radiator heating - 688 W		688	0,92	21,28	110,95	35,70	167,94	1,89
12.1.1	12	1	1	Radiator heating - 731 W		794	0,92	21,28	124,99	39,49	185,77	2,09
12.2.	12	2		Floor heating							
12.2.1	12	2	1	Floor heating - mortar		50	1,444	33,37	37,17	1,41	71,94	0,36
12.2.1	12	2	1	Floor heating - dry		50	1,344	31,09	51,46	1,65	84,20	0,42
12.3.1	12	3	1	Ceilling heating		50	1,005	23,25	198,90	4,44	226,59	3,85

5.2.5 Ventilation

Reference				Component/Technology	Max flow rate	Load loss	Heat Recovery	Labour Intensity	Labour Cost	Material Cost	Additional Cost	Total Cost	Maintenance Cost
					[m3 / h]	[Pa]	[%]	[h]	[EUR]	[EUR]	[EUR]	[EUR]	[EUR/year]
	13			**Ventilation**									
13.1.	13	1		Natural ventillation systems									
	13	1	1	roof extractor				0,248	5,71	168,78	3,49	177,98	1,96
13.2.	13	2		Mechanical Ventilation systems (exhaust air)									
13.2.1	13	2	1	extractor box	1000			0,24	5,55	2143,54	42,98	2192,07	309,08
13.2.2	13	2	2	roof fan	1100			8,02	185,70	594,78	15,61	796,09	112,25
13.2.3	13	2	3	ventilation unit	250			0,702	16,25	204,03	4,41	224,69	31,68
13.3.	13	3		Mechanical Ventilation systems (heat recovery)									
13.3.1	13	3	1	static without bypass	300	54,7	90	0,502	11,61	989,80	20,03	1021,44	17,37

13.3.1	13	3	1	static with bypass	300	54,7	90	0,502	11,61	1615,45	32,54	1659,61	28,31
13.3.2	13	3	2	heat recovery	387			0,4	9,25	793,44	16,05	818,75	13,92

5.2.6 Cooling

Reference				Component/Technology	Nominal power [kW]	Efficiency [%]	Labour Intensity [h]	Labour Cost [EUR]	Material Cost [EUR]	Additional Cost [EUR]	Total Cost [EUR]	Maintenance Cost [EUR/year]
	14			**Cooling**								
14.1.	14	1		Decentral air conditioning units one splits								
14.1.1	14	1	1	No distribution	3,2	400	4,222	97,68	929,18	20,54	1047,39	53,10
14.1.1	14	1	1	No distribution	5,8	365	4,222	97,68	1688,70	35,73	1822,10	92,38
14.1.2	14	1	2	With distribution	3,4	453	4,222	97,68	1285,00	27,65	1410,33	71,65
14.1.2	14	1	2	With distribution	4,2	382	4,222	97,68	1505,00	32,05	1634,73	83,04
14.1.	14	1		Decentral inside air conditioning units multi splits								
14.2.1	14	2	1	No distribution	3,2	400	2,112	97,68	394,88	9,85	502,41	22,95
14.2.1	14	2	1	No distribution	5,8	365	2,112	97,68	629,85	14,55	742,08	35,10
14.2.2	14	2	2	With distribution	3,4	453	2,112	48,86	624,98	13,48	687,32	34,92
14.2.2	14	2	2	With distribution	4,2	382	2,112	48,86	689,33	14,76	752,95	38,25
	14	3		Decentral outside air conditioning units multi splits								
	14	3		outside air conditionning for 2 inside	4		2,382	55,11	1077,38	57,30	1189,79	60,44
14.4.	14	4		Chillers								
14.4.1	14	4	1	No distribution	150		42,77	989,48	33150,87	682,81	34823,16	2228,68

5.2.7 Lighting

Reference				Component/Technology	Nominal power	Light Surface Area m2	Labour Intensity [h]	Labour Cost [EUR]	Material Cost [EUR]	Additional Cost [EUR]	Total Cost [EUR]	Maintenance Cost [EUR/year]
	15			Lighting								
15.1.	15	1		Fluorescent Lighting								
15.1.1	15	1	1	Fluorescent Lighting - 2 x 26 W	2x26 W	4	1,028	23,78	114,81	2,77	141,36	1,70
15.1.1	15	1	1	Fluorescent Lighting - 2 x 32W	2x32 W	6,5	1,028	23,78	131,47	3,11	158,36	1,90
15.2.	15	2		LED Lighting								
15.2.1	15	2	1	LED Lighting - 3 x 1 W	3x1 W	4	1,028	23,78	145,27	3,38	172,43	2,07

5.2.8 Shading

Reference				Component/Technology	Shaded Window area m2	Labour Intensity [h]	Labour Cost [EUR]	Material Cost [EUR]	Additional Cost [EUR]	Total Cost [EUR]	Maintenance Cost [EUR/year]
	16			Shading							
16.1.	16	1		Drop-arm awnings installation							
16.1.1	16	1	1	Manual	1	2,28	52,79	303,42	7,12	363,34	30,88
16.1.2	16	1	2	Automatic	1	2,28	52,79	433,42	9,72	495,94	42,16
16.1.3	16	1	3	Motorized	1	2,28	52,79	553,42	12,12	618,34	52,56
16.2.	16	2		External window blinds							
16.2.1	16	2	1	PVC 37 mm slats	1	0,45	10,51	21,98	1,62	34,11	0,85
16.2.2	16	2	2	Cast aluminium 33 mm slats	1	0,48	11,02	31,86	2,14	45,02	1,13
16.3	16	4		Automation							
16.3.1	16	3	1	PVC fixed	1	0,02	0,37	31,20	0,63	32,20	0,81
16.3.2	16	3	2	PVC adjustable	1	0,02	0,51	46,66	0,94	48,11	1,20
16.3.3	16	3	3	Aluminium horizontal	1	0,46	10,48	105,16	2,31	117,95	2,95
16.3.4	16	3	4	Aluminium vertical	1	0,32	7,36	100,16	2,15	109,67	2,74

16.4.	16	4		Solar control vinyl film							
16.4.1	16	4	1	External solar film	1	0,30	7,42	30,09	1,88	39,39	2,05
16.4.2	16	4	2	Internal solar film	1	0,30	7,42	21,84	1,46	30,72	1,60

5.2.9 Solar Thermal

Reference				Component/Technology	Collector Area	Efficiency [%]	Tank Capacity	Labour Intensity	Labour Cost	Material Cost	Additional Cost	Total Cost
					m2		l	[h]	[EUR]	[EUR]	[EUR]	[EUR]
	17			Solarthermal Collectors								
17.1.	17	1		Flat solar collector								
17.1.1	17	1	1	Invidual - flat roof	2,02	0,819	200	7,188	166,29	2498,32	133,23	2797,85
17.1.1	17	1	1	Invidual - flat roof	8,08	0,819	500	15,332	354,71	4435,00	239,49	5029,19
17.1.1	17	1	1	Invidual - titled roof	2,02	0,819	200	6,368	147,32	2505,93	53,07	2706,32
17.1.1	17	1	1	Invidual - titled roof	8,08	0,819	500	13,584	314,27	4520,80	96,70	4931,77
17.1.2	17	1	2	Collective - flat roof	2,1	0,75	200	23,03	532,80	5399,45	118,64	6050,89
17.1.2	17	1	2	Collective - titled roof	2,1	0,75	200	23,03	532,80	5015,05	110,96	5658,81
17.2.	17	2		Vacuum tube solar collector								
17.2.1	17	2	1	Invidual - flat roof	2,08	0,93	200	7,187	166,27	3137,99	165,21	3469,48
17.2.1	17	2	1	Invidual - flat roof	6,24	0,93	300	13,896	321,48	3881,33	210,14	4412,95
17.2.1	17	2	1	Invidual - titled roof	2,08	0,93	200	6,368	147,32	3137,99	65,71	3351,02
17.2.1	17	2	1	Invidual - titled roof	6,24	0,819	300	12,31	284,79	3881,33	83,32	4249,44
17.2.2	17	2	2	Collective - flat roof	4,5	0,73	300	23,03	532,80	7268,81	156,03	7957,64
17.2.2	17	2	2	Collective - titled roof	4,5	0,73	300	23,03	532,80	6769,25	146,04	7448,09

5.2.10 Storage Tank

Reference				Component/Technology	Capacity [l]	Nominal power [kW]	Labour Intensity [h]	Labour Cost [EUR]	Material Cost [EUR]	Additional Cost [EUR]	Total Cost [EUR]	Maintenance Cost [EUR/year]
	18			Storage Tank								
18.1.	18	1		Hotwater tank								
18.1.1	18	1	1	Hotwater tank - 130 l	130	36	10,12	234,13	5458,65	288,05	5980,83	400,72
18.1.1	18	1	1	Hotwater tank - 220 l	220	36	10,504	243,01	6125,67	322,26	6690,94	448,29
18.1.1	18	1	1	Hotwater tank - 370 l	370	31,7	10,954	253,42	6627,79	348,19	7229,40	484,37
18.1.1	18	1	1	Hotwater tank - 460 l	460	81,9	11,018	254,90	14641,32	753,75	15649,97	478,11
18.2.	18	2		Hotwater tank with electrical boiler								
18.2.1	18	2	1	Hotwater tank with electrical boiler - 75 l	75	2	1,916	44,33	224,19	13,43	281,94	21,10
18.2.1	18	2	1	Hotwater tank with electrical boiler - 150 l	150	2,2	2,156	49,88	443,41	24,66	517,95	38,77
18.2.1	18	2	1	Hotwater tank with electrical boiler - 300 l	300	3	2,396	55,43	761,21	40,83	857,47	64,18
18.3.	18	3		Hotwater tank from thermosolar								
18.3.1	18	3	1	Hotwater tank from thermosolar - 300 l	300	35,6	3,92	66,48	1225,00	64,57	1356,06	
18.3.1	18	3	1	Hotwater tank from thermosolar - 500 l	500	71,5	4,58	77,68	2268,00	117,28	2462,96	
18.3.1	18	3	1	Hotwater tank from thermosolar - 1000 l	1000	101,2	5,52	93,62	2268,00	118,08	2479,70	

5.2.11 Control Systems

Reference				Component/Technology	Reference Unit	Labour Intensity [h]	Labour Cost [EUR]	Material Cost [EUR]	Additional Cost [EUR]	Total Cost [EUR]	Maintenance Cost [EUR/year]
	20			Control Systems							
20.1.	20	1		Climatic control system for heating/cooling							
20.1.1	20	1	1	Centralized control of the installation of air cooling	1,00	4,12	95,32	4588,00	93,67	4776,98	167,19
20.1.2	20	1	2	Centralized control of the installation of heating and domestic hot water	1,00	22,40	518,22	707,80	24,52	1250,54	43,77
20.1.3	20	1	3	Centralized control of the installation of heating	1,00	22,20	513,60	615,65	22,58	1151,83	40,31
20.2.	20	2		Indoor thermostatic control system							

20.2.1	20	2	1	Indoor thermostatic control system	1,00	2,51	58,12	247,69	15,47	321,28	9,00
20.3.	20	3		Climatic-indoor thermostatic system							
20.3.1	20	3	1	Option 1	1,00	1,50	25,44	128,88	7,72	162,04	
20.3.2	20	3	2	Option 2	1,00	1,50	25,44	130,02	7,77	163,23	
20.4.	20	4		Occupancy sensors for lighting							
20.4.1	20	4	1	Occupancy sensors for lighting inside	1,00	0,40	9,25	28,18	0,75	38,18	1,11
20.4.1	20	4	1	Occupancy sensors for lighting outside	1,00	0,40	9,25	116,30	2,51	128,07	3,71
20.5.	20	5		Automatic daylight dimming systems							
20.5.1	20	5	1	Automatic daylight dimming systems	1,00	0,26	5,92	84,43	1,81	92,16	2,67
20.6.	20	6		Solar thermal control systems							
20.6.1	20	6	1	Solar thermal control systems	1,00	20,20	467,33	259,00	14,53	740,85	25,93

