Climate change REsilience framework for health SYStems and hospiTALs

DF3 - Guidelines for greener procurement in hospitals	
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Executive summary

The goal of the LIFE RESYSTAL project aligns with the goal of EU to become more resilient against climate change. More specifically LIFE RESYSTAL focuses on providing specific guidelines and supporting improved climate resilience for healthcare facilities and health systems. As such, the current report as a specialization of the deliverable of the DC3.2 task, aims to provide a comprehensive overview of guidelines for green procurement (GP) based on EU and national legislation and practices noting their relevance to, and implementation potential at the hospital level.

At the beginning of the report, the main definition of GP and the reasons that led to its use are referred, alongside the advantages. Subsequently, explaining the usefulness of the established GP criteria, some significant examples of use cases are given throughout Europe. Then, the material focuses mainly on the utility of using GP practices by health sector organisations and a proposed high level and stepped process to efficiently implement a GP practice within the procurement of gardening activities and energy waste management.

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Table of abbreviations	
Abbreviations	**Meaning**
GPP	Green Public Procurement
GP	Green Procurement
EU	European Union

1. Introduction

With the particularly worrying data on the exhaustion of natural resources and the extreme exploitation of the environment, more countries, public sectors, and private structures are developing plans to switch to a more environmentally friendly way of life. Moreover, in the face of the challenges of climate change, governments are trying to take measures to mitigate its negative effects in the future.[1] The last decades, in the spirit of circular economy and natural resources saving, in Europe ~~and beyond~~, countries have enacted rules and regulations promoting ecological, environmental, and sustainable considerations in relation to the practices of procuring materials, goods and services Over time, the influence and the strength of those regulations are covering more areas and categories of activity and product types.[2] These provisions apply to a large range of human activity with ~~the potential for a~~ negative environmental impact and energy waste; from building construction, road design and transport, to cleaning and gardening products and food services.

A characteristic example comes from the construction field. It is known that high both during construction and their use. [3] Thus, all the environmentally friendly agreements and methods in the EU recognise the need to drastically improve the energy efficiency of buildings - either by developing new construction techniques, or by renovating the existing construction facilities. [4] All Member States are obliged under European law to set minimum energy performance standards for all new buildings and major renovations, especially those for public use. [5]

Today, European governments are more informed than ever of the need to address and confront the hazards that come from the reckless exploitation of the environment and climate change[6] The Green Public Procurement (GPP) idea is moving in the direction of addressing and coping future environmental challenges either caused by human activity or by climatic phenomena. Green public procurement describes public sector organizations to procuring goods and services in a way which seeks to achieve environmental goals such as reducing greenhouse gas emissions, improving energy and water efficiency, and promoting recycling. The term "green procurement" aligns to several other important terms such as "sustainable procurement" and "ecological procurement", although each focus on a subtly different

[1] INFORM Climate Change Risk Index, JRC Technical Report, European Commission, 2022

[2] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law')

[3] GPP In practice Issue no. 57 December 2015

[4] DIRECTIVE 2010/31/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 19 May 2010 on the energy performance of buildings (recast)

[5] GPP Case studies Vienna's Sustainable New Hospital

[6] GPPIn practice, Building a greener London Fire Brigade

aspect of what the goal is but with a lot of overlap between them.[7] According to the European Commission, GPP is defined as[8]:

"a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured."

Public authorities and other institutions have the purchasing power for goods, services and works,[9] in large scale. As such, public procurements are an excellent mean of implementing environmental, social and economic policies. By taking advantage of this feature, public sectors can contribute and collaborate with local authorities, societies and businesses for the achievement of the environmental goals and objectives that the national and international community has established guiding at the same time a climate change treatment plan. Furthermore, GPP promotes innovation and competitiveness by incentivising suppliers to develop environmentally friendly products and services. GPP can also contributes to cost savings in the public sector as, for example, it can improve the energy efficiency of buildings, define a specific way of energy resources management, etc.. Other benefits, from the gradual application of GPP could be the following (see Figure 1 for a representation):

- ✓ Reduction of energy consumption
- ✓ Saving public resources (water, electricity, etc.)
- ✓ Reuse and repair materials for secondary operation by supporting small and domestic businesses, away from the idea of the linear model economy
- ✓ Promotion of the ideas for the protection of the environment and awareness of society
- ✓ Generate the procurement model in the private sector field and strengthen cooperation with the public ones

[7] Green public procurement implementation challenges in Australian public healthcare sector, Kamrul Ahsan, Shams Rahman* School of Business IT and Logistics, RMIT University, Melbourne, Australia

[8] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Public procurement for a better environment {SEC(2008) 2124} {SEC(2008) 2125} {SEC(2008) 2126

[9] Openness of public procurement markets in key third countries, DIRECTORATE-GENERAL FOR EXTERNAL POLICIES POLICY DEPARTMENT, July 2017, doi: 10.2861/444864

Figure 1: Advantages of GPP implementation

- ✓ Providing a healthy, comfortable way of life
- ✓ Building construction and repairs with respect of a positive environmental footprint guarantees a beautiful aesthetic result for public spaces
- ✓ In workplaces, by using green products and services, the health of workers, consumers and users is protected

2. Current EU green public procurement guidelines

Green public procurement is based on the public purchase of products and services from suppliers who[10,11]
(1) follow the requirements and standards of the established environmental rules
(2) contribute to the effort to minimise their environmental footprint
(3) have an experience and a reliable way of managing projects related to the environment and its protection.

