



New approach to the EU GPP criteria for office buildings - key results of LCA study

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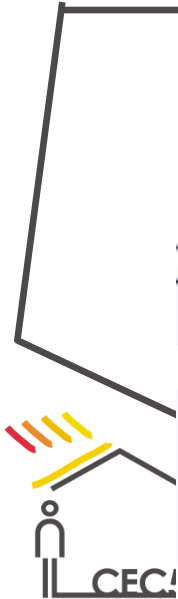
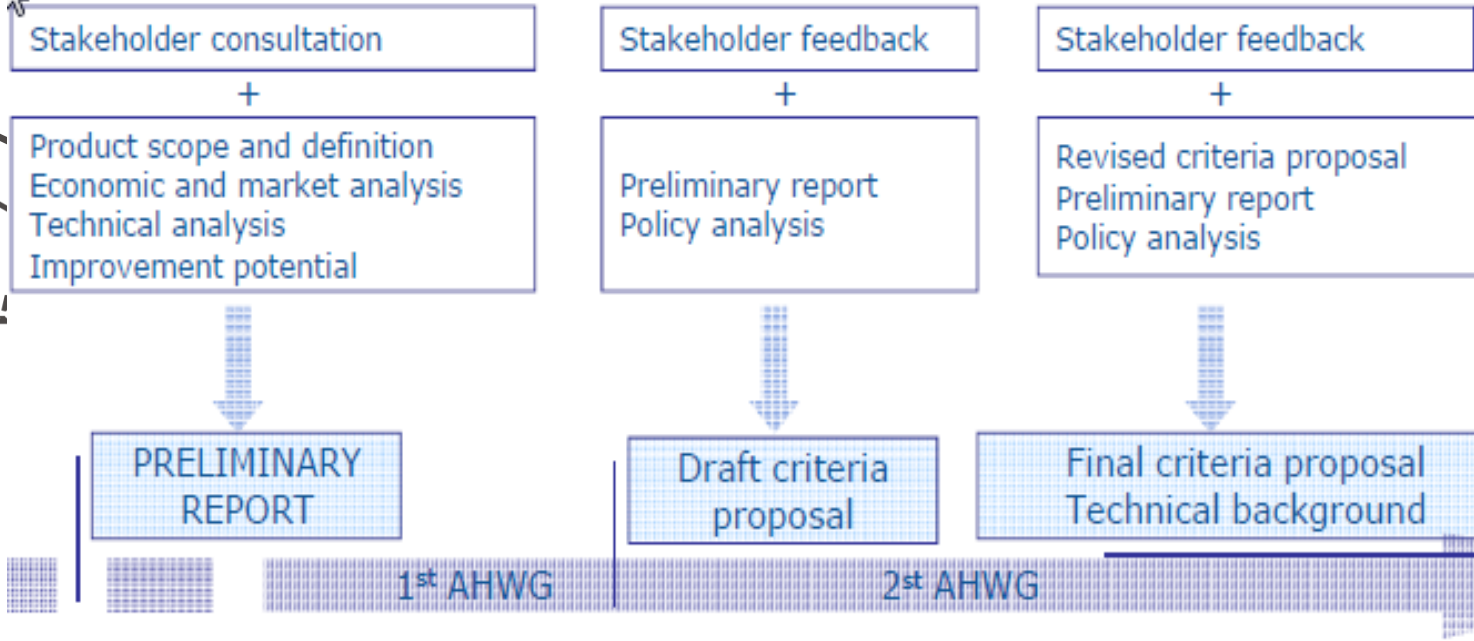
This project is implemented through the CENTRAL EUROPE Programme co-financed by the ERDF.