5.3 Database Germany

5.3.1 Opaque components

Reference				Component/Technology	Insulation Thickness mm	Labour Intensity [h/m2]	Labour Cost [EUR/m2]	Material Cost [EUR/m2]	Equipment Cost [EUR/m2]	Total Cost [EUR/m2]
	1			**Outer walls against air**						
1.1.	**1**	**1**		**External insulation (ETICS System - mineral wool)**						
1.1.1	1	1	1	MW, mineral plaster, dispersion - 100 mm insulation	100mm	1,84	67,70	63,62	0,43	131,75
1.1.1	1	1	1	MW, mineral plaster, dispersion - 120 mm insulation	120mm	1,84	67,70	66,50	0,45	134,65
1.1.1	1	1	1	MW, mineral plaster, dispersion - 140 mm insulation	140mm	1,89	69,54	69,37	0,47	139,38
1.1.1	1	1	1	MW, mineral plaster, dispersion - 160 mm insulation	160mm	1,89	69,54	73,18	0,49	143,21
1.1.2	1	1	2	MW, mineral plaster, silicate - 80 mm insulation	80mm	1,84	67,70	58,97	0,41	127,08
1.1.2	1	1	2	MW, mineral plaster, silicate - 100 mm insulation	100mm	1,84	67,70	63,74	0,43	131,87
1.1.2	1	1	2	MW, mineral plaster, silicate - 120 mm insulation	120mm	1,84	67,70	66,62	0,45	134,77
1.1.2	1	1	2	MW, mineral plaster, silicate - 160 mm insulation	160mm	1,89	69,54	73,30	0,49	143,33
1.1.2	1	1	2	MW, mineral plaster, silicate - 200 mm insulation	200mm	1,89	69,54	96,17	0,58	166,29
1.1.4	1	1	4	MW, mineral plaster, silicate - 250 mm insulation	250mm	1,94	71,37	110,30	0,58	182,25
1.1.5	1	1	5	MW, mineral plaster, silicate - 300 mm insulation	300mm	2,04	75,04	123,32	0,58	198,94
1.1.6	1	1	6	MW, adhesive process - 80 mm insulation	80 mm	1,54	56,69	53,79	0,01	110,49
1.1.6	1	1	6	MW, adhesive process - 100 mm insulation	100 mm	1,54	56,69	58,75	0,01	115,45
1.1.6	1	1	6	MW, adhesive process - 120 mm insulation	120 mm	1,59	58,53	62,62	0,01	121,16
1.1.6	1	1	6	MW, adhesive process - 140 mm insulation	140 mm	1,59	58,53	67,85	0,01	126,39
1.1.6	1	1	6	MW, adhesive process - 160 mm insulation	160 mm	1,64	60,36	72,40	0,01	132,77
1.1.6	1	1	6	MW, adhesive process - 180 mm insulation	180 mm	1,64	60,36	77,11	0,01	137,48
1.1.6	1	1	6	MW, adhesive process - 200 mm insulation	200 mm	1,69	62,20	83,04	0,01	145,25
1.1.6	1	1	6	MW, adhesive process - 240 mm insulation	240 mm	1,69	62,20	98,90	0,01	161,11
1.1.7	1	1	7	MW, mechanical fastening - 80 mm insulation	80 mm	1,74	64,03	66,47	0,01	130,51
1.1.7	1	1	7	MW, mechanical fastening - 100 mm insulation	100 mm	1,74	64,03	71,01	0,01	135,05
1.1.7	1	1	7	MW, mechanical fastening - 120 mm insulation	120 mm	1,84	67,70	73,51	0,01	141,22
1.1.7	1	1	7	MW, mechanical fastening - 140 mm insulation	140 mm	1,84	67,70	76,68	0,01	144,39
1.1.7	1	1	7	MW, mechanical fastening - 160 mm insulation	160 mm	1,94	71,37	81,10	0,01	152,48

1.1.7	1	1	7	MW, mechanical fastening - 200 mm insulation	200 mm	2,04	75,04	90,48	0,01	165,53
1.1.7	1	1	7	MW, mechanical fastening - 240 mm insulation	240 mm	2,14	78,71	99,32	0,01	178,04
1.1.8	1	1	8	MW, mineral plaster, WLG 035 - 160 mm insulation	160 mm	1,89	69,54	73,89	0,01	143,44
1.1.8	1	1	8	MW, mineral plaster, WLG 035 - 180 mm insulation	180 mm	1,89	69,54	82,39	0,01	151,94
1.1.8	1	1	8	MW, mineral plaster, WLG 035 - 200 mm insulation	200 mm	1,89	69,54	92,90	0,01	162,45
1.1.8	1	1	8	MW, mineral plaster, WLG 035 - 220 mm insulation	220 mm	1,94	71,37	95,11	0,01	166,49
1.1.8	1	1	8	MW, mineral plaster, WLG 035 - 240 mm insulation	240 mm	1,94	71,37	99,32	0,01	170,70
1.1.8	1	1	8	MW, mineral plaster, WLG 035 - 260 mm insulation	260 mm	1,94	71,37	103,31	0,01	174,69
1.1.8	1	1	8	MW, mineral plaster, WLG 035 - 280 mm insulation	280 mm	2,04	75,04	107,10	0,01	182,15
1.1.8	1	1	8	MW, mineral plaster, WLG 035 - 300 mm insulation	300 mm	2,09	76,88	111,42	0,01	188,31
1.1.9	1	1	9	MW, mineral plaster, lamella - 80 mm insulation	80 mm	1,6405	60,36	62,93	0,51	123,80
1.1.9	1	1	9	MW, mineral plaster, lamella - 100 mm insulation	100 mm	2,0405	75,04	64,53	0,48	140,05
1.1.9	1	1	9	MW, mineral plaster, lamella - 160 mm insulation	160 mm	1,7405	64,03	79,87	0,52	144,42
1.1.9	1	1	9	MW, mineral plaster, lamella - 180 mm insulation	180 mm	1,8405	67,70	80,19	0,52	148,41
1.1.9	1	1	9	MW, mineral plaster, lamella - 200 mm insulation	200 mm	1,8405	67,70	85,56	0,52	153,78
1.1.10	1	1	10	MW, straps, WF - 100 mm insulation	100 mm	2,6405	97,06	103,49	0,87	201,42
1.1.10	1	1	10	MW, straps 240/72 - 160 mm insulation	160 mm	2,6405	97,06	97,87	0,01	194,94
1.1.10	1	1	10	MW, straps 240/72 - 200 mm insulation	200 mm	2,7405	100,73	93,74	0,01	194,48
1.1.	**1**	**1**		**External insulation (ETICS System - polystyrene)**						
1.2.1	1	2	1	PS, mineral plaster, dispersion - 60 mm insulation	60 mm	1,72	63,26	55,26	0,46	118,98
1.2.1	1	2	1	PS, mineral plaster, dispersion - 80 mm insulation	80 mm	1,72	63,26	59,69	0,47	123,42
1.2.1	1	2	1	PS, mineral plaster, dispersion - 100 mm insulation	100 mm	1,72	63,26	60,43	0,46	124,15
1.2.1	1	2	1	PS, mineral plaster, dispersion - 120 mm insulation	120mm	1,72	63,26	71,95	0,46	135,67
1.2.1	1	2	1	PS, mineral plaster, dispersion - 140 mm insulation	140mm	1,72	63,26	72,25	0,47	135,98
1.2.1	1	2	1	PS, mineral plaster, dispersion - 160 mm insulation	160mm	1,82	66,93	75,77	0,49	143,19
1.2.1	1	2	1	PS, mineral plaster, dispersion - 180 mm insulation	180mm	1,82	66,93	78,72	0,51	146,16
1.2.1	1	2	1	PS, mineral plaster, dispersion - 200 mm insulation	200mm	1,82	66,93	86,17	0,54	153,64
1.2.1	1	2	1	PS, organic plaster, dispersion - 300 mm insulation	300mm	1,82	66,93	107,75	0,64	175,32
1.2.2	1	2	2	PS, finishing plaster, dispersion - 80 mm insulation	80mm	1,72	63,26	59,69	0,47	123,42
1.2.2	1	2	2	PS, finishing plaster, dispersion - 120 mm insulation	120mm	1,72	63,26	68,67	0,44	132,37
1.2.2	1	2	2	PS, finishing plaster, dispersion - 160 mm insulation	160mm	1,82	66,93	75,70	0,50	143,13
1.2.3	1	2	3	PS, cement mortar, dispersion - 60 mm insulation	60mm	1,72	63,26	55,26	0,46	118,98
1.2.4	1	2	4	PS, cement mortar, silicate - 40 mm insulation	40mm	1,72	63,26	51,72	0,46	115,44

1.2.5	1	2	5	PS, adhesive process - 80 mm insulation	80 mm	1,54	56,69	53,08	0,01	109,78
1.2.5	1	2	5	PS, adhesive process - 100 mm insulation	100 mm	1,54	56,69	55,15	0,01	111,85
1.2.5	1	2	5	PS, adhesive process - 120 mm insulation	120 mm	1,59	58,53	59,15	0,01	117,69
1.2.5	1	2	5	PS, adhesive process - 140 mm insulation	140 mm	1,59	58,53	62,89	0,01	121,43
1.2.5	1	2	5	PS, adhesive process - 160 mm insulation	160 mm	1,64	60,36	65,93	0,01	126,30
1.2.5	1	2	5	PS, adhesive process - 180 mm insulation	180 mm	1,64	60,36	71,30	0,01	131,67
1.2.5	1	2	5	PS, adhesive process - 200 mm insulation	200 mm	1,64	60,36	75,72	0,01	136,09
1.2.5	1	2	5	PS, adhesive process - 240 mm insulation	240 mm	1,69	62,20	86,35	0,01	148,56
1.2.6	1	2	6	PS, mechanical fastening - 80 mm insulation	80 mm	1,84	67,70	55,29	0,01	123,00
1.2.6	1	2	6	PS, mechanical fastening - 100 mm insulation	100 mm	1,84	67,70	57,92	0,01	125,63
1.2.6	1	2	6	PS, mechanical fastening - 120 mm insulation	120 mm	1,94	71,37	61,09	0,01	132,47
1.2.6	1	2	6	PS, mechanical fastening - 140 mm insulation	140 mm	1,94	71,37	64,55	0,01	135,93
1.2.6	1	2	6	PS, mechanical fastening - 160 mm insulation	160 mm	2,04	75,04	67,44	0,01	142,49
1.2.6	1	2	6	PS, mechanical fastening - 200 mm insulation	200 mm	2,09	76,88	72,55	0,01	149,44
1.2.6	1	2	6	PS, mechanical fastening - 240 mm insulation	240 mm	2,09	76,88	82,50	0,01	159,39
1.2.7	1	2	7	PS, organic plaster - 60 mm insulation	60 mm	1,74	64,03	58,49	0,47	122,99
1.2.7	1	2	7	PS, organic plaster - 80 mm insulation	80 mm	1,74	64,03	61,97	0,46	126,46
1.2.7	1	2	7	PS, organic plaster - 100 mm insulation	100 mm	1,74	64,03	65,49	0,46	129,98
1.2.7	1	2	7	PS, organic plaster - 120 mm insulation	120 mm	1,74	64,03	69,03	0,44	133,50
1.2.7	1	2	7	PS, organic plaster - 140 mm insulation	140 mm	1,74	64,03	73,10	0,47	137,60
1.2.7	1	2	7	PS, organic plaster - 160 mm insulation	160 mm	1,84	67,70	76,06	0,50	144,26
1.2.7	1	2	7	PS, organic plaster - 200 mm insulation	200 mm	1,84	67,70	88,05	0,55	156,30
1.2.7	1	2	7	PS, organic plaster - 220 mm insulation	220 mm	1,84	67,70	91,05	0,64	159,39
1.2.7	1	2	7	PS, organic plaster - 240 mm insulation	240 mm	1,84	67,70	95,32	0,64	163,66
1.2.7	1	2	7	PS, organic plaster - 260 mm insulation	260 mm	1,84	67,70	98,52	0,64	166,86
1.2.7	1	2	7	PS, organic plaster - 280 mm insulation	280 mm	1,84	67,70	100,65	0,64	168,99
1.2.7	1	2	7	PS, organic plaster - 300 mm insulation	300 mm	1,84	67,70	108,11	0,64	176,45
1.2.8	1	2	8	PS, WLS, 031 - 160 mm insulation	160 mm	1,74	64,03	80,61	0,01	144,65
1.2.8	1	2	8	PS, WLS, 031 - 180 mm insulation	180 mm	1,84	67,70	82,29	0,01	150,00
1.2.8	1	2	8	PS, WLS, 031 - 200 mm insulation	200 mm	1,84	67,70	84,71	0,01	152,42
1.2.8	1	2	8	PS, WLS, 031 - 220 mm insulation	220 mm	1,84	67,70	87,13	0,01	154,84
1.2.8	1	2	8	PS, WLS, 031 - 240 mm insulation	240 mm	1,84	67,70	91,12	0,01	158,83
1.2.8	1	2	8	PS, WLS, 032 - 160 mm insulation	160 mm	1,74	64,03	77,25	0,01	141,29