[10] DENSO GROUP Green Procurement Guideline January 2023 DENSO CORPORATION
[11] GOING GREEN BEST PRACTICES FOR SUSTAINABLE PROCUREMENT- OECD 2015

GPP is an idea where EU member states will voluntary and on a different extent adapt its way of operation. Unfortunately, the EU's 2014 Public Procurement Directive[12], does not go as far as to make GPP mandatory for member states.
Nevertheless, all EU Member States are obliged for public procurement to meet the most economically advantageous tender (MEAT) standards which consider characteristics such as supply reliability, positive environmental objectives and long- term sustainability.[13] In this way, quality can be ensured in the procurement process and not just the price.

2.1 GPP Standard Criteria

To further strengthen and foster the uptake of GPP within procurement practice, the EU put forward some common standard criteria that can be used by the EU Members. These criteria act as a guide for GPP practices, and their establishment has the following main advantages for the public sector who use them (Figure 2): [14] [15]

(1) Using GPP criteria drastically reduce the work of the administrative services of the interested bodies that want to implement the GPP as they provide written specifications that can easily be added on the tender documents.
(2) Sectors and businesses that operate in more than one Member State can have a common guide for public procurement practices.
(3) Ensure that public sectors procure goods, services and works that contribute to a significant reduction of the negative environmental impact together with future cost savings results.

[12] Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC Text with EEA relevance
[13] EU GPP Criteria for the design, construction, renovation, demolition and management of buildings, JRC Technical Report, European Commission February 2022
[14] EU GPP Criteria for Public Space Maintenance, JRC Technical Report, October 2019
[15] Journal of Cleaner Production, Criteria Analysis of green public procurement in the Spanish furniture sector, Marta Braulio-Gonzalo, Maria D. Bovea, Department of Mechanical Engineering and Construction, University of Jaume

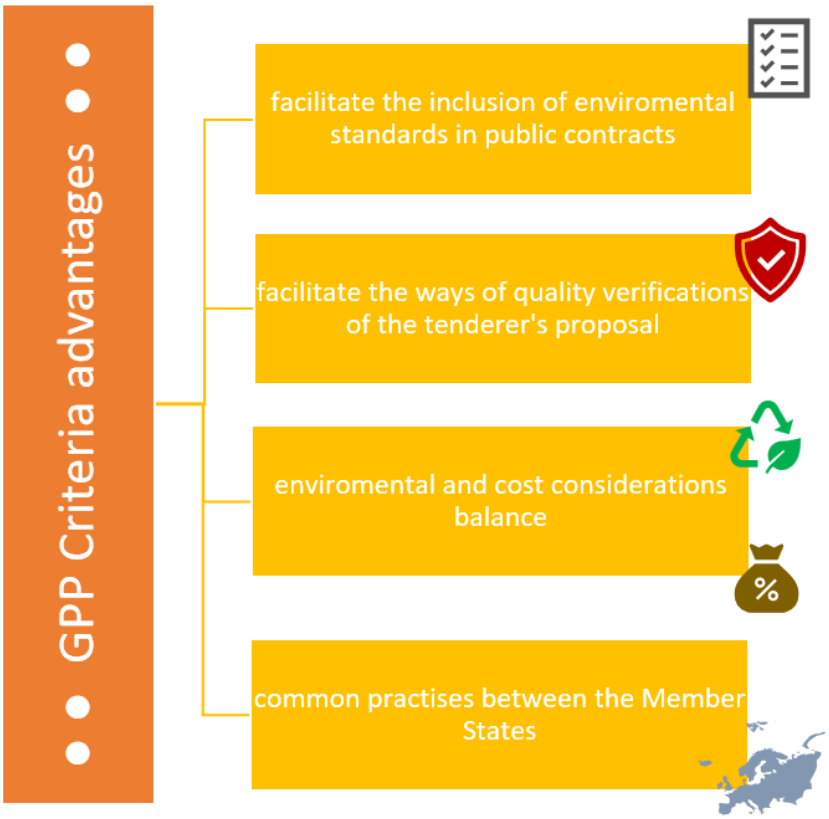

Figure 2: The main advantages of using GPP criteria from for the EU Countries Member States.

There are many fields and product groups covered by GPP criteria, including office building design, indoor cleaning services, electricity, imaging equipment etc. All the documents can be found electronically on the Green Public Procurement Criteria and Requirements on the European Commission website. [16] For every category there is a criteria document which stakeholders can consult and there are currently sets of criteria covering different categories of products and services.

For example, let's assume that the administration of a public sector organisation is interested in painting the main service building inside and outside and wants to ensure that the selection of paint materials has the lowest environmental impact, in terms of both during manufacture and use. The procurer can consult the corresponding category "GPP criteria for Paints, Varnishes and Road Markings[17]" and use the criteria in their procurement process.

Each set of criteria is regularly updated to account for current scientific data, innovative technologies, market developments and legislative changes.

[16] https://green-business.ec.europa.eu/green-public-procurement/gpp-criteria-and-requirements_en

[17] COMMISSION STAFF WORKING DOCUMENT, EU green public procurement criteria for paints, varnishes, and road marking

Furthermore, The Public Procurement Directive 2014/24/EU (public works, supply, and service contracts) establishes the standard format and procedures for the procurement process, which includes GPP criteria. Therefore, the EU GPP standards must adhere to EU guiding principles such as freedom of establishment and the free movement of products and services within the EU .

