Developing an Evidence Base for EU Product Policy Instruments on Windows and External Doors

Second Stakeholder Questionnaire

This questionnaire has been prepared on behalf of the European Commission, to inform and gather industry and other stakeholder input and opinion on Windows and External Doors, for the revision of the Green Public Procurement specifications for those products.

The data that you provide will help us understand current products and market conditions, and customer appetite for high environmental performance. It is your chance to influence the design of these environmental guidelines.

Friday 10th February 2012 is the deadline for posting questionnaires Windows.Doors@aea.com, or fax to +44 (0) 870 190 6933.

We rely heavily on stakeholder consultation, so your time and expertise are greatly appreciated and valued.

Thank you in advance for your support.

For further information regarding this questionnaire, please contact:

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+ or visit http://susproc.jrc.ec.europa.eu/windoors/index.html

ipts AEA

Date: January 2012

1. Your Company or Organisation

1.a *Please provide your contact details in the table below.*

Detail	Please enter your details below
Title	Dipl.-Ing.
* Name	Frank Koos
* Company/Organisation	FEMIB - Federation of the European Building Joinery Associations and EPW - European Plastic Window Association
Type of Company (e.g. Manufacturer, Retailer)	European NGO
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* *Please provide at least these details*

	Yes	No
It is often useful to follow up questionnaire responses, for example to clarify particular points. Are you happy to be contacted if required?	X	

2. Definitions

This section is for information only.

Following the first questionnaire, the definitions based on the terms used in EN12519 and EN14351 will be used. At the criteria development stage, the criteria may differentiate between products as appropriate.

Window:

Building component (glazing) for closing an opening in a wall or pitched roof that will admit light and may provide ventilation, including the frame of the window which is defined as the component forming the perimeter of a window, enabling it to be fixed to the structure

Roof Window:

Window intended for installation in a roof or the like which is inclined. Roof windows have the same characteristics as windows installed in walls with regard to function, cleaning, maintenance and durability

External Doors:

Doorset which separates the internal climate from the external climate of a construction for which the main intended use is the passage of pedestrians, including the frame of the door which is defined as the component forming the perimeter of a door, enabling it to be fixed to the structure

3. Stock Calculations

As part of the work calculations have been undertaken to establish the EU and Member States stock/sales of windows and external doors (in m^2) and forecast how it will change in the future. This will enable a calculation of the improvement potential in later tasks.

As discussed in section 3 (Task2: Economic and Market analysis) of the first report (Task 1 and Task 2), official EU statistics for windows and doors are aggregated to include other windows and doors not included within the scope of this study. Therefore, models were built to provide a reasonable estimate

of stock and sales figures based on a number of core assumptions as discussed in section 3.2.5 of the first report.

A number of assumptions have been made:

- Average window area across the EU residential sector is assumed to be 15% of the overall residential building floor area in square meter.
- Average window area across the EU for non residential area is assumed to be 10% of the overall building floor area to take account of the wide differences in building.
- Average door area across the EU for residential and non residential has been assumed to be equal to 1% of the overall floor area.
- The forecast for window and doors stock and sales growth is based on an additional 2% of floor space added every year across the EU27, and that the refurbishment rate for windows and door is typically 30 years, a replacement cycle of 5% per year.

3.a Do you agree with these assumptions? Please provide alternative information and justification where you disagree.

We do not have detailed EU average figures for window area according floor area.
We calculate refurbishment with 25 years (changing IGU and gaskets) and the service life with 50 years (same as estimated lifetime of the building).
A replacement cycle of 5% per year is much too high for windows. It would mean that every 20 years the window stock is replaced which is not the case. Looking at the figures for the 6 biggest countries of the study "The European Window Markets" from VFF in 2011 you will find:

Activity index (market volume in percentage of window stock)

DE	FR	UK	IT	ES	PL	average
2,08	2,86	2,51	1,79	2,8	2,4	2,4

This includes replacement and new windows in relation to existing windows. The replacement rate is about half of activity index (1,2%)! This fits also to the newest figures for Germany from this year. The replacement rate is there 1,3%. We would like to have 5%, but this is not realistic.