1.2.8	1	2	8	PS, WLS, 032 - 180 mm insulation	180 mm	1,84	67,70	79,55	0,01	147,26
1.2.8	1	2	8	PS, WLS, 032 - 200 mm insulation	200 mm	1,84	67,70	82,83	0,01	150,54
1.2.8	1	2	8	PS, WLS, 032 - 220 mm insulation	220 mm	1,84	67,70	85,13	0,01	152,84
1.2.8	1	2	8	PS, WLS, 032 - 240 mm insulation	240 mm	1,84	67,70	87,65	0,01	155,36
1.2.8	1	2	8	PS, WLS, 032 - 260 mm insulation	260 mm	1,84	67,70	90,23	0,01	157,94
1.2.8	1	2	8	PS, WLS, 032 - 280 mm insulation	280 mm	1,94	71,37	93,43	0,01	164,81
1.2.8	1	2	8	PS, WLS, 032 - 300 mm insulation	300 mm	1,94	71,37	96,79	0,01	168,17
1.2.8	1	2	8	PS, WLS, 033 - 120 mm insulation	120 mm	1,74	64,03	72,31	0,46	136,80
1.2.8	1	2	8	PS, WLS, 033 - 140 mm insulation	140 mm	1,74	64,03	75,48	0,46	139,97
1.2.8	1	2	8	PS, WLS, 033 - 160 mm insulation	160 mm	1,74	64,03	80,29	0,46	144,78
1.2.9	1	2	9	PS, straps, WF - 100 mm insulation	100 mm	2,34	86,05	101,26	0,79	188,10
1.2.9	1	2	9	PS, straps, WF - 160 mm insulation	160 mm	2,44	89,72	109,82	0,79	200,33
1.2.9	1	2	9	PS, straps, WF - 200 mm insulation	200 mm	2,44	89,72	116,55	0,79	207,06
1.2.9	1	2	9	PS, straps, WF - 240 mm insulation	240 mm	2,54	93,39	120,76	0,79	214,94
1.2.10	1	2	10	PS, clinker straps 240/72 - 140 mm insulation	140 mm	2,34	86,05	96,92	0,79	183,76
1.2.10	1	2	10	PS, clinker straps 240/72 - 180 mm insulation	180 mm	2,44	89,72	105,41	0,79	195,92
1.2.10	1	2	10	PS, clinker straps 240/72 - 200 mm insulation	200 mm	2,44	89,72	108,25	0,79	198,76
1.2.10	1	2	10	PS, clinker straps 240/52 - 220 mm insulation	220 mm	2,44	89,72	109,09	0,79	199,60
1.2.10	1	2	10	PS, clinker straps 240/52 - 240 mm insulation	240 mm	2,44	89,72	112,35	0,79	202,86
1.2.10	1	2	10	PS, clinker straps 240/52 - 280 mm insulation	280 mm	2,54	93,39	115,92	0,79	210,10
1.2.11	1	2	11	PS, clinker, flat facing brick - 160 mm insulation	160 mm	2,14	78,71	70,15	0,01	148,87
1.2.11	1	2	11	PS, clinker, flat facing brick - 200 mm insulation	200 mm	2,24	82,38	87,75	0,01	170,14
1.2.11	1	2	11	PS, clinker, flat facing brick - 240 mm insulation	240 mm	2,29	84,22	88,70	0,01	172,93
1.2.12	1	2	12	PS 180, natural stone - 180 mm insulation	180 mm	1,84	67,70	138,00	0,01	205,71
1.2.12	1	2	12	PS 220, natural stone - 220 mm insulation	220 mm	1,89	69,54	147,03	0,01	216,58
1.3.	**1**	**3**		**External insulation (ETICS System - wood fibreboard)**						
1.3.1	1	3	1	HF, mineral plaster, silicate - 60 mm insulation	60 mm	1,84	67,70	68,33	0,50	136,53
1.3.1	1	3	1	HF, mineral plaster, silicate - 100 mm insulation	100 mm	1,84	67,70	78,17	0,53	146,40
1.3.1	1	3	1	HF, mineral plaster, silicate - 120 mm insulation	120 mm	1,84	67,70	84,02	0,57	152,29
1.3.1	1	3	1	HF, mineral plaster, silicate - 160 mm insulation	160 mm	1,89	69,54	88,93	0,61	159,08
1.3.1	1	3	1	HF, mineral plaster, silicate - 180 mm insulation	180 mm	1,89	69,54	93,84	0,61	163,99
1.3.1	1	3	1	HF, mineral plaster, silicate - 200 mm insulation	200 mm	1,94	71,37	98,76	0,61	170,74
1.3.1	1	3	1	HF, mineral plaster, silicate - 220 mm insulation	220 mm	1,94	71,37	103,15	0,61	175,13

1.3.1	1	3	1	HF, mineral plaster, silicate - 230 mm insulation	230 mm	1,94	71,37	103,67	0,61	175,65
1.3.2	1	3	2	WF, mineral plaster - 60 mm insulation	60 mm	1,84	67,70	67,07	0,51	135,28
1.3.2	1	3	2	WF, mineral plaster - 80 mm insulation	80 mm	1,84	67,70	72,21	0,51	140,42
1.3.2	1	3	2	WF, mineral plaster - 100 mm insulation	100 mm	1,84	67,70	78,17	0,53	146,40
1.3.2	1	3	2	WF, mineral plaster - 120 mm insulation	120 mm	1,84	67,70	84,02	0,57	152,29
1.3.2	1	3	2	WF, mineral plaster - 160 mm insulation	160 mm	1,84	67,70	88,93	0,61	157,24
1.3.2	1	3	2	WF, mineral plaster - 180 mm insulation	180 mm	1,84	67,70	93,84	0,61	162,15
1.3.2	1	3	2	WF, mineral plaster - 200 mm insulation	200 mm	1,84	67,70	98,76	0,61	167,07
1.3.2	1	3	2	WF, mineral plaster - 220 mm insulation	220 mm	1,84	67,70	103,15	0,61	171,46
1.3.2	1	3	2	WF, mineral plaster - 230 mm insulation	230 mm	1,84	67,70	103,67	0,61	171,98
1.4.	**1**	**4**		**External insulation (ETICS System - mineral board)**						
1.4.	1	4		MB, fine plaster, dispersion - 80 mm insulation	80 mm	1,72	63,47	62,30	0,49	126,25
1.4.	1	4		MB, fine plaster, dispersion - 100 mm insulation	100 mm	1,72	63,47	68,71	0,53	132,70
1.4.	1	4		MB, fine plaster, dispersion - 120 mm insulation	120 mm	1,72	63,47	75,63	0,57	139,66
1.4.	1	4		MB, fine plaster, dispersion - 140 mm insulation	140 mm	1,72	63,47	81,73	0,60	145,79
1.4.	1	4		MB, fine plaster, dispersion - 200 mm insulation	200 mm	1,72	63,47	94,78	0,70	158,94
1.4.	1	4		MB, fine plaster, dispersion - 220 mm insulation	220 mm	1,72	63,47	104,07	0,70	168,23
1.4.	1	4		MB, fine plaster, dispersion - 240 mm insulation	240 mm	1,72	63,47	107,82	0,73	172,01
1.4.	1	4		MB, fine plaster, dispersion - 260 mm insulation	260 mm	1,718	63,47	106,20	0,73	170,39
1.4.	1	4		MB, fine plaster, dispersion - 280 mm insulation	280 mm	1,718	63,47	110,20	0,75	174,41
1.4.	1	4		MB, fine plaster, dispersion - 300 mm insulation	300 mm	1,718	63,47	115,55	0,75	179,76
1.5.	**1**	**5**		**External insulation (ETICS System - PUR)**						
1.5.1	1	5	1	PUR, mineral plaster, WLG 025 - 40 mm insulation	40 mm	1,74	64,03	64,74	0,46	129,23
1.5.1	1	5	1	PUR, mineral plaster, WLG 025 - 60 mm insulation	60 mm	1,74	64,03	69,21	0,01	133,25
1.5.1	1	5	1	PUR, mineral plaster, WLG 025 - 100 mm insulation	100 mm	1,84	67,70	66,73	0,01	134,44
1.5.1	1	5	1	PUR, mineral plaster, WLG 025 - 120 mm insulation	120 mm	1,84	67,70	69,99	0,01	137,70
1.5.1	1	5	1	PUR, mineral plaster, WLG 025 - 140 mm insulation	140 mm	1,84	67,70	76,60	0,01	144,31
1.5.1	1	5	1	PUR, mineral plaster, WLG 025 - 160 mm insulation	160 mm	1,84	67,70	81,13	0,01	148,84
1.5.1	1	5	1	PUR, mineral plaster, WLG 025 - 180 mm insulation	180 mm	1,94	71,37	81,23	0,01	152,61
1.5.1	1	5	1	PUR, mineral plaster, WLG 025 - 200 mm insulation	200 mm	1,94	71,37	85,33	0,01	156,71
1.5.1	1	5	1	PUR, mineral plaster, WLG 025 - 220 mm insulation	220 mm	1,94	71,37	92,90	0,01	164,28
1.5.2	1	5	2	PUR, mineral plaster, WLS 023 - 100 mm insulation	100 mm	1,84	67,70	69,47	0,01	137,18
1.5.2	1	5	2	PUR, mineral plaster, WLS 023 - 120 mm insulation	120 mm	1,84	67,70	72,29	0,01	140,00

1.5.2	1	5	2	PUR, mineral plaster, WLS 023 - 140 mm insulation	140 mm	1,84	67,70	78,81	0,01	146,52
1.5.2	1	5	2	PUR, mineral plaster, WLS 023 - 160 mm insulation	160 mm	1,84	67,70	83,23	0,01	150,94
1.5.2	1	5	2	PUR, mineral plaster, WLS 023 - 180 mm insulation	180 mm	1,94	71,37	87,53	0,01	158,91
1.5.2	1	5	2	PUR, mineral plaster, WLS 023 - 200 mm insulation	200 mm	1,94	71,37	90,47	0,01	161,85
1.5.2	1	5	2	PUR, mineral plaster, WLS 023 - 220 mm insulation	220 mm	1,94	71,37	95,42	0,01	166,80
1.5.3	1	5	3	PUR, mineral plaster, resol board - 80 mm insulation	80 mm	1,89	69,54	83,88	0,51	153,93
1.5.3	1	5	3	PUR, mineral plaster, resol board - 100 mm insulation	100 mm	1,89	69,54	89,85	0,53	159,92
1.5.3	1	5	3	PUR, mineral plaster, resol board - 120 mm insulation	120 mm	1,94	71,37	99,09	0,57	171,03
1.5.3	1	5	3	PUR, mineral plaster, resol board - 160 mm insulation	160 mm	1,99	73,21	116,60	0,61	190,42
1.5.3	1	5	3	PUR, mineral plaster, resol board - 180 mm insulation	180 mm	1,99	73,21	125,72	0,61	199,54
1.5.3	1	5	3	PUR, mineral plaster, resol board - 200 mm insulation	200 mm	2,04	75,04	137,95	0,64	213,63
1.6.	**1**	**6**		**External insulation (ETICS System - cork)**						
1.6.	1	6		cork, fine plaster, silicate - 60 mm insulation	60 mm	1,88	69,23	80,19	0,54	149,96
1.6.	1	6		cork, fine plaster, silicate - 100 mm insulation	100 mm	1,88	69,23	87,84	0,54	157,61
1.7.	**1**	**7**		**External insulation (ETICS System - reeds)**						
1.7.	1	7		reed, fine plaster - 50 mm insulation	50 mm	1,93	71,07	68,69	0,47	140,23
1.8.	**1**	**8**		**External insulation (ETICS System - VIP)**						
1.8.	1	8		VIP, mineral plaster, both sided - 65 mm insulation	65 mm	2,18	80,24	146,34	0,01	226,59
1.8.	1	8		VIP, mineral plaster, both sided - 70 mm insulation	70 mm	2,18	80,24	157,55	0,01	237,80
1.8.	1	8		VIP, mineral plaster, both sided - 75 mm insulation	75 mm	2,18	80,24	173,40	0,01	253,65
1.8.	1	8		VIP, mineral plaster, both sided - 80 mm insulation	80 mm	2,18	80,24	191,51	0,01	271,76
1.9.	**1**	**9**		**External insulation (ETICS System - aero-gel)**						
1.9.	1	9		Aero-gel, silicium, WLS 018 - 20 mm insulation	20 mm	2,28	83,91	103,98	0,01	187,90
1.9.	1	9		Aero-gel, silicium, WLS 018 - 30 mm insulation	30 mm	2,28	83,91	126,16	0,01	210,08
1.9.	1	9		Aero-gel, silicium, WLS 018 - 40 mm insulation	40 mm	2,28	83,91	160,10	0,01	244,02
1.9.	1	9		Aero-gel, silicium, WLS 018 - 50 mm insulation	50 mm	2,28	83,91	193,73	0,01	277,65
1.9.	1	9		Aero-gel, silicium, WLS 018 - 60 mm insulation	60 mm	2,38	87,58	220,01	0,01	307,60
1.9.	1	9		Aero-gel, silicium, WLS 018 - 70 mm insulation	70 mm	2,38	87,58	260,99	0,01	348,58
1.9.	1	9		Aero-gel, silicium, WLS 018 - 80 mm insulation	80 mm	2,38	87,58	288,31	0,01	375,90