GPP criteria lists are divided into four sections: [12]

- **Selection criteria:** These are intended to make sure the design team and contractors has the basic knowledge to carry out the task. They usually refer to the ability of the tenderer to perform the task, and their experience in comparable assignments.
- **Technical specifications:** These criteria specify the characteristics that must be met by the intended products and services. They constitute minimum requirements and standards that all tenders must comply with. For example, any tender who would like to supply indoor cleaning services must prove, among other things, that they will use cleaning products approved by the EU and with an ecological mark written on the packaging.
- **Award Criteria:** This is the criteria the contracting authority uses to evaluate the tender. That includes the quality and the total cost of the offer, and the award must be based on MEAT.
- **Contract Performance Clauses: These criteria s**pecify how a contract must be executed. The clauses should be monitored during the contract's execution, i.e. after the contract has been awarded. They can be combined with contractual penalties to ensure compliance with the contract. For instance, during a gardening service contract, chemical herbicides must not be applied 4 days before or after the area is swept.

For each of the above criteria, there are two levels to choose from, depending on the contracting authority's objectives or constraints (Figure 3). These are:

- **Core Criteria** are those that can be used by all contracting authorities in the Member States and cover the main environmental impacts. They allow easy implementation of GPP as they set minimum verification effort or cost increases.
- **Comprehensive Criteria:** are for those who want to buy the best environmental products available on the market. These may require additional testing or a slight increase in cost compared to other products with the same functionality. See figure 3 for a schematic representation.

Figure 3: Stakeholders may choose between core and comprehensive criteria, depending on the rigor of the program they want to implement. Each of these categories will indicate the nature of the four GPP groups the sector must follow. Comprehensive criteria correspond to stricter and higher-level circumstances.

GPP Criteria is a voluntary and auxiliary policy. The contracted authority may choose to include all or part of the given criteria in their tender documents. In brief, a public sector interested in GPP will first pick the criteria that best fit for its own case from the corresponding European Commission website (e.g. procurement for lighting and traffic signals) and make the main structure of the contract. Then, by the selection criteria the basic requirements for undertaking the work by the tenderer will be set. Technical specifications will set the conditions and the methods of verification that all tenderers must comply with. Afterwards, all the tenderers will be evaluated via the award criteria and the final contractor will be decided. When the execution starts, contract clauses will configure the method of performance, and the contractor will be under supervision until the end of the contract. (Figure 4) A public tender is considered as green when it fulfils at least the core criteria.[2] For best environmental results, the public tender must satisfy the comprehensive criteria.

Figure 4: Brief representation of how the criteria are used throughout the project in order for a public sector to be stated as green.

3. GPP use cases across Europe

In recent years, public institutions from many countries in Europe have applied the policies and criteria of GPP in many projects. [18] A compilation of case studies and projects on green and socially responsible public procurement across Europe can be found on the Good Practice Library of the European Commission website[19]. Some examples of EU GPP applications in the LIFE RESYSTAL pilot countries (France, Spain, and Italy) are given below together with the corresponding chosen criteria. These use cases helpful illustrations that will introduce stakeholders in green procurement applications since imitate and put into practice strategies and criteria provided by EU GPP thought.

3.1 Spain: The case study of an energy efficient hospital

In 2011, SERGAS responded to a call to establish the innovation program: Project H2050-4 (a sub-project of H2050)[20], as part of an agreement with the Spanish Ministry of Economy and Competitiveness.

Purpose of the program	Main subject matter of the contract	Selection Criteria
Creation of a self-sustaining hospital energy centre**.**	Procurement, installation and commissioning of energy installations/equipment and management software. To improve the overall energy efficiency rates of the hospital, new technologies were acquired which could obtain a high-performance mix of energy sources.	Experience in at least two similar supply contracts by the tenderer and/or installations during the last three years for an amount exceeding the 50% estimated amount for the new installations.

[18] Procuring innovative and sustainable construction, European Public Authority Snapshots, SCI-NETWORK

[19] https://green-business.ec.europa.eu/green-public-procurement/good-practice-library_en?f%5B0%5D=oe_page_subject%3Ahttp%3A//data.europa.eu/uxp/c_163e1e96&page=0

[20] file:///home/skarozis/Downloads/SUBPROJECT_ADVANCE_FILE_H2050_4.pdf

Award Criteria	Technical criteria	Contract clauses
✓ **Price (50%)** ✓ **Technical aspects (25%)** ✓ **Improvements to the current minimum requirements (15%)** ✓ **Execution plan (6%)** ✓ **Training plan for staff (4%)**	✓ Monitoring in real time the energy produced by each source, the total consumption of each different use of energy on an hourly basis, and the minimum comfort level of all rooms. ✓ Integration with third party systems. ✓ Warning management to advise of any abnormalities regarding energy consumption. etc.	✓ Absorption refrigerators must have co-efficient of performance (COP) ≥0.75 ✓ Photovoltaic polycrystalline solar panels must have an electrical efficiency ≥14%, etc.

3.2 France: Sustainable cleaning services and associated services [21]

Agglomeration of Dinan is an intercommunal entity based in Dinan (France). Starting from 2022, the Agglomeration of Dinan began to implement its Territorial Climate Air Energy Plan (TCAEP), which was envisioned as a tool for facilitating and coordinating the energy transition of the territory at the intermunicipal level.