Office Buildings: EU Ecolabel and Green Public Procurement

June 2012	Draft final EU Ecolabel criteria for office buildings	Draft_final_criteria.pdf
February 2012	Summary of the 2nd AHWG Ecolabel for office building (Updated)	Summary_2ndAHWG_Ecolabel.pdf
February 2012	Summary of the meeting for GPP for office building	Summary_AHWG_GPP.pdf
December 2011	GPP draft criteria proposal	GPP_draft_criteria_proposal.pdf
December 2011	Working document for GPP criteria	GPP_working_document.pdf
December 2011	Summary of the 2nd AHWG Meeting	Summary_2nd_AHWG_Meeting.pdf
November 2011	EU Ecolabel draft criteria proposal Updated	Draft_criteria_proposal_updated.pdf
November 2011	Working document 2nd AHWG meeting Updated	Working_document_2_(updated).pdf
November 2011	Technical background study	Technical_background.pdf
November 2011	Working document for EU Ecolabel criteria	Working_document_2.pdf
November 2011	EU Ecolabel draft criteria proposal	Draft_criteria_proposal.pdf
July 2011	Summary of the 1st AHWG Meeting	Summary_1st_AHWG_Meeting.pdf
June 2011	Working document 1st AHWG Meeting	Working_document.pdf
June 2011	Draft report: Economic and market analysis	Market_analysis.pdf
June 2011	Draft report: Product definition and scope	Product_definition.pdf
March 2011	Analysis and evaluation of 3rd draft criteria for Buildings and next steps	Analysis_of_3rd_draft_criteria.pdf
March 2011	EUEB feedback for the scope of the EU Ecolabel for Buildings	IPTS_reply.pdf



Criteria development step by step





Process is continuing...

Further development mainly consist of:

- ✓ **Clarifying** the 'use of construction materials and products complying with certain environmental criteria'
- ✓ **Finalizing the analysis** of the equivalence within national schemes
- ✓ **Finalizing the analysis of the procurements routes** in order to effectively set GPP criteria for environmental efficient buildings



Office Buildings, Green Public Procurement, Technical Background Report


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Definition



"An **office building** is a building which **contains administrative, financial, technical and bureaucratic activities as core representative activities.**"

Total estimated office building market:
20% of non-residential buildings is estimated as office buildings. They are concentrated in:

- moderate climate zones
- as large buildings
- erected before 1975



Scope



LCA studies based on CEN-TC 350 and ISO 14040-44 including:

- Production phase
- Construction phase
- Use phase
- End-of-life phase

Office building base case:

- Size: 4620m²
- Lay-out: 3 floors
- Geometry: rectangular shape
- Orientation: East-west
- Glazing area: 30-50%

Office building locations:

- Madrid: climatic zone C2
- London: climatic zone B2
- Tallinn: climatic zone A1



Life Cycle Inventory Analysis (LCI)

The following parameters were assessed:

- Age of the building: existing and new/to be renovated
- Percentage of glazing area: 30% and 50%.
- U-value of walls: three different options for each location.
- U-value of windows: double window ($U=3.157$) and triple window ($U=1.776$).
- Installation or not of a lighting control system
- Installation or not of thermal solar system
- Installation or not of PV system with different areas

For each location, a building with the following characteristics: 30% glazing, minimum U-values, total lighting control system and 120 m² PV panels was assessed.




Environmental impacts depending on the location and phase of the buildings (v %)

Impact category	Units (%) kg equiv.	MADRID, 30% glazing			
		Product	Construction	Use	End of life
GWP	kg CO ₂	8,30	0,06	91,22	0,42
ODP	kg CFC 11	12,07	0,00	87,88	0,05
AP	kg SO ₂	0,59	0,02	99,31	0,09
EP	kg (PO ₄) ³⁻	4,06	0,20	94,91	0,82
POF	kg ethene	1,18	0,04	98,45	0,33
ADP	kg Sb	94,23	0,00	5,76	0,01
PEC	MJ	5,51	0,06	94,14	0,28
WC	m ³	0,87	0,00	98,92	0,21