1.9.	1	9	Aero-gel, silicium, WLS 018 - 100 mm insulation	100 mm	2,48	91,25	325,09	0,01	416,35
	2		**Outer walls against earth**						
2.1.	**2**	**1**	**External perimeter insulation (XPS)**						
2.1.	2	1	Perimeter insulation (XPS), without sealing - 60 mm insulation	60 mm	0,39	14,92	22,46	0,00	37,38
2.1.	2	1	Perimeter insulation (XPS), without sealing - 80 mm insulation	80 mm	0,42	16,03	25,50	0,00	41,53
2.1.	2	1	Perimeter insulation (XPS), without sealing - 100 mm insulation	100 mm	0,44	16,78	29,82	0,00	46,60
2.1.	2	1	Perimeter insulation (XPS), without sealing - 120 mm insulation	120 mm	0,44	16,78	35,59	0,00	52,37
2.1.	2	1	Perimeter insulation (XPS), without sealing - 140 mm insulation	140 mm	0,44	16,78	41,58	0,00	58,36
2.1.	2	1	Perimeter insulation (XPS), without sealing - 160 mm insulation	160 mm	0,44	16,78	45,47	0,00	62,25
2.1.	2	1	Perimeter insulation (XPS), without sealing - 180 mm insulation	180 mm	0,46	17,52	48,20	0,00	65,72
2.1.	2	1	Perimeter insulation (XPS), without sealing - 200 mm insulation	200 mm	0,46	17,52	54,71	0,00	72,23
2.1.	2	1	Perimeter insulation (XPS), without sealing - 300 mm insulation	300 mm	0,46	17,52	79,83	0,00	97,35
2.2.	2	2	**External perimeter insulation (PUR)**						
2.2.	2	2	Perimeter insulation (PUR), without sealing - 50 mm insulation	50 mm	0,39	14,92	23,61	0,00	38,53
2.2.	2	2	Perimeter insulation (PUR), without sealing - 100 mm insulation	100 mm	0,44	16,78	34,44	0,00	51,22
2.3.	2	3	**External perimeter insulation (foam glass)**						
2.3.	2	3	Perimeter insulation (foam glass), without sealing - 80 mm insulation	80 mm	0,44	16,78	42,63	0,00	59,41
2.3.	2	3	Perimeter insulation (foam glass), without sealing - 100 mm insulation	100 mm	0,44	16,78	49,78	0,00	66,56
2.3.	2	3	Perimeter insulation (foam glass), without sealing - 120 mm insulation	120 mm	0,44	16,78	56,61	0,00	73,39
2.3.	2	3	Perimeter insulation (foam glass), without sealing - 140 mm insulation	140 mm	0,44	16,78	62,39	0,00	79,17
2.3.	2	3	Perimeter insulation (foam glass), without sealing - 160 mm insulation	160 mm	0,44	16,78	69,43	0,00	86,21

2.3.	2	3		Perimeter insulation (foam glass), without sealing - 200 mm insulation	200 mm	0,44	16,78	81,83	0,00	98,61
	3			**Basement (floor against earth)**						
3.1.	**3**	**1**		**Insulation on the inside (heated side) of the floor slab**						
3.1.1	3	1	1	Insulation on the inside, mineral, perlite - 160 mm insulation	160 mm	0,22	8,91	14,04	0,00	22,95
3.1.2	3	1	2	Insulation on the inside, synthetical, open-pored - 120 mm insulation	120 mm	0,3	11,67	15,25	0,00	26,92
3.1.2	3	1	2	Insulation on the inside, synthetical, open-pored - 140 mm insulation	140 mm	0,3	11,67	16,68	0,00	28,35
3.1.2	3	1	2	Insulation on the inside, synthetical, open-pored - 160 mm insulation	160 mm	0,32	12,49	17,31	0,00	29,80
3.1.2	3	1	2	Insulation on the inside, synthetical, open-pored - 180 mm insulation	180 mm	0,32	12,49	18,34	0,00	30,83
3.1.3	3	1	3	Insulation on the inside, synthetical, closed - 80 mm insulation	80 mm	0,29	11,25	12,06	0,00	23,31
3.1.3	3	1	3	Insulation on the inside, synthetical, closed - 120 mm insulation	120 mm	0,29	11,25	14,42	0,00	25,67
3.1.3	3	1	3	Insulation on the inside, synthetical, closed - 140 mm insulation	140 mm	0,29	11,25	16,58	0,00	27,83
3.1.3	3	1	3	Insulation on the inside, synthetical, closed - 180 mm insulation	180 mm	0,29	11,25	18,96	0,00	30,21
3.1.3	3	1	3	Insulation on the inside, synthetical, closed - 200 mm insulation	200 mm	0,31	12,08	21,12	0,00	33,20
3.1.4	3	1	4	Insulation on the inside, plant-based - 80 mm insulation	80 mm	0,33	12,90	28,79	1,40	43,09
3.1.4	3	1	4	Insulation on the inside, plant-based - 100 mm insulation	100 mm	0,33	12,90	29,89	1,40	44,19
3.1.4	3	1	4	Insulation on the inside, plant-based - 120 mm insulation	120 mm	0,38	14,96	31,77	1,40	48,13
3.1.4	3	1	4	Insulation on the inside, plant-based - 200 mm insulation	200 mm	0,42	16,61	35,37	1,40	53,38
3.2.	**3**	**2**		**Insulation on the outside of the floor slab, mineral**						
3.2.1	3	2	1	Insulation on the outside, foam glas - 60 mm insulation	60 mm	0,21	8,37	53,17	2,25	63,79
3.2.1	3	2	1	Insulation on the outside, foam glas - 80 mm insulation	80 mm	0,21	8,37	62,08	2,25	72,70

3.2.1	3	2	1	Insulation on the outside, foam glas - 100 mm insulation	100 mm	0,21	8,37	73,83	2,25	84,45
3.2.1	3	2	1	Insulation on the outside, foam glas - 140 mm insulation	140 mm	0,23	8,88	88,45	2,25	99,58
3.2.1	3	2	1	Insulation on the outside, foam glas - 160 mm insulation	160 mm	0,23	8,88	94,28	2,25	105,41
3.2.1	3	2	1	Insulation on the outside, foam glas - 200 mm insulation	200 mm	0,28	10,91	110,10	2,25	123,26
3.2.2	3	2	2	Insulation on the outside, foam glas gravel - 80 mm insulation	80 mm	0,25	9,87	26,49	3,28	39,64
3.2.2	3	2	2	Insulation on the outside, foam glas gravel - 100 mm insulation	100 mm	0,27	10,38	27,58	3,50	41,46
3.2.2	3	2	2	Insulation on the outside, foam glas gravel - 160 mm insulation	160 mm	0,3	11,68	34,35	4,13	50,16
3.2.2	3	2	2	Insulation on the outside, foam glas gravel - 200 mm insulation	200 mm	0,31	12,19	37,92	4,60	54,71
3.2.2	3	2	2	Insulation on the outside, foam glas gravel - 250 mm insulation	250 mm	0,33	12,93	42,18	4,93	60,04
3.2.2	3	2	2	Insulation on the outside, foam glas gravel - 300 mm insulation	300 mm	0,33	12,93	48,60	5,36	66,89
3.2.2	3	2	2	Insulation on the outside, foam glas gravel - 350 mm insulation	350 mm	0,34	13,44	51,49	5,78	70,71
3.3.	**3**	**3**		**Insulation on the outside of the floor slab, synthetical, closed**						
3.3.	3	3		Insulation on the outside, XPS - 80 mm insulation	80 mm	0,21	8,37	33,27	2,25	43,89
3.3.	3	3		Insulation on the outside, XPS - 100 mm insulation	100 mm	0,21	8,37	38,64	2,25	49,26
3.3.	3	3		Insulation on the outside, XPS - 120 mm insulation	120 mm	0,21	8,37	42,33	2,25	52,95
3.3.	3	3		Insulation on the outside, XPS - 160 mm insulation	160 mm	0,21	8,37	51,19	2,25	61,81
3.3.	3	3		Insulation on the outside, XPS - 200 mm insulation	200 mm	0,21	8,37	56,14	2,25	66,76
	4			**Ceiling against unheated**						
4.1.	**4**	**1**		**Insulation above the ceiling slab (mineral wool)**						
4.1.1	4	1	1	Insulation above the ceiling slab, MW - 100 mm insulation	100 mm	0,33	12,93	23,95	0,00	36,88
4.1.1	4	1	1	Insulation above the ceiling slab, MW - 120 mm insulation	120 mm	0,33	12,93	25,16	0,00	38,09
4.1.1	4	1	1	Insulation above the ceiling slab, MW - 140 mm insulation	140 mm	0,34	13,34	26,37	0,00	39,71

4.1.1	4	1	1	Insulation above the ceiling slab, MW - 160 mm insulation	160 mm	0,34	13,34	27,77		0,00	41,11
4.1.1	4	1	1	Insulation above the ceiling slab, MW - 180 mm insulation	180 mm	0,34	13,34	28,79		0,00	42,13
4.1.1	4	1	1	Insulation above the ceiling slab, MW - 200 mm insulation	200 mm	0,34	13,34	30,18		0,00	43,52
4.1.1	4	1	1	Insulation above the ceiling slab, MW - 220 mm insulation	220 mm	0,34	13,34	31,21		0,00	44,55
4.1.1	4	1	1	Insulation above the ceiling slab, MW - 240 mm insulation	240 mm	0,34	13,34	32,97		0,00	46,31
4.1.1	4	1	1	Insulation above the ceiling slab, MW - 280 mm insulation	280 mm	0,34	13,34	35,39		0,00	48,73
4.1.1	4	1	1	Insulation above the ceiling slab, MW - 300 mm insulation	300 mm	0,34	13,34	36,32		0,00	49,66
4.1.1	4	1	1	Insulation above the ceiling slab, MW - 360 mm insulation	360 mm	0,34	13,34	39,48		0,00	52,82
4.1.1	4	1	1	Insulation above the ceiling slab, MW - 400 mm insulation	400 mm	0,34	13,34	42,18	=		55,52
4.2.	4	2		**Insulation above the ceiling slab (cellulose)**							
4.2.1	4	2	1	Insulation above the ceiling slab, cellulose, fill - 50 mm insulation	50 mm	0,5	20,60	9,39		0,00	29,98
4.2.1	4	2	1	Insulation above the ceiling slab, cellulose, fill - 80 mm insulation	80 mm	0,64	26,54	13,90		0,00	40,44
4.2.1	4	2	1	Insulation above the ceiling slab, cellulose, fill - 100 mm insulation	100 mm	0,67	27,60	15,30		0,00	42,91
4.2.1	4	2	1	Insulation above the ceiling slab, cellulose, fill - 120 mm insulation	120 mm	0,55	22,66	13,85		0,00	36,50
4.2.2	4	2	2	Insulation above the ceiling slab, cellulose, blow-in - 200 mm insulation	200 mm	0,68	25,13	22,31		1,35	48,79
4.2.2	4	2	2	Insulation above the ceiling slab, cellulose, blow-in - 240 mm insulation	240 mm	0,61	25,13	20,84		1,40	47,37
4.2.2	4	2	2	Insulation above the ceiling slab, cellulose, blow-in - 300 mm insulation	300 mm	0,63	25,96	25,37		1,70	53,03
	5			**Flat roof**							
5.1.	5	1		**Flat roof, bituminous sheeting (PUR)**							
5.1.1	5	1	1	Flat roof, bituminous sheeting, PUR - 100 mm insulation	100 mm	1,60	64,94	81,68		0,73	147,35

5.1.1	5	1	1	Flat roof, bituminous sheeting, PUR - 120 mm insulation	120 mm	1,60	64,94	86,35	0,73	152,02
5.1.1	5	1	1	Flat roof, bituminous sheeting, PUR - 160 mm insulation	160 mm	1,62	65,75	92,71	0,73	159,19
5.1.1	5	1	1	Flat roof, bituminous sheeting, PUR - 180 mm insulation	180 mm	1,62	65,75	95,66	0,73	162,14
5.1.1	5	1	1	Flat roof, bituminous sheeting, PUR - 300 mm insulation	300 mm	1,59	64,53	88,31	0,73	153,57
5.1.1	5	1	1	Flat roof, bituminous sheeting, PUR - 400 mm insulation	400 mm	1,69	68,61	97,51	0,73	166,85
5.1.2	5	1	2	Flat roof, bituminous sheeting, PUR, passable - 120 mm insulation	120 mm	2,92	114,99	131,18	0,95	247,12
5.1.3	5	1	3	Flat roof, bituminous sheeting, PUR, greened - 120 mm insulation	120 mm	1,88	73,35	119,44	3,30	196,09
5.2.	**5**	**2**		**Flat roof, bituminous sheeting (PS)**						
5.2.1	5	2	1	Flat roof, bituminous sheeting, PS - 140 mm insulation	140 mm	1,56	63,39	68,67	0,74	132,80
5.2.1	5	2	1	Flat roof, bituminous sheeting, PS - 180 mm insulation	180 mm	1,56	63,39	71,92	0,74	136,05
5.2.1	5	2	1	Flat roof, bituminous sheeting, PS - 220 mm insulation	220 mm	1,56	63,39	77,23	0,74	141,36
5.2.2	5	2	2	Flat roof, bituminous sheeting, PS, gradient - 160 mm insulation	160 mm	1,83	74,41	70,89	0,74	146,04
5.2.2	5	2	2	Flat roof, bituminous sheeting, PS, gradient - 250 mm insulation	250 mm	1,83	74,41	74,74	0,74	149,89
5.2.3	5	2	3	Flat roof, bituminous sheeting, PS, passable - 140 mm insulation	140 mm	2,89	113,76	116,93	0,95	231,64
5.2.3	5	2	3	Flat roof, bituminous sheeting, PS, passable - 180 mm insulation	180 mm	2,89	113,76	120,18	0,95	234,89
5.2.3	5	2	3	Flat roof, bituminous sheeting, PS, passable - 200 mm insulation	200 mm	2,89	113,76	122,27	0,95	236,98
5.2.3	5	2	3	Flat roof, bituminous sheeting, PS, passable - 240 mm insulation	240 mm	2,91	114,58	129,04	0,95	244,57
5.2.3	5	2	3	Flat roof, bituminous sheeting, PS, passable - 300 mm insulation	300 mm	2,91	114,58	133,14	0,95	248,67
5.2.3	5	2	3	Flat roof, bituminous sheeting, PS, passable - 400 mm insulation	400 mm	3,01	118,66	142,34	0,95	261,95
5.2.4	5	2	4	Flat roof, bituminous sheeting, PS, passable, gradient - 160 mm insulation	160 mm	3,16	124,78	119,15	0,95	244,88