Purpose of the program	Main subject matter of the contract	Selection Criteria
Mitigate climate change, control energy consumption, and reduce atmospheric pollution factors. Main priority was the improvement of indoor air quality effluent by protecting natural resources.	Public procurement procedure for cleaning and associated services, with a low environmental impact and a social responsibility component.	-

[21] Sustainable cleaning services and associated services, Good Practice Library

Award Criteria	Technical criteria	Contract clauses
✓ **Price: weight 60% for each lot** ✓ **Methodology of implementation: weight 25% for each lot** ✓ **Axis of social progress: weight 15% for each lot**	✓ Purchase eco-label certified products for at least 90% of products. This percentage did not include specific disinfectant products required for the COVID-19 pandemic. ✓ Obligation to supply hand and paper towels made from recycled paper with the EU Ecolabel or the FSC label or equivalent. ✓ Obligation to hire unemployed people for 35 hours per €25,000 invoiced by the contractor. As per the French Public Procurement Code (Art. L2111-1), the contractor must include in their workforce certain priority groups, such as disabled people. etc.	✓ Any breach of regulatory obligation concerning the protection of the environment, and the use of products holding ecolabels may lead to contract termination or will be subject to a penalty. ✓ In case the product performance is not satisfactory, the contracting authority is allowed to apply a penalty or terminate the contract early.

3.3 Italy: 'Oxygen' project: The case study of planting 6 million trees

Lazio Region is the second most populated region of Italy. In this context, Lazio launched the 'Oxygen' project, whose objective is to promote the region's environmental heritage and quality whilst also enhancing public use within the framework of economically sustainable management. From 2020 to 2022, Lazio invested €12 million to plant and maintain 6 million new trees and shrubs in the whole region, one tree for each inhabitant.

Purpose of the program	Main subject matter of the contract	Selection Criteria
This procedure contributes to the actions put in place by the Region to promote the fight against climate change, offset CO2 emissions, and protect the	The Region published two calls for expression of interest in 2020 and 2021 to select the best projects to assign the trees and shrubs, preferably native, to be planted on public land or for public	-

biodiversity of the regional ecosystem.	use in the region's urban and peri-urban areas.	

Award Criteria	Technical criteria	Contract clauses
✓ **Up to 6 points were given for environmental certifications such as UNI EN ISO 14001, EMAS or UNI EN ISO 9001** ✓ **Up to 4 points were given for bidders' proposed water-saving and water resource rationalization techniques and technologies.** ✓ **Up to 2 points were given to bidders who use no less than 50 per cent of energy from renewable sources for heating their greenhouses.** **etc.**	✓ Plants must be local species, suitable for the planting site. ✓ Characteristics of packaging, aimed at using recycled material. To comply with the Minimum Environmental Criteria related to soil improvers and fertilizers used for bottom fertilization, technical specifications foresaw that: ✓ Fertilizers must contain natural substances. ✓ Soil improvers must be compostable and compliant with specific regulations. ✓ Usage of peats must be forbidden. ✓ Mulching must be performed with natural materials. ✓ Containers and packaging, if made of plastic, must have a minimum recycled content of 30%, must be returned to the supplier at the end of use, and must be recyclable. etc.	✓ Obligation for the supplier to perform quality control on plants at the delivery. ✓ Obligation for the supplier to provide guarantee of engraftment.

❖ *Under Italian law, the Minimum Environmental Criteria define technical specifications, contract performance clauses and award criteria to be used when awarding contracts for specific product and service categories. They are mandatory for what concerns technical specifications and contract clauses according to art. 34 of Legislative Decree 50/2016 (Italian Public Procurement law).*

4. Health sector related GPP specifications

From the Introduction it became clear that the construction, operation, and the maintenance of public institutions can contribute on enhancing the phenomenon of climate change. For instance, evidence suggests that hospitals and other facilities related to them are responsible for 4.5% of GHGs emissions worldwide.[22] Within the health sector, the USA, China, and EU are responsible 56% of emissions.[23] As for the EU, 5% of the European greenhouse gas emissions come from healthcare entities. [24]

The main factors that contribute to hospitals having negative environmental impact in comparison to other sectors are:

- ✓ High eenergy consumption (e.g. large amount of electricity and water needs) mainly generated from outside resources as hospitals do not have power generation onsite of the facility.
- ✓ Medical supplies and other chemical products used[25] (e.g. anesthetic gases, cleaning products)
- ✓ Office and hospitality products, equipment, and machinery, produce a significant volume of garbage. Also, the raw materials used for their construction (e.g., plastic) are harmful to the environment.[26]
- ✓ Transport needs are relatively high in healthcare. Patients, staff, suppliers must be constantly moved around the health system. All these movement have a negative impact in GHG emissions.

From the above, it is obvious that health sectors contribute negatively to the climate crisis problem. At the same time, health sectors and their operations are strongly affected by the hazards that are occurring as a result of climate change. For instance, the resilience of the facilities (because of the complexity and age of the buildings) will be tested by extreme weather phenomena such as heatwaves, floods etc. Furthermore, with the global warming, an increase in hospital admissions and hospitalizations, and changes to the kinds of sickness and disease being treated is expected as a result of rising global temperatures. [27] According to some studies and predictions, the sectors and the services on the Mediterranean Sea countries are at high risk to face the above effects of climate change. [28] [29]

[22] Matthew J. Eckelman, Kaixin Huang, Robert Lagasse, Emily Senay, Robert Dubrow, and
Jodi D. Sherman, Health Care Pollution And Public Health Damage In The United States: An Update, HEALTH AFFAIRS 39, NO. 12 (2020): 2071–2079

[23] Yasaswini Iyer, Skanda Moorthy, Sadeer Al-Kindi, Sanjay Rajagopalan, Climate change and healthcare organizations: a call to arms, European Heart Journal (2022) 43, 2435–2437.