Remark to the definitions: definitions should strictly stay to EN 12519.
The correct definition for **window** is: building component ~~(glazing)~~ for closing an opening in a wall or pitched roof that may admit light and/or provide ventilation. → A window could have in principle an opaque infill. Glazing is not a window, it is a transparent infill panel (see EN 12519 5.3.5)
The correct definition for **External Door** is: dividing the exterior from the interior of a building. This has nothing to do with "separates the internal climate from the external climate", because this is relevant only for a part of external doors and also for a part of internal doors! Please use "pedestrian doors separating the internal from the external climate" or leave doors out (low relevance for energy saving).

4. Environmental Life Cycle Assessment (LCA)

GPP specifications focus on the key environmental impacts of a product as identified via a life cycle approach and their relation to the cost throughout the whole life-cycle of the product. For this project, the Commission's EcoReport simplified life cycle tool will be used to identify and demonstrate environmental impacts associated with Windows and External Doors. This will take into account the different life cycle stages, including production, distribution, use and end of life.

This section of the questionnaire aims to clarify and gather additional information for the purposes of undertaking the environmental LCA. Due to the range of products available and interaction with the energy performance of the building as a whole, the type of criteria developed will be differentiated in terms of types of windows/doors i.e. residential or commercial and whether they are for a new/major refurbishment project or window replacement. It is proposed that the criteria for windows and doors for new/major commercial buildings should focus on the information that should be provided in order for the designer/architect to fully assess the energy performance of the whole building and make informed decisions regarding other building parameters such as cooling/heating, ventilation, shading, orientation etc.

The size of windows will affect its performance (including parameters such as solar gain, heat loss and air leakage) and amount of materials used. Therefore a standard window and door size is proposed. We welcome your commentary on this.

The sections below outline the proposed base case for these different type/use scenarios. The base case is the scenario against which design options and best practice will be compared.

In order to understand the material composition for the LCA, we would like stakeholder feedback in relation to material composition of these products and their packaging.

Feedback is sought on the following two areas:

+ material composition information already collated during the project; and
+ specific material composition information for products you place on the market.

The material composition of different products is sought in order to develop examples of typical products , which can then be entered into the EcoReport Tool as part of the LCA.

Residential Windows – New Construction & Refurbishment

The following are proposed for the residential window base case:

- Standard window size to be assessed is 1480mm high by 1230mm wide
- Residential windows are typically of a similar size and performance, whether used for replacement or new construction projects, therefore any criteria developed for residential windows would be applicable to both replacement and new construction projects.

4.a Do you agree with the proposed size chosen for the base case Y/N

Yes. Please be aware that the product standard states width * height, i.e. 1230 mm wide by 1480 mm high. It is essentially to write that the standard window used is without transoms/mullions and/or glazing bars.

But new Construction and Refurbishment should be treated separately and refurbishment should be further split into two categories because, windows and doors are intermediate products and the holistic optimisation of complete buildings should prevail on requirements at component level, to prevent the risk of sub-optimisation. GPP criteria should therefore be applied neither for new construction projects nor for renovation projects falling under the definition of major renovation given in the EPBD (Energy Performance of Buildings Directive 2010/31/EU) or for renovation projects assisted by energy experts."

4.b If no, please provide reasons why and alternative size details.

4.c The table below presents the information sought with regards a 1480mm high by 1230mm wide windows. Please provide feedback on the information presented and add any additional information as required.

Description of Component	Material	Weight (kg)	Agree	Disagree (Propose alternatives – material and weight)	Don't know
1. Glazing					
Single – domestic	Glass	13.18		Not used to separate the internal climate from the external climate	
Single – commercial		19.78		Not used to separate the internal climate from the external climate	
Double - domestic	Glass	26.37	X		
Double - commercial		39.55		No difference for same size	
Triple - domestic	Glass	39.55	X		
Triple - commercial		59.32		No difference for same size	
Other (please specify)	Glass				
2. Frame / Fittings					