5.2.5	5	2	5	Flat roof, bituminous sheeting, PS, greened - 140 mm insulation	140 mm	1,79	69,89	103,56	3,16	176,61
5.2.5	5	2	5	Flat roof, bituminous sheeting, PS, greened - 400 mm insulation	400 mm	1,91	74,79	128,97	3,16	206,92
5.2.6	5	2	6	Flat roof, bituminous sheeting, PS, greened, gradient - 160 mm insulation	160 mm	1,83	71,53	95,83	2,87	170,23
5.2.6	5	2	6	Flat roof, bituminous sheeting, PS, greened, gradient - 200 mm insulation	200 mm	1,83	71,53	98,82	2,87	173,22
5.2.6	5	2	6	Flat roof, bituminous sheeting, PS, greened, gradient - 250 mm insulation	250 mm	1,83	71,53	99,68	2,87	174,08
5.3.	**5**	**3**		**Flat roof, bituminous sheeting (MW)**						
5.3.1	5	3	1	Flat roof, bituminous sheeting, MW, gravel - 200 mm insulation	200 mm	1,61	65,27	71,77	0,74	137,78
5.3.1	5	3	1	Flat roof, bituminous sheeting, MW, gravel - 240 mm insulation	240 mm	1,61	65,27	78,80	0,74	144,81
5.3.2	5	3	2	Flat roof, bituminous sheeting, MW, passable - 160 mm insulation	160 mm	2,71	106,33	108,23	1,08	215,63
5.3.2	5	3	2	Flat roof, bituminous sheeting, MW, passable - 200 mm insulation	200 mm	2,71	106,33	113,82	1,08	221,22
5.3.2	5	3	2	Flat roof, bituminous sheeting, MW, passable - 240 mm insulation	240 mm	2,71	106,33	120,85	1,08	228,25
5.3.3	5	3	3	Flat roof, bituminous sheeting, MW, greened - 120 mm insulation	120 mm	1,69	65,87	98,65	2,97	167,49
5.3.3	5	3	3	Flat roof, bituminous sheeting, MW, greened - 160 mm insulation	160 mm	1,84	71,77	101,07	3,16	176,00
5.3.3	5	3	3	Flat roof, bituminous sheeting, MW, greened - 200 mm insulation	200 mm	1,84	71,77	106,66	3,16	181,59
5.4.	**5**	**4**		**Flat roof, bituminous sheeting (Foam glass)**						
5.4.1	5	4	1	Flat roof, bituminous sheeting, foam glass, gravel - 160 mm insulation	160 mm	1,6214	65,73	112,74	1,68	180,14
5.4.1	5	4	1	Flat roof, bituminous sheeting, foam glass, gravel - 300 mm insulation	300 mm	1,9014	77,15	179,62	2,53	259,30
5.4.2	5	4	2	Flat roof, bituminous sheeting, foam glass, passable - 100 mm insulation	100 mm	2,724	107,92	143,75	2,33	254,00
5.4.2	5	4	2	Flat roof, bituminous sheeting, foam glass, passable - 120 mm insulation	120 mm	2,764	109,55	150,18	2,48	262,21
5.4.2	5	4	2	Flat roof, bituminous sheeting, foam glass, passable - 140 mm insulation	140 mm	2,764	109,55	157,55	2,33	269,43

5.4.2	5	4	2	Flat roof, bituminous sheeting, foam glass, passable - 160 mm insulation	160 mm	2,784	110,37	161,64	2,71	274,72
5.4.2	5	4	2	Flat roof, bituminous sheeting, foam glass, passable - 200 mm insulation	200 mm	2,864	113,63	185,49	3,13	302,25
5.4.3	5	4	3	Flat roof, bituminous sheeting, foam glass, greened - 200 mm insulation	200 mm	2,0652	81,15	180,20	4,95	266,30
5.4.3	5	4	3	Flat roof, bituminous sheeting, foam glass, greened - 300 mm insulation	300 mm	2,2652	89,31	220,75	5,38	315,44
	7			**Tilted roof**						
6.1.	**6**	**1**		**External Insulation on roof (EPS)**						
6.1.1	6	1	1	External Insulation on roof - Alu - 120 mm insulation	120 mm	0,3	12,06	39,65	0,00	51,71
6.1.2	6	1	2	External Insulation on roof - WLG 035 - 120 mm insulation	120 mm	0,2	8,04	25,39	0,00	33,43
6.1.2	6	1	2	External Insulation on roof - WLG 035 - 140 mm insulation	140 mm	0,19	7,64	25,05	0,00	32,69
6.1.2	6	1	2	External Insulation on roof - WLG 035 - 160 mm insulation	160 mm	0,2	8,04	31,88	0,00	39,92
6.1.2	6	1	2	External Insulation on roof - WLG 035 - 180 mm insulation	180 mm	0,17	6,83	32,16	0,00	38,99
6.1.2	6	1	2	External Insulation on roof - WLG 035 - 200 mm insulation	200 mm	0,22	8,84	37,73	0,00	46,57
6.1.2	6	1	2	External Insulation on roof - WLG 035 - 220 mm insulation	220 mm	0,24	9,65	40,86	0,00	50,51
6.1.3	6	1	3	External Insulation on roof - WLS 032 - 160 mm insulation	160 mm	0,17	6,83	28,24	0,00	35,07
6.1.3	6	1	3	External Insulation on roof - WLS 032 - 180 mm insulation	180 mm	0,18	7,24	32,10	0,00	39,34
6.1.3	6	1	3	External Insulation on roof - WLS 032 - 200 mm insulation	200 mm	0,19	7,64	33,75	0,00	41,39
6.1.3	6	1	3	External Insulation on roof - WLS 032 - 220 mm insulation	220 mm	0,2	8,04	34,97	0,00	43,01
6.1.4	6	1	4	External Insulation on roof - WLS 031 - 160 mm insulation	160 mm	0,17	6,83	31,34	0,00	38,17
6.1.4	6	1	4	External Insulation on roof - WLS 031 - 180 mm insulation	180 mm	0,17	6,83	33,90	0,00	40,73
6.1.4	6	1	4	External Insulation on roof - WLS 031 - 200 mm insulation	200 mm	0,19	7,64	36,25	0,00	43,89

6.1.4	6	1	4	External Insulation on roof - WLS 031 - 220 mm insulation	220 mm	0,2	8,04	38,70	0,00	46,74
6.2.	**6**	**2**		**External Insulation on roof (PUR/PIR & PUR+other materials)**						
6.2.1	6	2	1	External Insulation on roof - PU - Alu-laminated - 100 mm insulation	100 mm	0,2	8,04	36,14	0,00	44,18
6.2.1	6	2	1	External Insulation on roof - PU - Alu-laminated - 120 mm insulation	120 mm	0,2	8,04	45,21	0,00	53,25
6.2.1	6	2	1	External Insulation on roof - PU - Alu-laminated - 160 mm insulation	160 mm	0,22	8,84	55,94	0,00	64,78
6.2.2	6	2	2	External Insulation on roof - PU, PYE- sheet - 120 mm insulation	120 mm	0,2	8,04	52,74	0,00	60,78
6.2.3	6	2	3	External Insulation on roof - PU, Mineral fleece - 120 mm insulation	120 mm	0,2	8,04	47,29	0,00	55,33
6.2.3	6	2	3	External Insulation on roof - PU, Mineral fleece - 140 mm insulation	140 mm	0,22	8,84	43,28	0,00	52,12
6.2.3	6	2	3	External Insulation on roof - PU, Mineral fleece - 160 mm insulation	160 mm	0,22	8,84	50,25	0,00	59,09
6.2.3	6	2	3	External Insulation on roof - PU, Mineral fleece - 180 mm insulation	180 mm	0,24	9,65	57,64	0,00	67,29
6.2.4	6	2	4	External Insulation on roof - PU+MW - 140 mm insulation	140 mm	0,22	8,84	42,77	0,00	51,61
6.2.5	6	2	5	External Insulation on roof - PU+WM - 122 mm insulation	122 mm	0,22	8,84	41,89	0,00	50,73
6.2.5	6	2	5	External Insulation on roof - PU+WM - 142 mm insulation	142 mm	0,22	8,84	45,78	0,00	54,62
6.2.5	6	2	5	External Insulation on roof - PU+WM - 162 mm insulation	162 mm	0,24	9,65	52,03	0,00	61,68
6.2.5	6	2	5	External Insulation on roof - PU+WM - 182 mm insulation	182 mm	0,24	9,65	64,40	0,00	74,05
6.2.6	6	2	6	External Insulation on roof - PU+GF - 58 mm insulation	58 mm	0,2	8,04	24,34	0,00	32,38
6.3.	**6**	**3**		**External Insulation on roof (Soft fibres-WF)**						
6.3.1	6	3	1	External Insulation on roof - WF - WLG 040 - 100 mm insulation	100 mm	0,2	8,04	34,29	0,00	42,33
6.3.1	6	3	1	External Insulation on roof - WF - WLG 040 - 120 mm insulation	120 mm	0,2	8,04	37,98	0,00	46,02
6.3.1	6	3	1	External Insulation on roof - WF - WLG 040 - 140 mm insulation	140 mm	0,2	8,04	41,14	0,00	49,18

6.3.2	6	3	2	External Insulation on roof - WF - WLG 045 - 120 mm insulation	120 mm	0,18	7,24	34,85	0,00	42,09
6.3.2	6	3	2	External Insulation on roof - WF - WLG 045 - 140 mm insulation	140 mm	0,18	7,24	39,79	0,00	47,03
6.3.2	6	3	2	External Insulation on roof - WF - WLG 045 - 180 mm insulation	180 mm	0,22	8,84	48,47	0,00	57,31
6.3.3	6	3	3	External Insulation on roof - WF - WLG 047 - 220 mm insulation	220 mm	0,2	8,04	62,36	0,00	70,4
6.4.	**6**	**4**		**External Insulation on roof (MW)**						
6.4.	6	4		External Insulation on roof - MW - WLG 035 - 120 mm insulation	120 mm	0,2	8,04	34,21	0,00	42,25
6.4.	6	4		External Insulation on roof - MW - WLG 035 - 160 mm insulation	160 mm	0,21	8,44	40,66	0,00	49,1
6.4.	6	4		External Insulation on roof - MW - WLG 035 - 180 mm insulation	180 mm	0,23	9,25	47,72	0,00	56,97
6.4.	6	4		External Insulation on roof - MW - WLG 035 - 200 mm insulation	200 mm	0,23	9,25	54,55	0,00	63,8
6.4.	6	4		External Insulation on roof - MW - WLG 035 - 220 mm insulation	220 mm	0,25	10,05	58,51	0,00	68,56
6.5.	**6**	**5**		**External Insulation on roof (foam glass)**						
6.5.	6	5		External Insulation on roof - foam glass - 240 mm insulation	240 mm	0,3	12,06	80,35	0,00	92,41
6.6.	**6**	**6**		**External Insulation on roof (XPS)**						
6.6.	6	6		External Insulation on roof - XPS - 140 mm insulation	140 mm	0,16	6,43	23,10	0,00	29,53
6.6.	6	6		External Insulation on roof - XPS - 160 mm insulation	160 mm	0,18	7,24	26,40	0,00	33,64
6.6.	6	6		External Insulation on roof - XPS - 240 mm insulation	240 mm	0,15	6,03	49,51	0,00	55,54
6.7.	**6**	**7**		**External Insulation on roof (phenolic resin)**						
6.7.	6	7		External Insulation on roof - phenolic resin - 80 mm insulation	80 mm	0,18	7,24	42,11	0,00	49,35
6.7.	6	7		External Insulation on roof - phenolic resin - 100 mm insulation	100 mm	0,18	7,24	54,11	0,00	61,35
6.7.	6	7		External Insulation on roof - phenolic resin - 120 mm insulation	120 mm	0,2	8,04	61,50	0,00	69,54
6.7.	6	7		External Insulation on roof - phenolic resin - 140 mm insulation	140 mm	0,2	8,04	71,47	0,00	79,51
6.7.	6	7		External Insulation on roof - phenolic resin - 160 mm insulation	160 mm	0,22	8,84	83,64	0,00	92,48