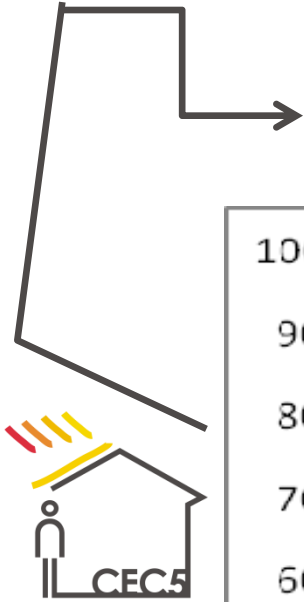
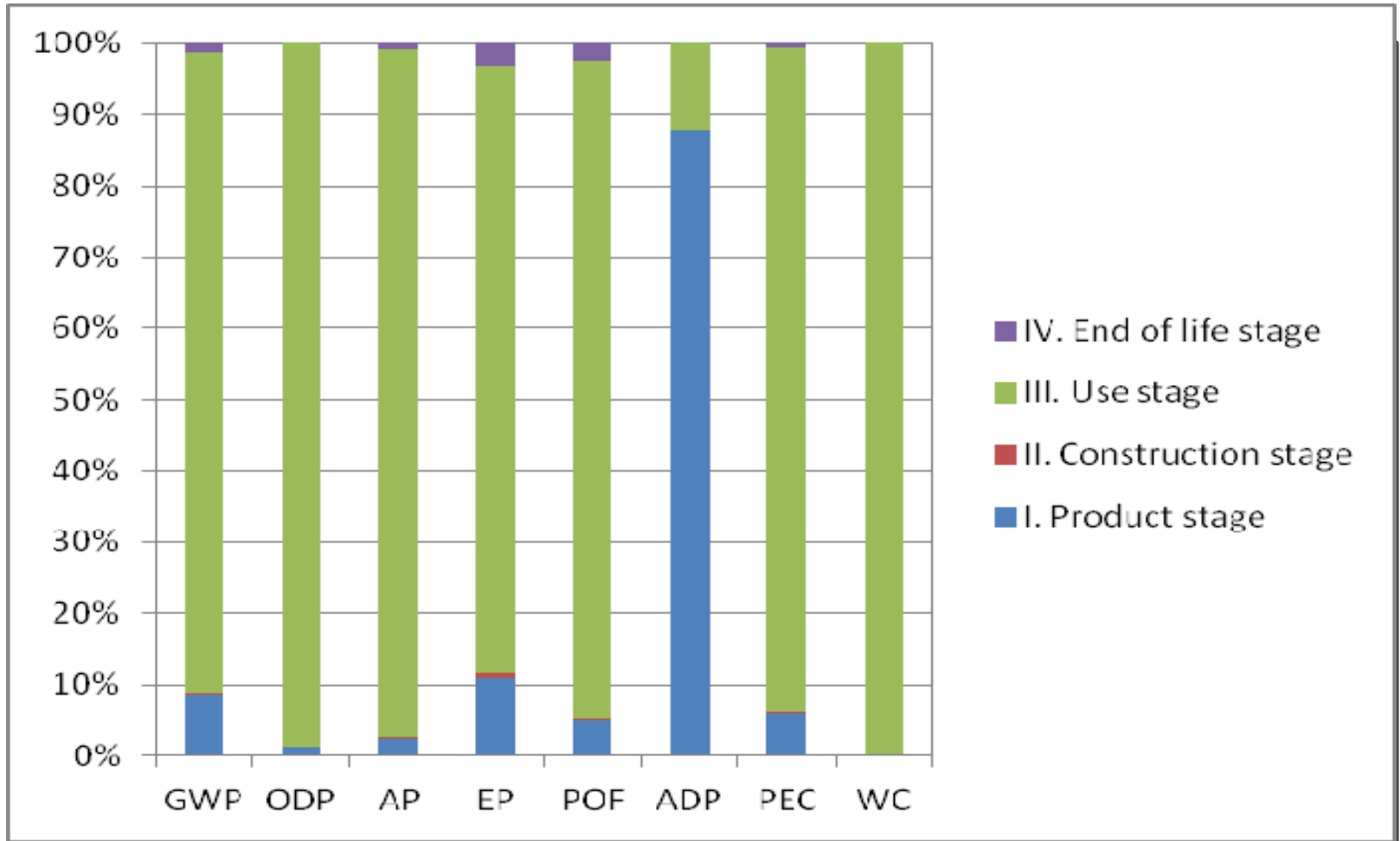