Frames	wood	14.14		See comments below. Depending also on density of wood specie.	
	plastic	18.03		Figure too high in relation to other materials	
	Aluminium	14.40		Figure too low (thermal break missing?)	
	Al/Wood	19.24		Figure too high, is similar to real Aluminium (cover profile included)	
Cockspur handle - domestic		0.30		Negligible	
Cockspur handle - commercial		0.46		Negligible	
Cockspur catch		0.03		Negligible	
Peg stay		0.17		Negligible	
Friction stay (210mm)		0.142		Negligible	
Friction stay (310mm)		0.213		Negligible	
Espagnolette lock (400mm)		0.175		Negligible	
Espagnolette lock (740mm)		0.363		Negligible	
Espagnolette lock (880mm)		0.455		Negligible	
Other (please specify)					
4. Packaging					

4.d Please indicate in the table (with an X) whether you broadly agree, disagree or don't know with the information presented. Where you do not agree, please provide alternative figures in the table (if possible). Reasons why and additional information can be added below.

Glazing: no difference in weight for same size between domestic and commercial, but maybe different from frame area (related to material and design).
Frames: Different from region/climate condition. Lower Uw-value needs bigger profiles and more material! Often mixture of materials for profiles used.
Hardware: is similar for all windows and negligible because of the small weight. In addition many products are mainly used on UK windows and not on the usual tilt and turn windows or sliding systems.
Packaging: different from region/climate condition and quality/price of product
Figures for weight available from several LCA studies (e.g. from Kreißig, IKP, University of Stuttgart or ift, Rosenheim/Germany)

4.e Do you agree with the following performance parameters for the standard window configuration

3. Energy Performance Characteristics	Value	Agree	Disagree (Propose alternatives – material and weight)	Don't know
U value (outer and sash)	1.4 W/m^{2}K		x	
U value – glazing	1.5 W/m^{2}K		x	
G value	0.6 W/mK		x	
Air Leakage	2 2 m^3/hr/m^2 @ 600Pa		x	

4.f If you do not agree with the standard energy performance values presented above please provide alternative figures. Reasons why and additional information can be added below.

To give exact and common values of performance is not possible at EU level. Different climate and different ways of handling energy requirements need to be taken into account. By stating that requirements shall be e.g. 5 or 10% better than the legal requirements in the given MS it is insured that the best performing products are used without removing the possibility to choose the best overall performing product from a holistic point of view.
The configuration is only referring to heating conditions (northern Europe) and not cooling conditions (southern Europe. If g-value is limited to minimum 0,6 solar glass cannot be used anymore.
Regarding air leakage and its influence on energy performance the requirement should be given at 50 Pa – this is common practice around Europe. But we have to point out that this value is not part of CE marking. EN 14351-uses classes for air permeability according EN 12207. The used input data should be based on declared values according hEN.
The only way to address this item correctly is to wait and to refer to the energy label in the future

4.g Can you provide evidence of standard energy performance values – reference to published sources would be very helpful.

These values are different to each country and normally used only for replacement of old windows, not for new buildings or major renovation (calculation of energy consumption of building needed, see EPBD)!

	Yes	No
4.h Is there any potentially harmful or hazardous substance which might be included in the material composition of windows?		X

*If **yes**,* please indicate which substance(s) and which type(s) of windows are concerned. Additional information might also be provided separately.

EGDS is dealing with this item and will prepare mandate for product standard EN 14351, if there is any relevance. There is a study on Dangerous Substances on indoor air available from ift (see document DS 205). The data on the emission of several components used in doors and windows indicate that the emission levels are significantly below any national requirements should be of no concern.

Commercial Windows – Replacement

The scope of commercial refurbishment can include domestic type products/ construction to highly glazed facades similar to those on a new building. We propose to use the above residential data for smaller windows for the commercial replacement market as a first approximation. We welcome expert opinion advising how we should address larger windows in terms of a typical size and construction.

The material use and performance of windows used in the replacement of commercial windows varies depending on age and type of building. Many commercial properties have small windows similar to those used for residential properties. However, individual calculations for each and every window type and size used may be too onerous for smaller commercial projects.