5.3.2 Windows

Reference				Component/Technology	window area m2	Labour Intensity [h/m2]	Labour Cost [EUR/m2]	Material Cost [EUR/m2]	Equipment Cost [EUR/m2]	Total Cost [EUR/m2]
	1			**Windows in Wall**						
8.1.	**8**	**1**		**Wood, passive house window**						
8.1.1	**8**	1	1	wood, passive house, 1-winged, spruce, 0,5-1,25 m2	0,5-1,25 m2	2.00	78.90	350.00	0.00	428.90
8.1.2	**8**	1	2	wood, passive house, 1-winged, spruce, 1,25-2,00 m2	1,25-2,00 m2	2.00	78.90	310.00	0.00	388.90
8.1.3	**8**	1	3	wood, passive house, 1-winged, spruce, 2,00-3,00 m2	2,00-3,00 m2	2.00	78.90	309.00	0.00	387.90
8.1.4	**8**	1	4	wood, passive house, 2-winged, spruce, 1,25-2,00 m2	1,25-2,00 m2	2.02	79.69	522.00	0.00	601.69
8.1.5	**8**	1	5	wood, passive house, 2-winged, spruce, 2,00-3,00 m2	2,00-3,00 m2	2.00	78.90	369.00	0.00	447.90
8.1.6	**8**	1	6	wood, passive house, 1-winged, spruce, thermowood, 0,5-1,25 m2	0,5-1,25 m2	2.02	79.69	429.00	0.00	508.69
8.1.7	**8**	1	7	wood, passive house, 1-winged, spruce, thermowood, 1,25-2,00 m2	1,25-2,00 m2	2.00	78.90	420.00	0.00	498.90
8.1.8	**8**	1	8	wood, passive house, 1-winged, spruce, thermowood, 2,00-3,00 m2	2,00-3,00 m2	2.02	79.69	321.00	0.00	400.69
8.1.9	**8**	1	9	wood, passive house, 2-winged, spruce, thermowood, 0,5-1,25 m2	0,5-1,25 m2	2.02	79.69	613.00	0.00	692.69
8.1.10	**8**	1	10	wood, passive house, 2-winged, spruce, thermowood, 1,25-2,00 m2	1,25-2,00 m2	2.02	79.69	568.00	0.00	647.69
8.1.11	**8**	1	11	wood, passive house, 2-winged, spruce, thermowood, 2,00-3,00 m2	2,00-3,00 m2	2.02	79.69	450.00	0.00	529.69
8.2.	**8**	2		**Synthetic, passive house window**						
8.2.1	**8**	2	1	synthetic, passive house, 1-winged, synthetic , 0,5-1,25 m2	0,5-1,25 m2	2.00	78.90	248.00	0.00	326.90
8.2.2	**8**	2	2	synthetic, passive house, 1-winged, synthetic , 1,25-2,00 m2	1,25-2,00 m2	2.00	78.90	219.00	0.00	297.90
8.2.3	**8**	2	3	synthetic, passive house, 1-winged, synthetic , 2,00-3,00 m2	2,00-3,00 m2	2.00	78.90	200.00	0.00	278.90
8.3.	**8**	3		**Wood-Aluminium, passive house window**						
8.3.1	**8**	3	1	wood-aluminium, passive house, 1-winged, wood-aluminium, 0,5-1,25 m2	0,5-1,25 m2	2.02	79.69	578.00	0.00	657.69
8.3.2	**8**	3	2	wood-aluminium, passive house, 1-winged, wood-aluminium, 1,25-2,00 m2	1,25-2,00 m2	2.02	79.69	536.00	0.00	615.69
8.3.3	**8**	3	3	wood-aluminium, passive house, 1-winged, wood-aluminium, 2,00-3,00 m2	2,00-3,00 m2	2.02	79.69	466.00	0.00	545.69

8.3.4	**8**	3	4	wood-aluminium, passive house, 2-winged, wood-aluminium , 1,25-2,00 m2	1,25-2,00 m2	2.02	79.69	584.00	0.00	663.69
8.3.5	**8**	3	5	wood-aluminium, passive house, 2-winged, wood-aluminium , 2,00-3,00 m2	2,00-3,00 m2	2.02	79.69	475.00	0.00	554.69
8.3.6	**8**	3	6	wood, passive house, 1-winged, spruce, thermowood, 0,5-1,25 m2	0,5-1,25 m2	2.02	79.69	527.00	0.00	606.69
8.3.7	**8**	3	7	wood-aluminium, passive house, 1-winged, wood-aluminium, 1,25-2,00 m2	1,25-2,00 m2	2.02	79.69	530.00	0.00	609.69
8.3.8	**8**	3	8	wood-aluminium, passive house, 1-winged, wood-aluminium, 2,00-3,00 m2	2,00-3,00 m2	2.02	79.69	413.00	0.00	492.69
8.3.9	**8**	3	9	wood-aluminium, passive house, 2-winged, wood-aluminium , 1,25-2,00 m2	1,25-2,00 m2	2.02	79.69	584.00	0.00	663.69
8.3.10	**8**	3	10	wood-aluminium, passive house, 2-winged, wood-aluminium , 2,00-3,00 m2	2,00-3,00 m2	2.02	79.69	475.00	0.00	554.69
8..	**8**			**Aluminium, passive house window**						
8.4.1	**8**	4	1	aluminium, passive house, 1-winged, aluminium , 0,5-1,25 m2	0,5-1,25 m2	0.45	17.75	248.00	0.00	265.75
8.4.2	**8**	4	2	aluminium, passive house, 1-winged, aluminium , 1,25-2,00 m2	1,25-2,00 m2	0.45	17.75	421.00	0.00	438.75
8.4.3	**8**	4	3	aluminium, passive house, 1-winged, aluminium , 2,00-3,00 m2	2,00-3,00 m2	0.45	17.75	316.00	0.00	333.75
..				**Synthetic-Aluminium, passive house window**						
.5.1		5	1	synthetic-aluminium, passive house, 1-winged, synthetic-aluminium, 0,5-1,25 m2	0,5-1,25 m2	2.00	78.90	339.00	0.00	417.90
.5.2		5	2	synthetic-aluminium, passive house, 1-winged, synthetic-aluminium, 1,25-2,00 m2	1,25-2,00 m2	2.00	78.90	319.00	0.00	397.90
.5.3		5	3	synthetic-aluminium, passive house, 1-winged, synthetic-aluminium, 2,00-3,00 m2	2,00-3,00 m2	2.00	78.90	293.00	0.00	371.90
9..	**9**			**Windows in Tilted Roof**						
9.1.	**9**	1		**Wood (pine) windows**						
9.1.1	**9**	1	1	wood (pine) window, 2-winged, pine med Cu, 780x1180 mm	780x1180 mm	8.00	326.75	1336.79	0.00	1663.54
9.1.2	**9**	1	2	wood (pine) window, 2-winged, pine med Cu, 1140x1600 mm	1140x1600 mm	9.60	391.74	1629.77	0.00	2021.51
9.1.3	**9**	1	3	wood (pine) window, 2-winged, pine med Cu, 940x1180 mm	940x1180 mm	8.04	328.34	1580.34	0.00	1908.68
9.1.4	**9**	1	4	wood (pine) window, 2-winged, pine med Alu, 780x1180 mm	780x1180 mm	7.95	324.75	1182.65	0.00	1507.40
9.1.5	**9**	1	5	wood (pine) window, 2-winged, pine med Alu, 1140x1600 mm	1140x1600 mm	9.42	384.73	1437.25	0.00	1821.98
9.1.6	**9**	1	6	wood (pine) window, 2-winged, pine med Alu, 940x1180 mm	940x1180 mm	7.97	325.38	1388.93	0.00	1714.31
9.2.	**9**	2		**Synthetic windows**						
9.2.1	**9**	2	1	synthetic window, 2-winged, synthetic med Cu, 940x1400 mm	940x1400 mm	8.15	333.34	1276.58	0.00	1609.92

9.2.2	**9**	2	2	synthetic window, 2-winged, synthetic med Cu, 940x1180 mm	940x1180 mm	8.15	333.34	1455.72	0.00	1789.06
9.2.4	**9**	2	4	synthetic window, 2-winged, synthetic med Alu, 740x1230 mm	740x1230 mm	7.80	319.02	1353.84	0.00	1672.86
9.2.5	**9**	2	5	synthetic window, 2-winged, synthetic med Alu, 1050x1120 mm	1050x1120 mm	8.80	359.92	1514.62	0.00	1874.54
..				**Windows in Flat Roof**						
	1									
10.1.	**0**	1		**Alu-glass rooflight dome**						
10.1.	**1**									
1	**0**	1	1	rooflight dome, Alu-glass , 150x150 mm	150x150 mm	9.30	385.95	4030.28	0.00	4416.23
10.1.	**1**									
2	**0**	1	2	rooflight dome, Alu-glass , 180x180 mm	180x180 mm	9.30	385.95	4334.40	0.00	4720.35
	1									
10.2.	**0**	2		**Acrylic rooflight dome**						
10.2.	**1**									
1	**0**	2	1	rooflight dome, Acryl, three wall dome, 100x100 mm	100x100 mm	8.70	357.63	1647.37	0.00	2005.00
10.2.	**1**									
2	**0**	2	2	rooflight dome, Acryl, three wall dome, 100x100 mm electr.	100x100 mm electr.	9.80	406.70	3420.95	0.00	3827.65
10.2.	**1**									
3	**0**	2	3	rooflight dome, Acryl, two wall dome, 100x100 mm	100x100 mm	12.30	510.45	4078.07	0.00	4588.52
10.2.	**1**									
4	**0**	2	4	rooflight dome, Acryl, two wall dome, 150x150 mm	150x150 mm	12.30	510.45	4379.38	0.00	4889.83
10.2.	**1**									
5	**0**	2	5	rooflight dome, Acryl, two wall dome, 100x100 mm, pneumatic	100x100 mm, pneumatic	11.40	473.10	2465.87	0.00	2938.97
	1									
10.3.	**0**	3		**PE resin rooflight dome**						
	1									
	0	3	1	rooflight dome, PE resin, two wall dome, 100x100 mm electr.	100x100 mm electr.	9.80	406.70	2991.29	0.00	3397.99

5.3.3 Heating System

Reference				Component/Technology	Capacity	Labour Intensity	Labour Cost	Material Cost	Equipment Cost	Total Cost
					kW	[h]	[EUR]	[EUR]	[EUR]	[EUR]
				Heating System						
11..	1 1 1			**Oil boiler (conventional)**						
11.1.1	1 1 1	1	1	oil boiler conventional, 20-25 kW	20-25 kW	20.45	791.32	4868.28	0.00	5659.60
11.1.2	1 1 1	1	2	oil boiler conventional, 90-120 kW	90-120 kW	20.88	811.23	7276.80	0.00	8088.03
11.1.3	1 1 1	1	3	oil boiler conventional, 230-350 kW	230-350 kW	38.59	1493.35	13963.94	0.00	15457.29
11..	1 1 1			**Gas boiler (conventional)**						
11.2.1	1 1 1	2	1	gas boiler conventional, 20-25 kW	20-25 kW	16.50	638.70	4440.67	0.00	5079.37
11.2.2	1 1 1	2	2	gas boiler conventional, 90-120 kW	90-120 kW	24.82	962.89	7230.66	0.00	8193.55
11.2.3	1 1 1	2	3	gas boiler conventional, 230-350 kW	230-350 kW	40.04	1550.23	13391.95	0.00	14942.18
11..	1 1 1			**Oil boiler (condensing)**						
11.3.1	1 1 1	3	1	oil boiler condensing, 4-25 kW	4-25 kW	14.81	573.34	5416.64	0.00	5989.98
11.3.2	1 1 1	3	2	oil boiler condensing, 36-120 kW	36-120 kW	21.70	840.33	13252.46	0.00	14092.79
11..	1 1 1			**Gas boiler (condensing)**						
11.4.1	1 1 1	4	1	gas boiler condensing, 3-15 kW	3-15 kW	14.72	569.81	5004.05	0.00	5573.86
11.4.2	1 1 1	4	2	gas boiler condensing, 4-25 kW	4-25 kW	14.81	573.34	5227.36	0.00	5800.70
11.4.3	1 1 1	4	3	gas boiler condensing, 8-50 kW	8-50 kW	15.05	582.75	6745.87	0.00	7328.62
11.4.4	1	4	4	gas boiler condensing, 28-90 kW	28-90 kW	21.63	837.59	10949.63	0.00	11787.22