Key Environmental Impacts

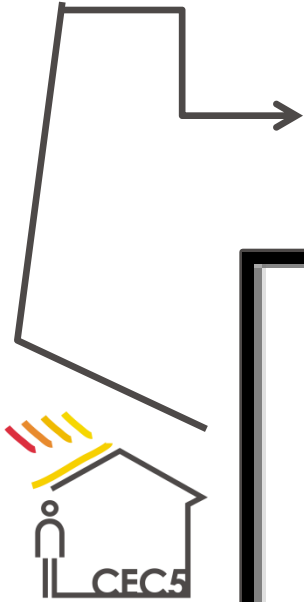
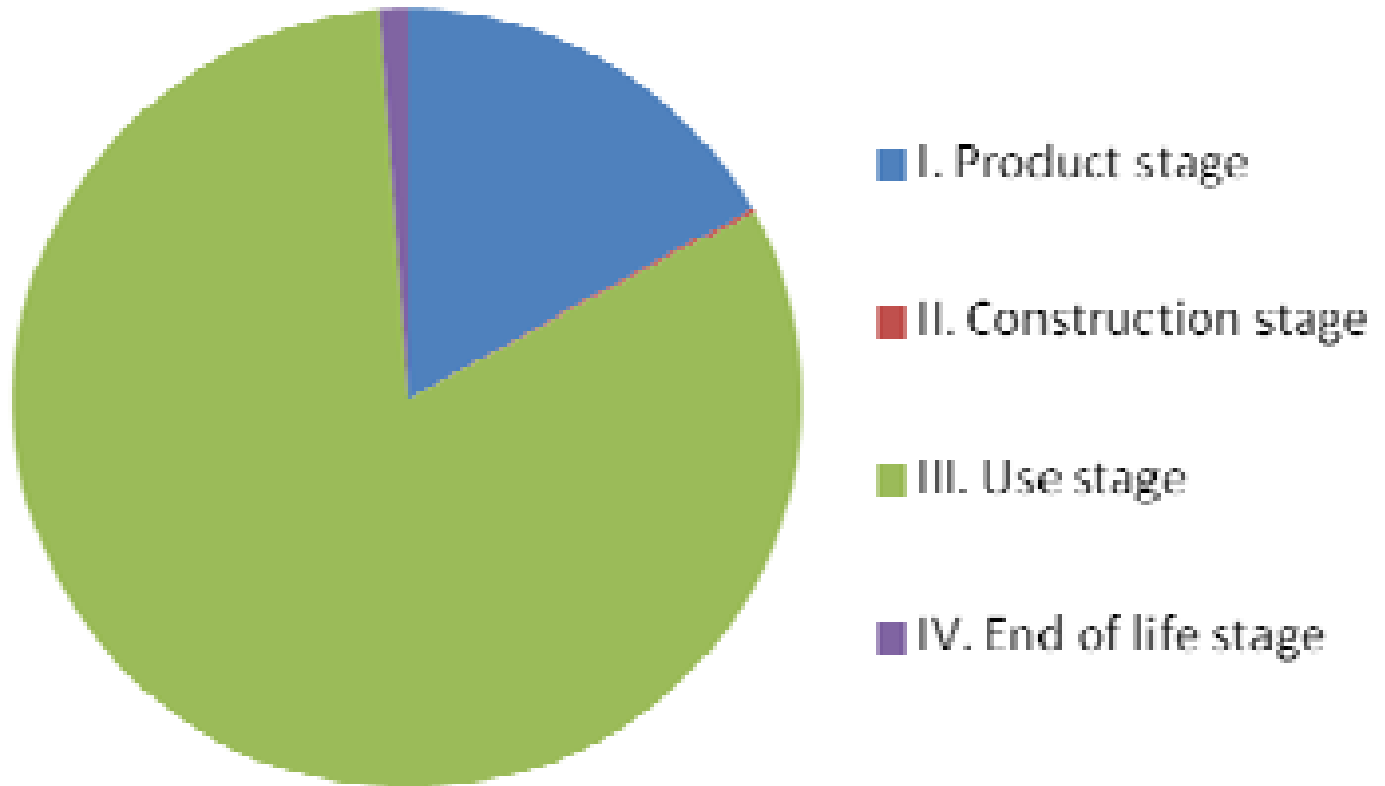


The use of energy for space, water heating and ventilation, electrical equipment and lighting cause the largest environmental impacts of a building during its lifetime. Water consumption and the production of waste water are other important impacts of buildings.