It is therefore proposed to use the base case identified above for residential windows for replacement commercial windows.

4.i Is this approach reasonable?

Yes but the comment in 4f is also valid here.
Furthermore “highly glazed facades constructions” are not windows! They are curtain walling according EN 13830. Curtain walling may include windows, but these are not so different in size related to commercial windows. Anyhow EN 14351-1 does not differ and there is no distinction needed.
We are of the opinion that within commercial applications engineers are involved and as a result EPBD or ‘holistic’ approaches not dealing only with windows are taken into account. There is no need to have special GPP requirements for commercial buildings

4.j If no, please provide information on other common window sizes used when replacing commercial windows

Commercial Windows – New Construction

For new commercial building construction projects the common approach is to assess the energy performance of the whole building and not individual components. This is in line with

the Energy Performance of Buildings Directive[1] and consistent with the development of other policy instruments, for example the current project developing an EU ecolabel and GPP criteria for office buildings.

For this reason we propose that for this scenario any GPP criteria developed will focus on the information that should be provided for windows enabling an assessment of the whole building to be undertaken.

4.k The following information for windows is required to undertake an assessment of the energy performance of a whole building:

- *Thermal transmittance – u value*
- *Solar gain – g value*
- *Air leakage*

4.l Do you agree with this? Are there any other parameters that should be included?

Yes and no. Shading Coefficient must also be taken into account as it reduces solar gains (g value) and as a result reduces cooling demands.
For air leakage please consult § 4.f

Climate Variation

Climate variation is another factor influencing the energy performance of a window or door. During the heating period (cooler weather conditions) heat loss and utilisation of passive solar gain are important while during the cooling period (warmer weather conditions) reduction of solar radiation into the building is the primary concern.

It is important to get a sense of the relative importance of climate on different parameters. We welcome your feedback on the typical energy performance characteristics (e.g. U-value, G-value, and air leakage) most appropriate for different countries or regions. This would help inform the development of the criteria related to the energy performance/balance of the window or door. In addition, information is sought on the typical estimation of heating and cooling degree days per region or country.

4.m The table below presents the information sought with regards to the typical or best practice performance parameters. Please provide feedback on the information presented in the following table:

Product	Parameter	Country/ Region	Typical Value (e.g. express in W/m^{2}k)	Heating Degree Days	Cooling Degree Days
Windows	**Thermal transmittance (U value)**				
	Solar gains (g value)				
	Air tightness / air permeability (L value)				
Doors	**Thermal transmittance (U value)**				
	Solar gains (g value)				
	Air tightness / air permeability (L				

[1] http://eur-lex.europa.eu/JOHtml.do?uri=OJ:L:2010:153:SOM:EN:HTML

	value)				

4.n Please provide any additional comments regarding heating and cooling degree days and the impacts of regional climates on windows and doors in the following:

See comment to 4f.
The requested information does not help for an European approach! Rules on climate conditions (climate zones) may change by national standardisation or legislation. Requirements should be decided on national level. It is important, that a common European method, based on declared values from CE marking is used and not to define many national parameters on European level.
For energy efficiency it must be referred to the European energy label

External Doors

The following are proposed for both residential and commercial external door base case:

- Standard door size to be assessed is 2180mm high by 1230mm wide
- Residential doors are typically of a similar size and performance, whether used for replacement or new construction projects, therefore GPP criteria developed for residential doors would be applicable to both replacement and new construction projects.

4.o Do you agree with the proposed size chosen for the base case Y/N

Yes. Also here the size should be stated as 1230 mm wide by 2180 mm high.
Please remind the remark to the definitions in 3.a

4.p If no, please provide reasons why and alternative size details.

4.q Limited information regarding external pedestrian doors exists in the public domain. With regards to the base case development for external pedestrian doors, three variations of the base case are proposed:

- *A solid door*
- *Fully glazed door*
- *Half glazed door*

Which type of external pedestrian door would you agree is most appropriate for the base case example? Please state why.

There is no rule. It depends on both application and aesthetics.