	1									
11..	1			**Heat pump air**						
	1									
11.5.1	1	5	1	heat pump (air)inside, 6-12 kW (heating)	6-12 kW (heating)	18.46	717.47	15533.87	0.00	16251.34
	1									
11.5.2	1	5	2	heat pump (air)inside, 12-20 kW (heating)	12-20 kW (heating)	18.46	717.47	17482.32	0.00	18199.79
	1									
11.5.3	1	5	3	heat pump (air)inside, 6-12 kW (heating+warm water)	6-12 kW (heating+warm water)	26.46	1029.02	17164.96	0.00	18193.98
	1									
11.5.4	1	5	4	heat pump (air)inside, 12-20 kW (heating+ warm water)	12-20 kW (heating+ warm water)	26.46	1029.02	19113.41	0.00	20142.43
	1									
11.5.5	1	5	5	heat pump (air)outside, 6-12 kW (heating)	6-12 kW (heating)	44.57	1731.34	15242.37	380.07	17353.77
	1									
11.5.6	1	5	6	heat pump (air)outside, 12-20 kW (heating)	12-20 kW (heating)	0.00	0.00	0.00	0.00	0.00
	1									
11..	1			**Heat pump ground**						
	1									
11.6.1	1	6	1	heat pump (water), 5-15 kW (heating)	5-15 kW (heating)	253.47	10306.39	17079.29	720.50	28106.17
	1									
11.6.2	1	6	2	heat pump (water), 15-30 kW (heating)	15-30 kW (heating)	253.47	10306.39	17884.29	720.50	28911.17
	1									
11.6.3	1	6	3	heat pump (water), 30-65 kW (heating)	30-65 kW (heating)	254.47	10345.59	23809.29	720.50	34875.37
	1									
11.6.4	1	6	4	heat pump (water), 5-15 kW (heating+warm water)	5-15 kW (heating+warm water)	280.06	11341.26	19527.12	726.50	31594.87
	1									
11.6.5	1	6	5	heat pump (water), 15-30 kW (heating+warm water)	15-30 kW (heating+warm water)	280.06	11341.26	20332.12	726.50	32399.87
	1									
11.6.6	1	6	6	heat pump (water), 30-65 kW (heating+warm water)	30-65 kW (heating+warm water)	281.06	11380.46	26257.12	726.50	38364.07
	1									
11..	1			**Heat pump groundwater**						
	1									
11.7.1	1	**7**	1	heat pump (ground), 5-15 kW (heating)	5-15 kW (heating)	351.87	13757.64	16969.70	3510.78	34238.11
	1									
11.7.2	1	7	2	heat pump (ground), 5-15 kW (heating+cooling)	5-15 kW (heating+cooling)	351.87	13757.64	17395.70	3510.78	34664.11
	1									
11.7.3	1	7	3	heat pump (ground), 15-30 kW (heating)	15-30 kW (heating)	351.87	13757.64	21209.70	3510.78	38478.11
	1									
11.7.4	1	7	4	heat pump (ground), 15-30 kW (heating+cooling)	15-30 kW (heating+cooling)	351.87	13757.64	19959.70	3510.78	37228.11

	1								
11.7.5	1	7	5	heat pump (ground), 30-65 kW (heating)	30-65 kW (heating)	352.87	13796.84	26209.70	3510.78	43517.31
	1									
11.7.6	1	7	6	heat pump (ground), 5-15 kW (heating+ warm water)	5-15 kW (heating+ warm water)	358.96	14035.56	18871.36	3510.78	36417.69
	1			heat pump (ground), 5-15 kW (heating/cooling+ warm	5-15 kW (heating/cooling+ warm		14035.56	19297.36		36843.69
11.7.7	1	7	7	water)	water)	358.96			3510.78	
	1						14035.56	23111.36		40657.69
11.7.8	1	7	8	heat pump (ground), 15-30 kW (heating+ warm water)	15-30 kW (heating+ warm water)	358.96			3510.78	
	1			heat pump (ground), 15-30 kW (heating/cooling+ warm	15-30 kW (heating/cooling+ warm		14035.56	21861.36		39407.69
11.7.9	1	7	9	water)	water)	358.96			3510.78	
11.7.10	1		1				14074.76	28111.36		45696.89
	1	7	0	heat pump (ground), 30-65 kW (heating+ warm water)	30-65 kW (heating+ warm water)	359.96			3510.78	
	1									
11.8.	1	8		**District heating station**						
	1									
11.8.1	1	8	1	district heating, 15 kW	15 kW	4.88	188.74	3608.97	0.00	3797.71
	1									
11.8.2	1	8	2	district heating, 30 kW	30 kW	4.88	188.74	3585.86	0.00	3774.60
	1									
11.8.3	1	8	3	district heating, 40 kW	40 kW	4.88	188.74	4241.77	0.00	4430.51
	1									
11.9.	1	9		**Wood heating boiler, pellet stoves**						
	1									
11.9.1	1	9	1	wood boilers & pellet stoves, wood boiler, 10-30 kW	wood boiler, 10-30 kW	23.83	923.83	6807.53	0.00	7731.36
	1			wood boilers & pellet stoves, woodchips , wood chips, until 50kW,	wood chips, until 50kW,					
11.9.2	1	9	2	diameter 2,5 m	diameter 2,5 m	15.00	588.00	3324.94	0.00	3912.94
	1			wood boilers & pellet stoves, woodchips , wood chips, until 50kW,						
11.9.3	1	9	3	diameter 3,5 m	Maintenance Frequency	15.00	588.00	3655.93	0.00	4243.93
	1			wood boilers & pellet stoves, woodchips , wood chips, until 50kW,	wood chips, until 50kW,					
11.9.4	1	9	4	diameter 4,5 m	diameter 4,5 m	15.00	588.00	3986.92	0.00	4574.92
	1									
11.9.5	1	9	5	wood boilers & pellet stoves, pellet stove, 0-10 kW (air)	0-10 kW (air)	3.39	132.89	3824.05	0.00	3956.94
	1			wood boilers & pellet stoves, pellet stove, 3-13 kW						
11.9.6	1	9	6	(air+water)	3-13 kW (air+water)	3.39	132.89	4724.05	0.00	4856.94
	1							13693.91		14626.72
11.9.7	1	9	7	wood boilers & pellet stoves, pellet heating boiler, 5-25 kW	5-25 kW	23.98	932.81		0.00	

	1			wood boilers & pellet stoves, pellet heating boiler, 45-120					19510.7			20365.1
11.9.8	1	9	8	kW	45-120 kW		21.98	854.41	1	0.00		2

5.3.4 Heating Distribution

Reference				Component/Technology	Capacity	Labour Intensity	Labour Cost	Material Cost	Equipment Cost	Total Cost	Maintenance Cost
					W	[h]	[EUR]	[EUR]	[EUR]	[EUR]	[EUR]
				Heat Distribution							
12..	1 2 1			**Radiator heating**							
12.1.1	2 1	1	1	Radiator Heatingpanel radiator, wall120 or 150 Watt	120 or 150 Watt	1.80	70.56	168.17	0.00	238.73	
12.1.2	2 1	1	2	Radiator Heatingpanel radiator, wall180 Watt	180 Watt	1.80	70.56	172.17	0.00	242.73	
12.1.3	2 1	1	3	Radiator Heatingpanel radiator, wall240 Watt	240 Watt	1.80	70.56	190.77	0.00	261.33	
12..4	2 1		4	Radiator Heatingpanel radiator, wall270 Watt	270 Watt	1.80	70.56	199.57	0.00	270.13	
12.2.5	2 1	2	5	Radiator Heatingpanel radiator, wall300 Watt	300 Watt	1.80	70.56	186.17	0.00	256.73	
12.2.6	2 1	2	6	Radiator Heatingpanel radiator, wall360 Watt	360 Watt	1.80	70.56	199.17	0.00	269.73	
12.2.7	2 1	2	7	Radiator Heatingpanel radiator, wall365 Watt	365 Watt	1.80	70.56	230.12	0.00	300.68	
12..8	2 1		8	Radiator Heatingpanel radiator, wall480 Watt	480 Watt	1.80	70.56	228.17	0.00	298.73	
12.3.9	2	3	9	Radiator Heatingpanel radiator, wall500 Watt	500 Watt	1.80	70.56	251.27	0.00	321.83	
12.3.10	1 2 1	3	1 0 1	Radiator Heatingpanel radiator, wall640 Watt	640 Watt	1.80	70.56	213.17	0.00	283.73	
12..11	2		1	Radiator Heatingpanel radiator, wall660 Watt	660 Watt	1.97	77.22	240.17	0.00	317.39	
12.4.12	1 2	4	1 2	Radiator Heatingpanel radiator, wall720 Watt	720 Watt	1.80	70.56	272.12	0.00	342.68	

12.4.1	**1**		1							
3	**2**	4	3	Radiator Heatingpanel radiator, wall780 Watt	780 Watt	1.80	70.56	251.27	0.00	321.83
12.4.1	**1**		1							
4	**2**	4	4	Radiator Heatingpanel radiator, wall840 Watt	840 Watt	1.80	70.56	292.07	0.00	362.63
12.4.1	**1**		1							
5	**2**	4	5	Radiator Heatingpanel radiator, wall900 Watt	900 Watt	1.80	70.56	273.27	0.00	343.83
	1		1							
12..16	**2**		6	Radiator Heatingpanel radiator, wall905 Watt	905 Watt	1.97	77.22	354.02	0.00	431.24
12.5.1	**1**		1							
7	**2**	5	7	Radiator Heatingpanel radiator, wall960 Watt	960 Watt	1.97	77.22	280.17	0.00	357.39
12.5.1	**1**		1							
8	**2**	5	8	Radiator Heatingpanel radiator, wall1015 Watt	1015 Watt	1.80	70.56	323.57	0.00	394.13
12.5.1	**1**		1							
9	**2**	5	9	Radiator Heatingpanel radiator, wall1020 Watt	1020 Watt	1.80	70.56	351.37	0.00	421.93
12.5.2	**1**		2							
0	**2**	5	0	Radiator Heatingpanel radiator, wall1100 Watt	1100 Watt	1.97	77.22	320.57	0.00	397.79
12.5.2	**1**		2							
1	**2**	5	1	Radiator Heatingpanel radiator, wall1480 Watt	1480 Watt	1.97	77.22	352.47	0.00	429.69
12.5.2	**1**		2							
2	**2**	5	2	Radiator Heatingpanel radiator, wall1560 Watt	1560 Watt	1.97	77.22	385.52	0.00	462.74
	1		2							
12..23	**2**		3	Radiator Heatingpanel radiator, wall1740 Watt	1740 Watt	1.97	77.22	443.27	0.00	520.49
	1						10306.3	17079.2		28106.1
12.6.1	**2**	6	**1**	**Floor heating**	5-15 kW (heating)	253.47	9	9	720.50	7
	1			Floor Heatingpipes, floor above groundnub plate 46 mm,	nub plate 46 mm, soundproof insulation 30/28 mm					
12.6.1	**2**	6	1	soundproof insulation 30/28 mm		1.37	53.91	65.29	0.00	119.19
	1			Floor Heatingpipes, floor above groundnub plate 46 mm,	nub plate 46 mm, soundproof insulation 50/48 mm					
12.6.2	**2**	6	2	soundproof insulation 50/48 mm		1.37	53.91	72.00	0.00	125.90
	1			Floor Heatingpipes, floor above groundnub plate 46 mm,	nub plate 46 mm, soundproof insulation 70/68 mm					
12.6.3	**2**	6	3	soundproof insulation 70/68 mm		1.37	53.91	77.72	0.00	131.62
	1			Floor Heatingpipes, floor above groundnub plate 63 mm,	nub plate 63 mm, soundproof insulation 30/28 mm					
12.6.4	**2**	6	4	soundproof insulation 30/28 mm		1.37	53.91	68.70	0.00	122.60
	1			Floor Heatingpipes, floor above groundnub plate 63 mm,	nub plate 63 mm, soundproof insulation 50/48 mm					
12.6.5	**2**	6	5	soundproof insulation 50/48 mm		1.37	53.91	75.41	0.00	129.31

12..6	1 2		6	Floor Heatingpipes, floor above groundnub plate 63 mm, soundproof insulation 70/68 mm	nub plate 63 mm, soundproof insulation 70/68 mm	1.37	53.91	81.13	0.00	135.03	
12.7.7	1 2	7	7	Floor Heatingpipes, floor above unheated roomnub plate 46 mm	nub plate 46 mm	1.18	46.26	64.13	0.00	110.39	
12.7.8	1 2	7	8	Floor Heatingpipes, floor above unheated roomnub plate 63 mm	nub plate 63 mm	1.18	46.26	67.54	0.00	113.80	
12.7.9	1 2	7	9	Floor Heatingpipes, floor above heated room, nub plate 46 mm	nub plate 46 mm	0.98	38.61	56.38	0.00	94.98	
12.7.10	1 2	7	10	Floor Heatingpipes, floor above heated room, nub plate 63 mm	nub plate 63 mm	0.98	38.61	59.79	0.00	98.39	
12.7.	1 2	7		**Pedestal heating**	30-65 kW (heating)	352.87	13796.84	26209.70	3510.78	43517.31	
12.7.1	1 2	7	1	Floor Heatingpipes, pedestal, 400 W	400 W	1.95	76.45	299.43	0.00	375.88	