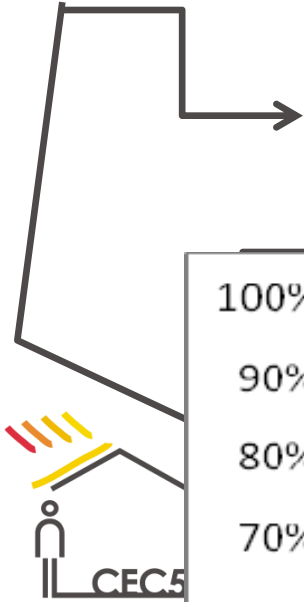
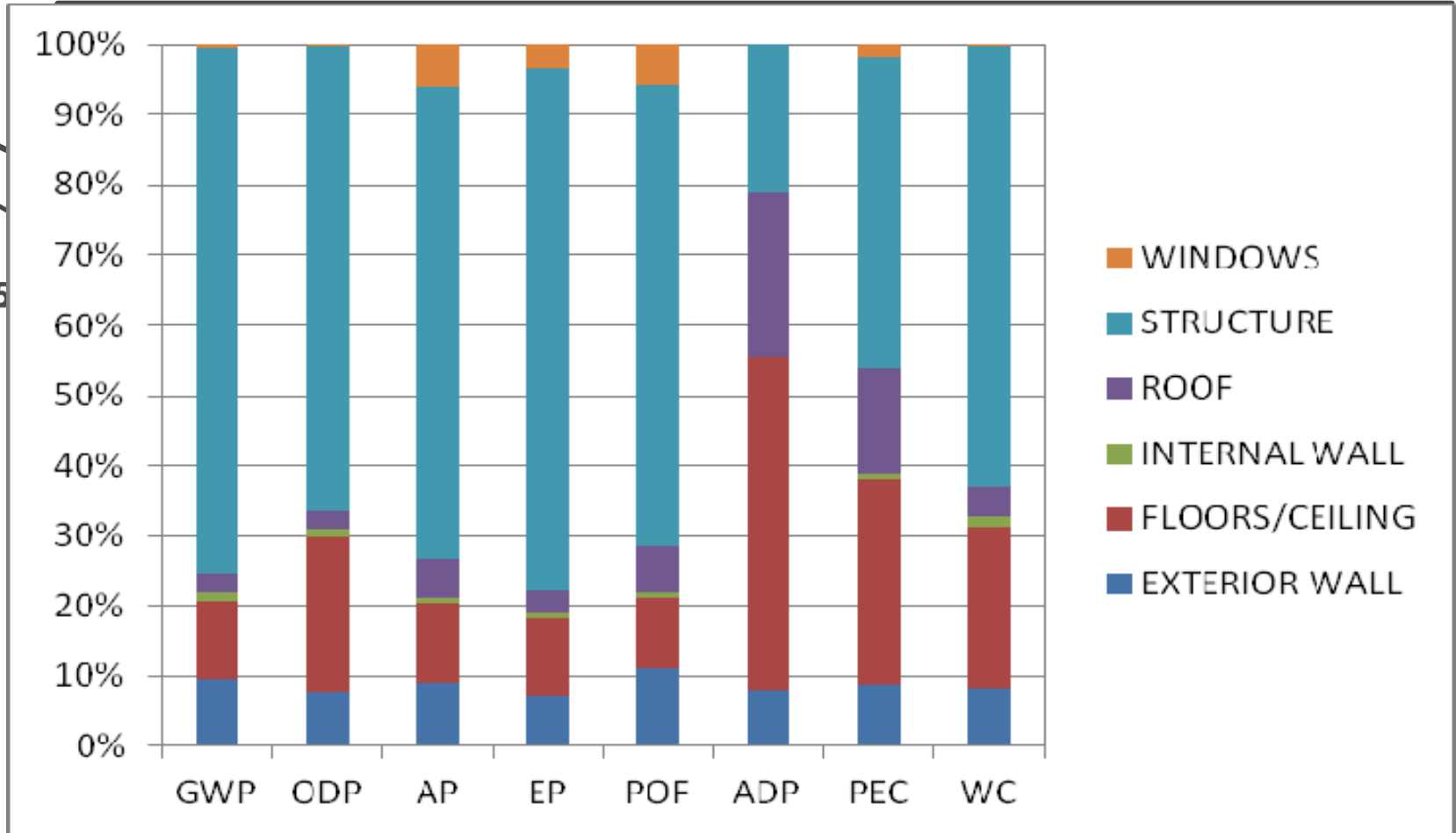
Relative contribution of the different life cycle phases of the environmental impact of 1m2 of office area during 1 year