4.r The table below presents the information sought with regards a 2180mm high by 1230mm wide door. Please provide feedback on the information presented and add any additional information as required. Where information is not provided please provide typical weights.

Description of Component	Material	Weight (kg)	Agree	Disagree (Propose alternatives – material and weight)	Don't know
1. Average Door Weights					
Door	wood	63.24		Comments see below	
	plastic	30.00			
	metal	67.57			
	Al/Wood	65.42			
Hinge	General	0.5			
Pair of lever handles	General	0.7			

	Aluminium	0.4			
	Stainless	1			
Kickplate 900 x 200 x 1.5 (pair)	General	3			
	Aluminium	1.5			
	Stainless	4			
Heavy duty door closer	General	3			
Economy door closer	General	2			
Euro pattern lock 72mm ctrs	General	1			
Other (please specify)					
4. Packaging					

4.s *Please indicate in the table (with an X) whether you broadly agree, disagree or don't know with the information presented. Where you do not agree, please provide alternative figures in the table (if possible). Reasons why and additional information can be added below.*

Because of the mentioned three variations, single values for the weight are not possible.
The glazing is missing
You are requested to consult 4.d

4.t *We want to gain an understanding of typical u values for external doors. The u value of a typical door will vary in particular with respect to the amount if glazing used i.e. whether it is fully glazed, half glazed or opaque. In the table below, please provide information on the approximate percentage glazing of a typical external door.*

Region/Country	Percentage glazing for a typical external door (%)	Application (residential or commercial)	Additional Commentary
Scandinavia	12	Residential	The u value of a typical door will vary also extremely by the used materials and thickness
Austria/Swiss	20	Residential	
UK	5	Residential	

Unfortunately markets or Architect's demands are so different that cannot be written down. The ones who will provide you figures are having certain interests to promote their products.

4.u *Is there any potentially harmful or hazardous substance which might be used in the material composition of doors?*

Yes	No
	X

*If **yes**,* please indicate which substance(s) and which type(s) of doors are concerned. Additional information might also be provided separately.

You are requested to consult 4.h

Actual Product Data – Windows and External Doors

4.v *Actual data on your best selling products (residential and commercial windows and external doors) would greatly help us improve the accuracy of the LCA modelling. Therefore, for your best selling products, please provide details of the material composition of the product and its packaging in the tables below, referencing the appropriate EcoReport material code from Annex 1. Packaging volume is also requested, as this is used in EcoReport to help calculate impacts during the distribution phase. Please focus on best selling products, which may not necessarily be the top performing products (which are addressed in Section 6).*

Please enter general product details in this first table.

Product Type	Product Details				Size (m2)	Packaging	Comments
e.g. wood frame double glazed unit, solid wood door etc	*Product code*	*Product name*	*Total Product weight*	*Number of Years on Market*	*Size of window unit*	*Volume (m3) or Dimensions (mm)*	

Use this second table to record component unit weights, in kg, for each product.

Product Type	Component	Material Description	Component Weight	EcoReport Material Code	Comments
As detailed above	*Hinges, Handles, Seals, Locks, etc*	*Plastic (PET etc.), Steel, Rubber etc.*	*kg or % of total above*	*See Annex 1 [or enter "n/a" (not available) if there is no appropriate code]*	

Use this third table to record component performance parameters and market.

Product Type	Component	Material Description	Performance Parameter	Product Market	EcoReport Material Code	Comments
As detailed above	*Hinges, Handles, Seals, Locks, etc.*	*Plastic (PET etc.), Steel, Rubber etc.*	*U-value, g-value, Air Leakage – please indicate and supply a value*	*Residential, non-residential*	*See Annex 1 [or enter "n/a" (not available) if there is no appropriate code]*	

Please insert additional rows if there are more materials per product example, or if you have can provide information on more than one product example.

Maintenance

Stakeholders responding to the first questionnaire remarked that maintenance levels are an important means to improving the durability and service life of windows and doors. Here we seek your views on the relevance of product cleaning and water use to the overall impact on the product's life cycle.

4.w Do you agree that window and door cleaning (including water and detergent use) is an important aspect of the environmental impacts of window and door use throughout the life cycle? Can you provide evidence to demonstrate the impact?