[24] Decarbonization of the Health Sector: A Commentary by EASAC and FEAM European Academies' Science Advisory Council and Federation of European Academies of Medicine, April 2021

[25] HEALTH CARE'S CLIMATE FOOTPRINT - HOW THE HEALTH SECTOR CONTRIBUTES TO THE GLOBAL CLIMATE CRISIS AND OPPORTUNITIES FOR ACTION, Health Care without Harm, ARUP, September 2019

[26] Genevieve S. Silva and Cassandra Thiel, What Would It Mean for Health Care Organizations to Justly Manage Their Waste? AMA Journal of Ethics, October 2022, Volume 24, Number 10: E934-943

[27] Jennifer Israelsson, Andrew Charlton-Perez, Ting Sun, Impact of climate change on hospital admissions: a case study of the Royal Berkshire Hospital in the UK, Royal Meteorological Society, DOI: 10.1002/met.2084, 2022

[28] Manfred A. Lange, Climate Change in the Mediterranean: Environmental Impacts and Extreme Events, IEMed, Mediterranean Yearbook 2020

[22] Walter Leal Filho, Evangelos Manolas, Climate Change in the Mediterranean and Middle Eastern Region, Springer 2022

Given the new reality posed by climate change, healthcare sectors will need to collaborate to adapt to the changing environment. Otherwise, their ability to offer services to society safety and in a way that does not harm the environment will be in doubt.
Any healthcare organisation that wants to be more environmentally sustainable must focus on the following broad principles: [30]

- ✓ New construction methods and improvement of hospital buildings (materials used, design strategies, maintenance)
- ✓ Energy production from renewable energy resources
- ✓ An integrated system of monitoring and managing electricity and water consumption.
- ✓ Use products (cleaning products, papers, chemicals, other supplies) with minimal environmental impact.
- ✓ Machinery, PCs, cooling devices etc., must have a low environmental impact (in manufacture and operation).
- ✓ Nature positive solutions - planting trees on the site, designing and installing green roofs etc.

As described in Section 2, the EU GPP Criteria is a tool that can encourage a public sector into a way of operation, which is positive for the environment and is also financially advantageous. Using the four kinds of criteria, an organization can implement green procurement faster, safely, with a guarantee of quality and a positive environmental impact.

The EU voluntary GPP Criteria [31] most relevant to the health sectors, cover the following product groups:

- ✓ EU GPP Criteria for Computers, monitors, tablets and smartphones
- ✓ EU GPP Criteria for Electricity
- ✓ EU GPP Criteria for Food catering services and vending machines
- ✓ EU GPP criteria on Furniture
- ✓ EU GPP criteria for Imaging Equipment, consumables, and print services
- ✓ EU GPP criteria for Indoor cleaning services
- ✓ EU GPP criteria for Office building design, construction and management
- ✓ EU GPP criteria for Public space maintenance
- ✓ Electrical and Electronic Equipment used in the Health Care Sector

[30] Vardeep Singh Dhillon, Dilpreet Kaur, Green Hospital and Climate Change: Their Interrelationship and the Way Forward, Journal of Clinical and Diagnostic Research. 2015 Dec, Vol-9(12): LE01-LE0
[31] https://green-business.ec.europa.eu/green-public-procurement/gpp-criteria-and-requirements_en

5. Proposed GPP implementation scheme for Health Sector

In the next section, we will outline the steps a health sector may follow to adopt a GPP approach. The approach can be applied to any green procurement project regardless of the field of application with appropriate changes each time. These steps are not a mandatory part of green procurement, but rather can be used as a guide to steer the healthcare organisation's internal procurement processes.

- ✓ **Step 1 Establish a GPP team.** The hospital administration expresses its interest in applying green procurement policies for the health sector's needs. A special team (the GPP team) that will take care of the whole program and will provide experience and best practices by organising and setting goals must be formed. That team may be part of the hospital (managers, engineers, medical staff, patients) and/or external partners (scientists, technocrats, governance levels representatives etc.).
- ✓ **Step 2 Plan the GPP roadmap and information needs.** With the GPP team formed, it is time to collect all the information needed for the roadmap plan. The team must look closer at the GPP definitions and methods of implementation. Also, meetings with green procurement experts and other sectors that have already applied the GPP could be extremely helpful.
- ✓ **Step 4 Define adaptation needs of the hospital – First impression of GPP topic:** In this step the GPP team must make thorough research for the facts that place the hospital in a non-ecofriendly position, with negative environmental footprint and huge amounts of funds waste. At the same time, a serious investigation of the possible hazards the hospital may face cause of climate change must be done. The results may occur after questionnaires, meetings with the scientific society, local authorities and personal experience from the hospital workplace. The data collected will indicate the adaptations needs of the hospital and the GPP team will get a glimpse of the topic of GPP criteria must consult. For instance, cause of the global warming, especially during summer, there are a lot of hospitals where they waste more energy forward cooling than in the past. A good idea is window replacements by others with high insulation performance. GPP Criteria for building design, construction and management will head the administration to this direction. It is worth to mentioned, that the tools developed and coupled in LIFE RESYSTAL Toolbox, alongside relevant LIFE RESYSTAL documentation can be utilized in this step (DA2.1, DA2.2, DA2.3, DA2.4, DC1.2, DC1.3, DC1.4, DC1.5, DC1.6, DC1.7).
- ✓ **Step 5 Compile information and best practices on GPP:** Here the GPP team must consult other hospitals' examples, barriers etc. for similar practices on implementing GPP criteria. The difference with Step 2 is that on this level the GPP team knows better the case study and the green procurement adaptation needed.
- ✓ **Step 6 Design the GPP process - Formation of the characteristics of the project** This step will specialize the main features of the project. GPP team must collect all the data and results from Step 4. All these outcomes should be interpreted with caution by those in charge and after discussion with the administration department the final field of intervertion will be decided. From this, the corresponding GPP topic for an ecofriendly sector will be indicated. The basic criteria that will be included on the public contract must be decided here. Recall that all the recommended criteria are optional and auxiliary. All the chosen criteria must be reconsidered according to the following four parameters:

- Legal Limitations and national rules for procurements
- Costing – Available Funds
- Environmental conditions of the area
- Expected positive impacts after GPP

The final structure of the GPP process is now ready. The public document contains in detail the purpose of the program, the main subject matter of the contract and all the criteria that the GPP process is based on.

- ✓ **Step 7 Report results and recommendations** After the execution has end, the GPP team should compile an analytic report where it will state and provide in detail:
  - Means to be used by the decision-makers responsible
  - Accurate unbiased information
  - The current resilience effectiveness
  - Potential solutions if the setting is deemed ineffective
  - This report will enrich the available data on green procurement policies for other sectors who may be interested in.

See Figure 5 for a schematic representation.

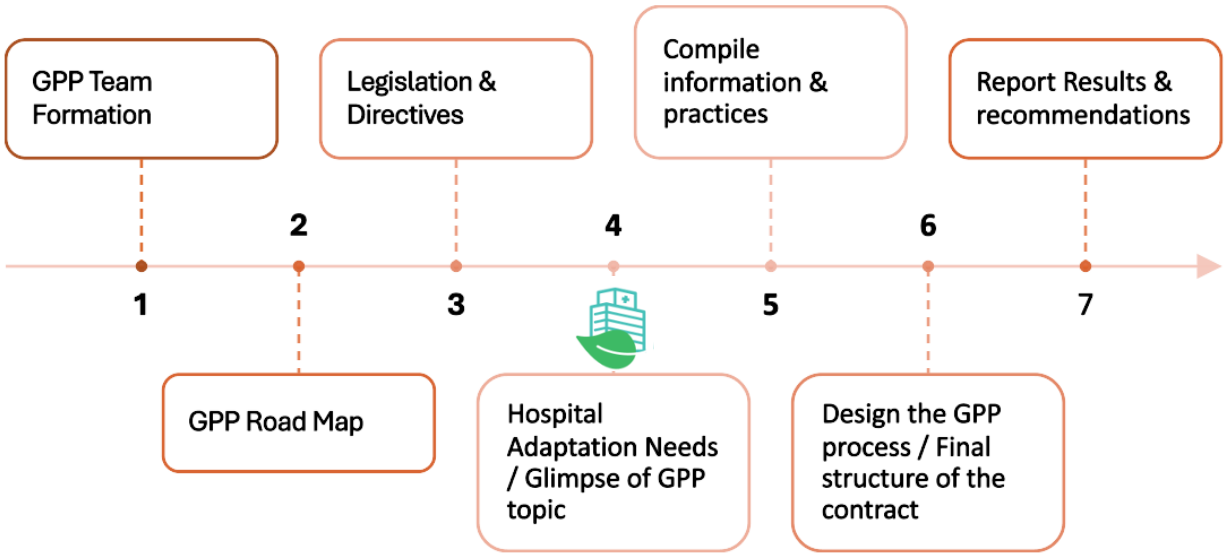

Figure 5:Diagram of the guidelines described in the main text via the seven steps.

6. LIFE RESYSTAL pilot measures and GPP categories

As mentioned at the beginning, the LIFE RESYSTAL project aspires to guarantee that Europe's health infrastructures are ready to face climate change hazards. Towards that, all pilots of the project will implement a common set of green adaptation measures that will work as a baseline for validating the technology solutions (LIFE RESYSTAL Toolbox). The horizontal measures for all pilots are tree planting and lawn rewilding. As such, the current section presents the GPP relevant categories that LIFE RESYSTAL piltos may take into account during the procurement process.

The project, emphasis is placed on the following two GPP categories:

1. Gardening activities and public space maintenance and
2. Energy services

that pilot countries and stakeholders may follow so as to continue their resilience against the climate crisis. From the collection of criteria mentioned above all the guidelines and criteria for the cases 1 and 2 are related with the following groups:

- ✓ EU GPP criteria for Office building design, construction and management[32]
- ✓ EU GPP criteria for Public space maintenance[33]
- ✓ EU GPP criteria on Furniture[34]

To the point of the present, the **basic** technical specifications for public space maintenance activity and energy performance are listed briefly in the next two sections (6.1, 6.2) and they are ordered according to the next diagram (Figure 6).