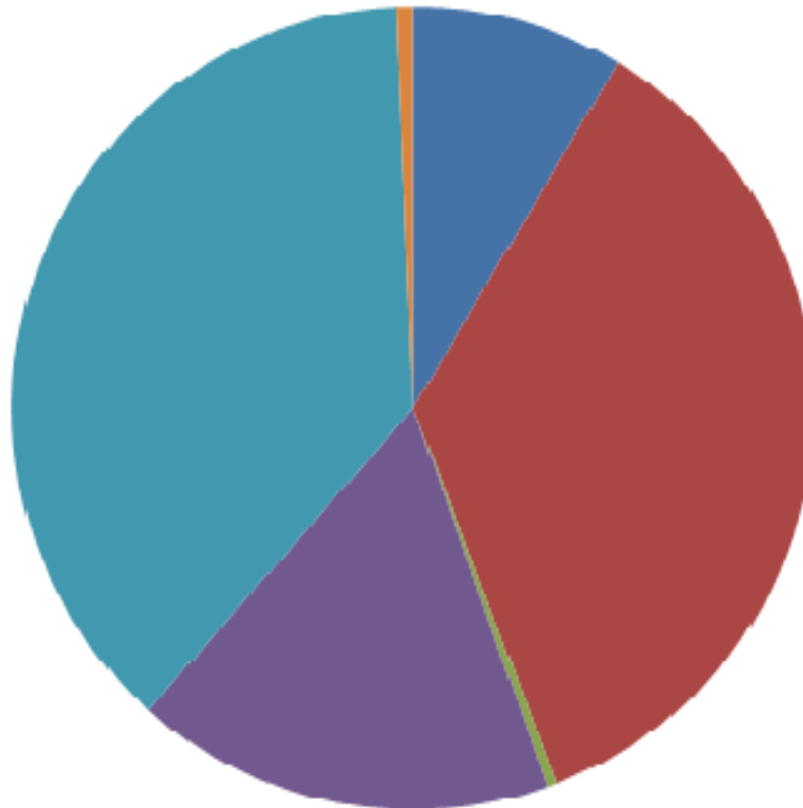
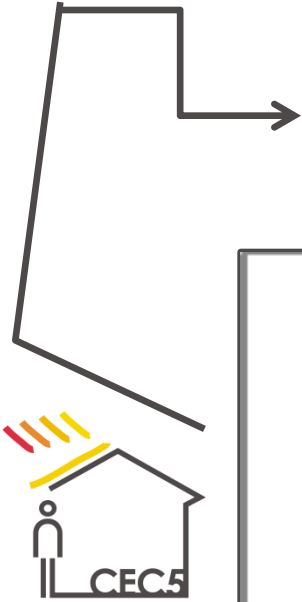
Contribution of the different life cycle phases in the overall normalised and weighted results



Contribution of different building elements to the overall environmental impacts of the construction of 1m2 office area