No. Evidence is given with environmental product declaration (EPD) according EN 15804.
There is a study from ift Rosenheim available on the environmental impact of windows of different material for the whole life cycle (cradle to grave – average EPDs).

4.x Can you estimate the frequency (annually) at which windows and doors are cleaned for both residential and non-residential buildings?

That depend a lot of the habits of the users of the building and the climate. A rule of thumb is to clean at least twice a year outside is sufficient to prevent degradation – of course it needs to be combined with regular maintenance like painting of wooden surfaces, adjustments and lubrication of e.g. hinges.

Lifetime

To date, research and stakeholder feedback suggests the following estimated life times for windows and doors (i.e. product replacement even when the product is still in working order):

Product (based on frame material)	Lifetime Range identified by research/stakeholders	Proposed EcoReport Input (average)
Windows		
Wood	10- 75 years	42.5 years
Plastic	15 – 50 years	32.5 years
Iron/Steel	10 – 75 years	42.5 years
Aluminium	25 – 40 years	32.5 years
Doors		
Wood	10- 50 years	30 years
Plastic	25 – 50 years	37.5 years
Iron/Steel	15 – 35 years	25 years
Aluminium	10 – 35 years	22.5 years

4.y Do you agree with these lifetime figures for the EcoReport input?

Yes	No
	X

*If **no**, how would you modify them?*
Material is only one factor conditioning the lifespan of window. Products, design, quality of manufacture maintenance and many others could be much more relevant. Windows and doors of all kind of materials will get to the same service live. Only the amount of maintenance is different.
The possibility of replacing windows due to technical progress, financial incentives or changing tastes is not relevant for the service live and ecological assessment.
It makes no sense to have a service live for windows longer than the lifetime of the building.

4.z Do you have any more specific lifetime information for window and door lifetimes in either domestic or non-domestic applications?

Yes	No
	X

*If **yes**, please provide further details?*

Research has shown that components are often the limiting factor to window and door lifetimes unless replaced. This view was confirmed by stakeholders. The following table lists the estimated lifetimes of a number of products significant to the functioning of window and doors.

Product	Estimated Lifetime (years)
Fittings: simple fittings, sliding door fittings	30

Product	Estimated Lifetime (years)
Fittings: Tilt-turn fittings, swing wing fittings	25
Door locks, door hinge dampers, panic locks	25
Door closers	20
Door operators	15
Sealing Profiles	20
Sealants	12
Blinds	40

	Yes	No
4.aa *Do you agree with these lifetime figures for the EcoReport input?*		(X)

*If **no**, how would you modify them?*
The first 5 is maybe in the higher end – it will indeed require that they are maintained according to manufacturer's instructions. IGU is missing

4.bb *Please identify any further component which are significant to the lifetime and functioning of windows and doors? Please provide an estimate of their lifetime*

Glazing is very important. Their estimated lifetime is 20-25 years.
Thresholds on doors when made of wood will have a lifetime on 10-15 years.

Other Environmental Issues

	Yes	No
4.cc *To your knowledge, is there any direct pollutant emission (to air/water/soil) related to the different lifecycle phases of windows and doors, in particular during their use and disposal phases?*		X

If yes, *please indicate which pollutant(s), which lifecycle phase(s) and the source. Additional information might also be provided separately.*

	Yes	No
4.dd *Is there any potentially harmful or hazardous substance emission (to air/water/soil) related to the different lifecycle phases of windows and doors, in particular during their use and disposal phases?*		X

If yes, *please indicate which substance(s), which lifecycle phase(s) and the source. Additional information might also be provided separately.*

You are requested to consult 4.h

5. Life Cycle Costs (LCC)

Understanding the LCC of products is important for identifying cost-effectiveness over the product's entire life time. For Green Public Procurement, an LCC approach may help to procure products with a better environmental performance, whilst saving the purchasing authority money.