5.3.5 Ventilation

Reference				Component/Technology	Size [-]	Labour Intensity [h]	Material Cost [EUR]	Labour Cost [EUR]	Equipment Cost [EUR]	Total Cost [EUR]	Maintenance Cost [EUR]
				Ventilation							
	1										
13..	3			**Automatic Natural Ventilation**							
13.1.1	1 3	1	1	Mechanical ventilation system, Installing new (no ventilation system installed in existing building), 450m3 / h	1 m2 living space	5.88	3349.4975	230.37524	0.6	3580.47	
13.1.2	1 3	1	2	Mechanical ventilation system, Installing new (no ventilation system installed in existing building), 450m3 / h	100 m2 living space	39.65	6003.235	1556.524	0.6	7560.36	
13.1.3	1 3	1	3	Mechanical ventilation system, Installing new (no ventilation system installed in existing building), 450m3 / h	150 m2 living space	56.10	7297.6075	2201.286	0.6	9499.49	
13.1.4	1 3	1	4	Mechanical ventilation system, Installing new (no ventilation system installed in existing building), 450m3 / h	200 m2 living space	72.84	8614.728	2858.473	0.6	11473.96	
13.1.5	1 3	1	5	Mechanical ventilation system, Installing new (no ventilation system installed in existing building), 450m3 / h	250 m2 living space	89.59	9931.7925	3515.57	0.6	13447.96	

13.1.6	**13**	1	6	Mechanical ventilation system, Installing new (no ventilation system installed in existing building), 220m3 / h	70 m2 living space	17.64	3235.1808	691.1168	25.36	3951.66			

5.3.6 Lighting

Reference				Component/Technology	Type [-]	Labour Intensity [h]	Material Cost [EUR]	Labour Cost [EUR]	Equipment Cost [EUR]	Total Cost [EUR]	Maintenance Cost [EUR]
				Lighting Indoors							
15..	**15**			**Fluorescent Lighting**							
15.1.1	**15**	1	1	Fluorescent Lighting, Replacing existing Lighting	Fluorescent Lighting						
15..	**15**			**LED Lighting**							
15.2.1	**15**	2	1	LED Lighting, Replacing existing Lighting	LED						

5.3.7 Shading

Reference				Component/Technology	Type [-]	Labour Intensity [h]	Material Cost [EUR]	Labour Cost [EUR]	Equipment Cost [EUR]	Total Cost [EUR]
				Shading						
16..	**16**			**Shutters**						
16.1.1	**161**	1	1	External Shutters (swinging), wood, Installed External Shading	950/1200 mm (blind blades)	2.00	244.82	80.30	0.00	325.13
16.1.2	**161**	1	2	External Shutters (swinging), wood, Installed External Shading	950/1200 mm (filled blades)	2.00	237.82	80.30	0.00	318.13
16.1.3	**161**	1	3	External Shutters (swinging), wood, Installed External Shading	500/2500-3200 mm	5.28	1016.30	201.64	0.00	1217.94
16.1.4	**161**	1	4	External Shutters (swinging), Alu, Installed External Shading	500/2500-3200 mm	6.69	947.90	255.92	0.00	1203.83
16.1.5	**161**	1	5	External Shutters (swinging), plastic, manually, Installed External Shading	1125/1250 mm	1.95	169.94	75.20	0.00	245.14
16.1.6	**161**	1	6	External Shutters (swinging), plastic, manually, Installed External Shading	brick, d=30 (1000/2375 mm)	2.31	205.85	89.79	0.00	295.64

16.1.7	16	1	17	External Shutters (swinging), plastic, manually, Installed External Shading	brick, d=36,5 (1000/2375 mm)	2.31	209.62	89.79	0.00	299.41
16.1.8	16	1	18	External Shutters (swinging), plastic, manually, Installed External Shading	lightweight concrete, non load-bearing d=24 (1000/2375 mm)	2.12	181.32	82.36	0.00	263.68
16.1.9	16	1	19	External Shutters (swinging), plastic, manually, Installed External Shading	lightweight concrete, non load-bearing d=30 (1000/2375 mm)	2.20	185.88	85.49	0.00	271.37
16.1.10	16	1	10	External Shutters (swinging), plastic, manually, Installed External Shading	lightweight concrete, non load-bearing d=36,5 (1000/2375 mm)	2.23	189.38	86.66	0.00	276.04
16.1.11	16	1	11	External Shutters (swinging), plastic, manually, Installed External Shading	lightweight concrete, load-bearing d=36,5 (1000/2375 mm)	2.27	202.63	88.23	0.00	290.86
16.1.12	16	1	12	External Shutters (swinging), plastic, electrical, Installed External Shading	brick, d=30 (1000/2375 mm)	2.43	288.35	94.41	0.00	382.76
16.1.13	16	1	13	External Shutters (swinging), plastic, electrical, Installed External Shading	brick, d=36,5 (1000/2375 mm)	2.43	292.12	94.41	0.00	386.53
16.1.14	16	1	14	External Shutters (swinging), plastic, electrical, Installed External Shading	lightweight concrete, non load-bearing d=24 (1000/2375 mm)	2.24	263.82	86.98	0.00	350.80
16.1.15	16	1	15	External Shutters (swinging), plastic, electrical, Installed External Shading	lightweight concrete, non load-bearing d=30 (1000/2375 mm)	2.32	268.38	90.11	0.00	358.49
16.1.16	16	1	16	External Shutters (swinging), plastic, electrical, Installed External Shading	lightweight concrete, non load-bearing d=36,5 (1000/2375 mm)	2.35	271.88	91.28	0.00	363.16
16.1.17	16	1	17	External Shutters (swinging), plastic, electrical, Installed External Shading	lightweight concrete, load-bearing d=36,5 (1000/2375 mm)	2.39	285.13	92.85	0.00	377.98
16.1.18	16	1	18	External Shutters (swinging), light metal, manually, Installed External Shading	brick, d=30 (1125/1250 mm)	0.93	84.19	36.15	0.00	120.34
16.1.19	16	1	19	External Shutters (swinging), light metal, manually, Installed External Shading	brick, d=30 (1000/2160 mm)	1.10	157.55	42.62	0.00	200.17
16.1.20	16	1	10	External Shutters (swinging), light metal, electrical, Installed External Shading	brick, d=30 (1125/1250 mm)	1.35	155.59	52.32	0.00	207.91
16.1.21	16	1	11	External Shutters (swinging), light metal, electrical, Installed External Shading	brick, d=30 (1000/2160 mm)	1.52	228.95	58.79	0.00	287.74

16..	16			**Marquee**							
16.2.1	161	2	1	Marquee, Installed External Shading	1200/2000 mm	3.66	327.90	140.05	0.00	467.95	
16.2.2	161	2	**2**	Marquee, Installed External Shading	Wintergarden outside	1.89	176.00	72.21	0.00	248.21	
16.2.3	161	2	3	Marquee, Installed External Shading	Shading (Baldachin), inside	0.33	85.90	12.81	0.00	98.70	
16..	161			**External Blinds**							
16.3.1	161	3	1	external blinds, venetian blind, 2- 4 m², electrical, Installed External Shading	1200/2000 mm	0.71	77.23	27.26	0.00	104.48	
16.3.2	161	3	2	external blinds, venetian blind, 2- 4 m², electrical, Installed External Shading	2500/3000 mm	0.58	87.17	22.36	0.00	109.53	
16.3.3	161	3	3	external blinds, vertical, electrical, Installed External Shading	1200/2000 mm	0.46	137.10	17.55	0.00	154.65	
16.3.4	161	3	4	external blinds, vertical, electrical, Installed External Shading	2500/3000 mm	0.42	121.62	16.01	0.00	137.63	
16.3.5	161	3	5	external blinds, diagonal, electrical, Installed External Shading	900/1800 mm	0.74	179.15	28.53	0.00	207.67	
16.3.6	161	3	6	external blinds, diagonal, electrical, Installed External Shading	1400/1400 mm	0.59	136.90	22.71	0.00	159.61	
16.3.7	161	3	7	external blinds, diagonal, electrical, Installed External Shading	1400/2600 mm	0.59	140.27	22.75	0.00	163.02	
16..	161			**Fixed Blinds**							
16.4.1	161	4	1	metal construction, wood lamella, stiff, Installed Stiff Shading	1000/2250 mm	2.11	72.52	91.10	7.00	170.62	
16.4.2	161	4	2	metal construction, fibre cement, lamella, stiff, Installed Stiff Shading	1000/2250 mm	2.97	109.04	126.25	7.00	242.29	
16.4.3	161	4	3	metal construction, VSG glass matted, stiff, a=1,2m, Installed Stiff Shading	Glazing	2.20	115.26	94.85	7.50	217.60	
16..	161			**Internal Blinds**							
	161	5	1	internal blinds, alu/synthetical, Installed Internal Shading	1000/1500 mm	0.35	45.00	13.46	0.00	58.46	
	161	5	2	internal blinds, alu/synthetical, Installed Internal Shading	2000/1700 mm	0.27	44.49	10.23	0.00	54.72	

16	5	3	internal blinds, blinds horizontal, Installed Internal Shading	1000/1000 mm	0.89	73.64	34.10	0.00	107.74
16	5	4	vertical lamella, textile, Installed Internal Shading	2000/2750 mm	0.41	79.54	15.81	0.00	95.35
16	5	5	vertical lamella, textile, Installed Internal Shading	4000/2750 mm	0.40	75.42	15.23	0.00	90.65
16	5	6	Curtains, textile, Installed Internal Shading	Curtain (translucent)	0.79	93.94	30.25	0.00	124.19
16	5	7	Curtains, textile, Installed Internal Shading	Curtain (opaque)	0.00	30.25	0.00	143.19	173.45

5.3.8 Solar Thermal

Reference				Component/Technology	System size [m2]	Labour Intensity [h]	Material Cost [EUR]	Labour Cost [EUR]	Equipment Cost [EUR]	Total Cost [EUR]	Maintenance Cost [EUR]
				Solarthermal Collectors							
17..	**17**			**Flat solar collector**							
17.1.1	**17**	1	1	Flat Solar Collector, new Installation on roof	5 m2 (in-roof)	18.10	3547.38	709.52	0.00	4256.90	
17.1.2	**17**	1	2	Flat Solar Collector, new Installation on roof	5 m2 (on-roof)	16.10	3148.14	631.12	0.00	3779.26	
17.1.3	**17**	1	3	Flat Solar Collector, new Installation on roof	5 m2 (flat-roof)	17.10	3298.88	670.32	0.00	3969.20	
17.1.4	**17**	1	4	Flat Solar Collector, new Installation on roof	10 m2 (in-roof)	22.15	5316.58	868.28	0.00	6184.86	
17.1.5	**17**	1	5	Flat Solar Collector, new Installation on roof	10 m2 (on-roof)	20.15	4917.34	789.88	0.00	5707.22	
17.1.6	**17**	1	6	Flat Solar Collector, new Installation on roof	10 m2 (flat-roof)	21.15	5068.08	829.08	0.00	5897.16	
17.1.7	**17**	1	7	Flat Solar Collector, new Installation on roof	15 m2 (in-roof)	29.55	7695.50	1158.36	0.00	8853.86	
17.1.8	**17**	1	8	Flat Solar Collector, new Installation on roof	15 m2 (on-roof)	26.55	7174.06	1040.76	0.00	8214.82	
17.1.9	**17**	1	9	Flat Solar Collector, new Installation on roof	15 m2 (flat-roof)	27.55	7372.54	1079.96	0.00	8452.50	
17.2.	**17**	2		**Vacuum tube solar collector**							
17.2.1	**17**	2	1	Vacuum tube solar collector, new Installation on roof	2,5 m2	12.30	5780.70	482.16	0.00	6262.86	
17.2.2	**17**	2	2	Vacuum tube solar collector, new Installation on roof	4 m2	12.30	8626.50	540.96	0.00	9167.46	

5.3.9 Storage Tank

Reference				Component/Technology	System size [l]	Labour Intensity [h]	Material Cost [EUR]	Labour Cost [EUR]	Equipment Cost [EUR]	Total Cost [EUR]
				Storage Tank						
18..	**18**			**Hotwater tank**						
18.1.1	**18**	1	1	Hot water tank with integrated electrical boiler, Replacement of existing tank	200 l	16.01	3280.13	619.93	0.00	3900.06
18.1.2	**18**	1	2	Hot water tank with integrated electrical boiler, Replacement of existing tank	400 l	20.63	3007.65	798.85	0.00	3806.50
18.1.3	**18**	1	3	Hot water tank with integrated electrical boiler, Replacement of existing tank	500 l	21.13	3469.07	818.45	0.00	4287.52
18.1.4	**18**	1	4	Hot water tank with integrated electrical boiler, Replacement of existing tank	1000 l	25.13	10289.03	975.25	0.00	11264.28
18.1.5	**18**	1	5	Hot water tank with integrated electrical boiler, Replacement of existing tank	2000 l	27.63	16092.83	1073.25	0.00	17166.08
18.1.6	**18**	1	6	Hot water tank with integrated electrical boiler, Replacement of existing tank	3000 l	34.13	25793.03	1328.05	0.00	27121.08