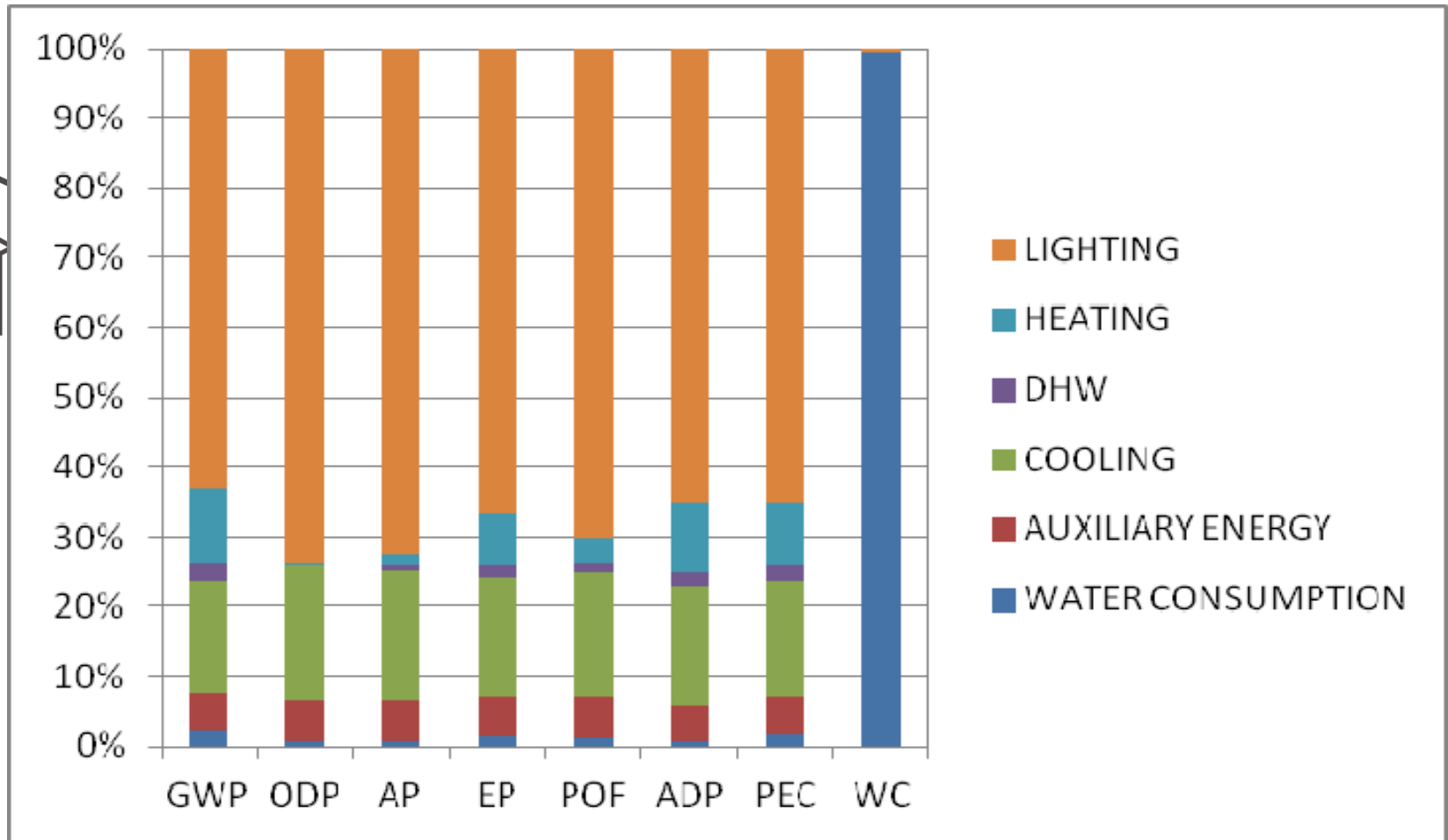


Contribution of different building materials to normalised and weighted environmental impacts of 1m² of office area