Product Prices

Indicative product prices are presented below for the shortlisted products:

Product	Price Range (€)	Proposed Value for LCC
Timber casement window side hung (double glazed)	400 – 500	450
PVC-U casement window side hung (double glazed)	180 - 350	265
Triple glazed timber window	500 - 800	650

PVC- U entrance door plus Skylight	500 – 600	550
PVC-U entrance door (approximately 50% glazing)	400 - 500	450
Opaque solid wood entrance door	100 - 300	200
Half glazed exterior solid wood entrance door (ranging from veneer to solid hardwood doors)	220 - 500	360
Composite entrance doors	300 - 600	450

	Yes	No
5.a *Are these prices representative for the product types?*		X

*If **no**, how would you modify them?*
This approach is too simple. Prices differ from marked conditions (demand and supply), also from the performance of characteristics and design.
It is impossible to define mean figures for the complete European market. Products, salaries, demands etc. vary and as a result we cannot define/provide inputs for such mean figures.
Some materials and product types are missing.

Installation, Maintenance, Repair and Disposal Costs

The following information has been collated in relation to installation, repair and maintenance costs. **The installation, maintenance and repair costs are labour fees plus materials. They do not include the price of the product.**

Window Frame Installation Fitting Costs and Charges

Product	Installation - Average Cost in €'s
PVC-U window frames installation & fitting inc. glazing & trims ect.	€91 per frame
Softwood window frame installation & fitting inc. architrave	€91 per frame
Hardwood window frame installation & fitting inc. architrave	€103 per frame
Glazing	€30 per pane
Brick cut-outs	€72 per cut-out

Door hanging and Installation

Product	Installation - Average Cost in €'s
PVC-U door installation inc. glazing & architrave	€109 per door
Softwood external door hanging only	€72 per door
Hardwood external door hanging	€85 per door
Locks, letterboxes & door furniture timber doors only	€18 per item
Glazing	€18 per pane
Brick cut-outs single doors	€73 per cut-out

Window Repair Costs and Charges

Product	Repair - Average Cost in €'s
Replacement glazing units for PVC-U windows and external doors	€18 per unit
Replacement glazing units for timber frames or timber frames	€24 per unit
Replacement window or door glass pinned & putty	€30 per pane
Replacement handles	€12 each
General repair work	€25 per hour

Window Removal Costs and Charges

Product	Repair - Average Cost in €'s
Timber windows removed	€30

PVC-U windows removed	€30
Metal windows removed inc sub frame	€36
External timber doors removed	€12
External timber door frame removal	€24
Disposal	€150 per tonne

5.b *Do you have any additional information regarding installation, maintenance repair and disposal costs? Do they differ between residential and commercial premises?*

Those figures may be correct for a specific location in Europe but cannot be considered as representative ones! This is so market depend that it is not possible to give a general EU level.

5.c *Do you have any additional information regarding the cleaning requirements and cleaning costs for windows and external doors? Do they differ between domestic and non domestic premises?*

See answer 5.b.

Spare Parts – Costs and Frequency Required

5.d *Please complete the table below with regards to the cost of the spare parts mentioned below. Please give an indication of the replacement rate for domestic and non-domestic properties. The replacement rate records the frequency with which these parts are typically replaced .*

	Spare Part	Indicative Average Price	Replacement Rate	
			Domestic	Non-Dom
		Euros	Frequency in years	
Windows	Frames			
	Glass			
	Hinges			
	Handles			
	Seals			
	Locks			
	Other (please specify)			
Doors	Frames			
	Glass			
	Hinges			
	Handles			
	Seals			
	Locks			
	Other (please specify)			

5.e *Can you provide costs and replacement frequencies for other spare parts not included in the table above?*

See comments to 5.b.

6. Product Developments

In order to understand the improvement potential of windows and doors, it is important to identify best available technology and future products that are still in the design and development stages.

A range of questions in relation to product development areas are presented below.

Best Available Products

6.a *At present a large range of products are available to improve the energy efficiency of windows or doors. The measures incorporated into the product are designed to achieve savings through a reduction in heating or cooling requirements for example.*

To understand the extent that window and door products can be improved, please can you provide information, using the table below, in relation to the currently top performing products with regards to energy efficiency. For example, multi-glazing products, composite frames etc.