- ❖ *On this report special focus is given on the technical criteria because they constitute the meaning difference in a public procurement process as they give the more weighted features for a contract to be stated as green.*
- ❖ *Readers can visit the EU GPP website and look for all the criteria for the procurement products in question.*

6.1 Gardening Activities & Public Space Maintenance

It is known that all the traditional gardening activities, public spaces maintenance/renovation methods, etc. have a strong contribution to climate change. [35] For instance, the extraction of peat and other raw materials is highly environmentally unhealthy with serious impacts on biodiversity and humans. [36] Many ways of designing parks, squares, precincts of public buildings (such as Universities, Health Sectors) and

[32] https://circabc.europa.eu/ui/group/44278090-3fae-4515-bcc2-44fd57c1d0d1/library/862af61d-a410-4baa-a7b9-22273623db57/details

[33] https://circabc.europa.eu/ui/group/44278090-3fae-4515-bcc2-44fd57c1d0d1/library/3dbf0d36-3a89-4a31-a96f-e0cd06fda842/details

[34] https://circabc.europa.eu/ui/group/44278090-3fae-4515-bcc2-44fd57c1d0d1/library/f0159ad2-4983-49ef-8830-27f083e8568d/details

[35] Hospital demolition with 100% recycling of materials, GPP Good Practice, issue 116, November 2022

[36] Peatland International, issue 4.2019, 10 December 2019

other smaller public spaces are starting to be revised. New strategies are developed in a wide range of applications. From plant selection (e.g. noninvasive and non-allergenic plants) and gardening activities to the appropriate selection of materials to be used for several constructions. All these new techniques not only contribute to self-improvement of these places as such but have a positive impact on the surrounding area.[37] By way of illustration, an excellent design of the free space of a health sector with the most recent requirements (choice of suitable plants, way of watering etc.) has a strong positive environmental impact on the whole institution as it can reduce the energy consumption of the main building, improve patients' mood and many other results. Furthermore, neighbours will benefit as well as building occupants and visitors.

The public space maintenance activity (including gardening activities) referred to the replacement or repairing of the following three types of items:

- ✓ Pavements, bike lanes, roads
- ✓ Public furnishings such as furniture elements, playground elements, signage, and directional elements (excluding streetlamps), drinking fountains, decorative fountains and manhole covers
- ✓ Gardening items such as; plant and trees, irrigation and pumping systems, lawn care etc.

Subsequently, some essential technical specifications criteria for gardening activities and outdoor furniture for public use are given via tables in the next paragraph 6.1.1. Technical specifications criteria are organised in one table per category. The first column includes the core criteria, and the second includes the comprehensive criteria. If a common criterion exists, it is shown on the same table line, covering both columns. These include the main requirements that a healthcare centre should consider for

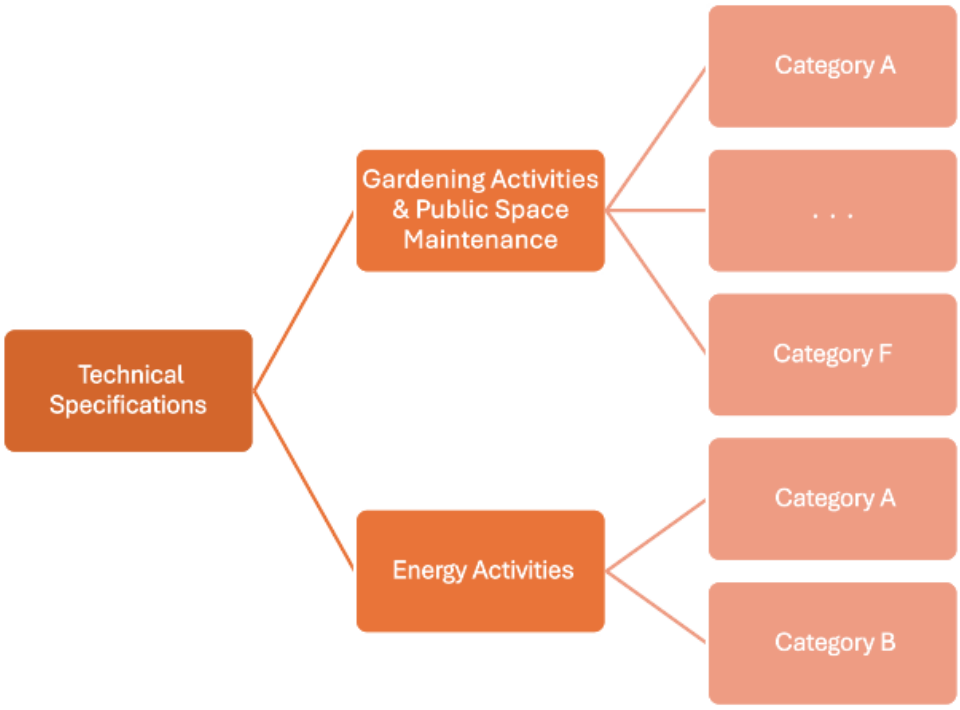

Figure 5: Classification of the main technical specifications regarding gardening activities (6 categories including product groups for furniture) and Energy Activities (2 categories).

[37] Combining procurement models for green and healthy buildings, GPP in Practice, Issue No 109

gardening activities in its surrounding free area, plus all the standards for furniture materials needed for human service (benches, canopies, bins etc.).