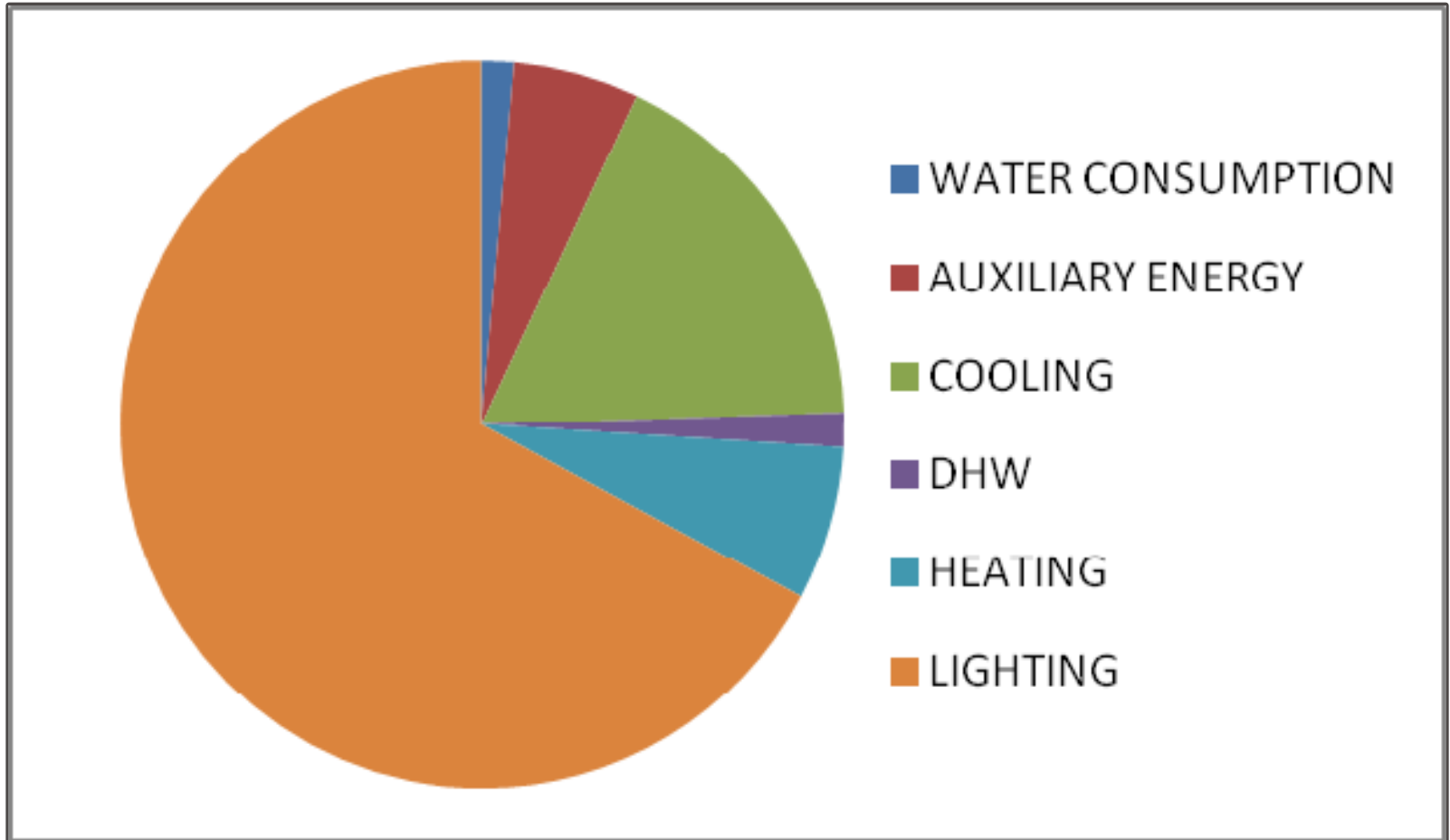


- EXTERIOR WALL
- FLOORS/CEILING
- INTERNAL WALL
- ROOF
- STRUCTURE
- WINDOWS

Contribution of the different use processes to the environmental impact of 1m2 of office area during 1 year



Contribution of different energy consumption to normalised and weighted environmental impacts during the use phase of 1m2 of office area during 1 year



<p>The consumption of energy for heating, cooling, ventilation, hot water, and electricity, and resulting CO2 emissions</p>	<ul style="list-style-type: none"> - Maximize the energy performance of buildings - Ensure high energy efficiency standards for heating, cooling, ventilation and hot water systems, and electronic devices - Encourage the use of localised5 renewable energy sources (I-RES)
<p>The consumption of natural resources</p>	<ul style="list-style-type: none"> - Include a systematic Life Cycle Approach (LCA) for building materials - Encourage the use of sustainably harvested and produced resources
<p>Over-consumption of fresh water resources both during construction and during the use phase</p>	<ul style="list-style-type: none"> - Encourage the installation of high-end water saving technologies and reduce the use of freshwater during the construction process.
<p>Emission of substances harmful to human health and the environment during the production or disposal of building materials leading to air and water pollution Negative health impacts on building users due to building materials containing dangerous substances</p>	<ul style="list-style-type: none"> - Encourage the use of non-toxic building materials - Encourage the use of substitute substances/materials for dangerous building materials - Good indoor air quality and well-being
<p>Transportation of construction materials and products generates CO2 emissions that have an influence on climate change</p>	<ul style="list-style-type: none"> - Use energy efficient vehicles for transportation and on the building site - Apply effective supply chain management systems




GPP approach

In the planning and construction phases of a building, it is important to consider the ultimate use of the building and possible reduction of environmental impacts through:

- energy efficiency (ventilation, heating and cooling, insulation, lighting, various appliances, etc.)
- water efficiency
- promotion of good condition and long-life of the building, by a service and maintenance plan for the house
- improving the indoor environment, considering constituent materials/ good ventilation / material and quality control during the construction phase
- including the possibility to alter and modify the inner space



Possible GPP criteria

- 
- ✓ Ability to perform the contract
 - ✓ Minimum energy performance requirements during use
Energy metering and efficiency training
 - ✓ Installation of localized RES
 - ✓ Rational use of the natural resources/construction materials
 - ✓ Use of construction materials and products complying with certain environmental criteria
 - ✓ Recovery of construction materials
 - ✓ Products and materials with high recycled content
 - ✓ Materials from responsible sourcing
 - ✓ Exclusion of certain substances
 - ✓ Well-being
 - ✓ Water saving installations
 - ✓ Waste and water management



Thank you for your attention