Product	Best Available U Value (w/m^{2}k)	Best Available G Value (%)	Best Available Air Leakage Rate (m^3/hr)	Other relevant attributes	Any additional Comments /details
Windows					
Doors					

6.b *Please provide any additional information regarding window and door products below (for example: how long have the products been commercially available, installation examples across Europe, when are future products likely to be available; cost savings/payback times for products*

There are no overall best product, but an optimal product for each location, orientation, building type, use etc…

Other Product Developments

6.c *If relevant, please provide information in relation to other product developments/trends for windows and doors, which may improve their environmental performance in the future (these can be submitted separately). This could include innovative products just coming onto the market or those planned to be introduced to the market in the next few years. It may include when future products are likely to be available, cost savings/payback times compared to existing products.*

Innovation may include, but should not be limited to: air sandwich glazing, vacuum glazing, Low-emissivity coatings, smart windows (e.g. electrochromatic windows), solar cell glazing, aerogels, glazing cavity gas fills, spacers, frames. This may include new products or new components that can be retrofitted to existing systems to improve performance.

We are expecting that windows will become more innovative. More and more automations will be installed/used to optimise their performance.
This may include the use of photovoltaic cells to produce energy. But energy is not the only aspect for sustainability, other characteristics are also to be developed like acoustic performance, mechanical strength, burglar resistance, handicapped accessibility,…

Finally, are developments in other countries for window and door products which are likely to start to penetrate the European market significantly?

What do you mean by “other countries”, is this outside from EU? This seems not to become true, as the European manufactures have the world leading window and door products today. Other countries copy therefore the European products to become successful.

7. Other Information

7.a *If you have any other relevant information on toilets and urinals, please could you provide it below or email to:*
Windows.doors@aea.com or chris.nuttall@aeat.co.uk or jackie.fitzgerald@aeat.co.uk

Many thanks indeed for your time in providing us with your information. Your contribution is very much appreciated.

Annex 1: EcoReport Material Codes for Q2.2

EcoReport Category	EcoReport Material Code Description
1-BlkPlastics	1-LDPE
	2-HDPE
	3-LLDPE
	4-PP
	5-PS
	6-EPS
	7-HI-PS
	8-PVC
	9-SAN
	10-ABS
2-TecPlastics	11-PA 6
	12-PC
	13-PMMA
	14-Epoxy
	15-Rigid PUR
	16-Flex PUR
	17-Talcum filler
	18-E-glass fibre
	19-Aramid fibre
OEM manufacturing*	20-all plastic parts
3-Ferro	21-St sheet galv.
	22-St tube/profile
	23-Cast iron
	24-Ferrite
	25-Stainless 18/8 coil
4-Non-ferro	26-Al sheet/extrusion
	27-Al diecast
	28-Cu winding wire
	29-Cu wire
	30-Cu tube/sheet
	31-CuZn38 cast
	32-ZnAl4 cast
	33-MgZn5 cast

EcoReport Category	EcoReport Material Code Description
OEM manufacturing	34-foundries Fe/Cu/Zn
	35-foundries Al
	36-sheetmetal plant
	37-sheetmetal scrap
5-Coating	38-pre-coating coil
	39-powder coating
	40-Cu/Ni/Cr plating
	41-Au/Pt/Pd
6-Electronics	42-LCD per m2 scrn
	43-CRT per m2 scrn
	44-big caps & coils
	45-slots / ext. ports
	46-IC's avg., 5% Si, Au
	47-IC's avg., 1% Si
	48-SMD/ LED's avg.
	49-PWB 1/2 lay 3.75kg/m2
	50-PWB 6 lay 4.5 kg/m2
	51-PWB 6 lay 2 kg/m2
	52-Solder SnAg4Cu0.5
	98-controller board
Electronics OEM manufacturing	PWB assembly
7-Misc.	54-Glass for lamps
	55-Bitumen
	56-Cardboard
	57-Office paper
	58-Concrete

Notes: OEM is referred to any component made by a second company and used in the product