Category A: Ornamental Plants	
A1 Core Criteria	**A2 Comprehensive Criteria**
Ornamental Plants ✓ **X% Organic; grown according to the requirements laid down in EC No 834/2007 or the US NOP or equivalent legal obligation set by trade partners of the EU** **and/or** ✓**Y% IPM; grown according to IPM principles as defined by UN FAO or EU Directive 2009/128/EC** ○***Purchased ornamental plans should be suitable for the local growing conditions to reduce water, fertilizer consumption etc.***	**Ornamental Plants** ✓ Z% Organic; grown according to the requirements laid down in EC No 834/2007 or the US NOP or equivalent legal obligation set by trade partners of the EU **and/or** ✓W% IPM; grown according to IPM principles as defined by UN FAO or EU Directive 2009/128/EC ○*Purchased ornamental plans should be suitable for the local growing conditions to reduce water, fertilizer consumption etc.*
	Plants containers and packaging Plants must be delivered in containers: ✓reusable **and/or** ✓recyclable **and/or** ✓compostable *(according to EN 14995:2007 or EN 13432:2000 standards)*
Invasive alien species ✓**The ornamental plans purchased must be native. If alien species are planted, it shall be ascertained that they will not become invasive.** ○***Preference should be given to plant species native to the area. If alien species are planted, consider local and the European policies on invasive alien species (EU Regulation 1143/2014)***	

Category B: Soil Improvers	
B1 Core Criteria	**B2 Comprehensive Criteria**
Organic constituents of soil improvers and mulch **The following material are not allowed as organic constituents of a final product:** **☒Peat** **☒Materials derived from organic fraction of mixed municipal household waste** **☒Materials derived from sludges** **☒Materials derived from Category 1 animal by-products *(EC 1069/2009)***	**Organic constituents of soil improvers and mulch** **1)** The following material are allowed as organic constituents of a final product: ✓Materials derived from the recycling of the bio-waste from separate collection *(Article 3; 2008/98/EC)* ✓Materials derived from category 2 & 3 animal by products *(EC 1069/2009 & EU 142/2011)* ✓Materials derived from any other biomass by-products (*Article 5; 2008/98/EC)* ✓Materials derived from fecal matter straw and other natural non-hazardous agricultural or forestry material *(Article 2.1(f); 2008/98/EC)* ✓Materials derived from recycling or recovery of any other biomass waste not mentioned above. **2)**Materials derived from recycling or recovery of sludge are only allowed if the sludge comply with the following requirements: **a)** They are identified as one of the following types of waste *(CD 2000/532/EC)* ✓Ø20305 ✓Ø20403 ✓Ø20502 ✓Ø20603 ✓Ø20705 **b)** They are a single source separated, without effluents or sludge outside a specific production process.
Heavy metals in soil improvers **The content of the following elements in the final product must not exceed the values shown below [in mg/kg]:** **☒Cadmium; 1.5 ☒Chromium total; 100** **☒Copper; 200 ☒Mercury; 1 ☒Nickel; 50** **☒Lead; 120 ☒Zinc; 600**	**Heavy metals in soil improvers** The content of the following elements in the final product must **not** exceed the values shown below [in mg/kg]: ☒Cadmium; 1 ☒Chromium total; 100 ☒Copper; 100 ☒Mercury; 1 ☒Nickel; 50 ☒Lead; 100 ☒Zinc; 300
	Physical contaminants in soil improvers

	The content of glass, metal, plastic with size of > 2 mm in the final product **must not** exceed 0.5% (dry weight).
	Product performance of soil improvers ☒**Must not** adversely affect plant emergence and subsequent growth. ✓The organic matter as loss on ignition of the final product must be at least 15% DW. ✓The dry matter content of the final product must be at least 25% FW.
	Primary pathogens in soil improvers The content of primary pathogens in the final product **must not** exceed the following levels: ☒Salmonella spp: absent in 25g fresh weight ☒E. coli: <1000 CFU/g fresh weight (CFU: colony-forming units)

Category C: Automatic irrigation systems	
C1 Core Criteria	**C2 Comprehensive Criteria**
Automatic Irrigation **The automatic irrigation systems must allow for detailed parametrization:** **✓Set up of different irrigation zones** **✓Possibility to adjust the volume of dispensed water by zones** **✓Possibility to program watering time periods by zones** **✓Possibility to measure soil humidity level and block the irrigation if necessary (e.g. after rain)** ***○The contracting authority will provide the guidelines based on the water resources availability***	

Category D: Gardening Services	
D1 Core Criteria	**D2 Comprehensive Criteria**
Ornamental plants and soil improvers used for the provision of gardening services ✓**The ornamental plants supplied during the provision of the gardening services must be compliant with the requirements A1.** ✓**The soil improvers used for the provision of the gardening services must be compliant with the requirements B1.**	**Ornamental plants and soil improvers used for the provision of gardening services** ✓The ornamental plants supplied during the provision of the gardening services must be compliant with the requirements A2. ✓The soil improvers used for the provision of the gardening services must be compliant with the requirements B2, C2.
Pest control and invasive alien species management **The tenderer must provide an annual Phytosanitary Treatment Plan. The plan should consider local or national policies for control of invasive alien species and of the EU Regulation 1143/2014. The plan must comply with the EU Directive 2009/128/EC on the sustainable use of pesticides and according to the local policies on the use of chemicals.**	**Pest control and invasive alien species management** The tenderer must present an annual Phytosanitary Treatment Plan, which must include non-chemical treatment methods such as thermal, mechanical or biological treatments. The plan should consider local or national policies for control of invasive alien species and of the EU Regulation 1143/2014.

Category E: Landscaping and habitat creation	
E1 Core Criteria	**E2 Comprehensive Criteria**
Landscaping and habitat creation **From a satellite view, at least 60% of the building plot area, including space occupied by the building, shall be landscaped with vegetation and/or water surfaces. In areas already covered by road or walkway access routes for occupants and visitors, this area could be counted as vegetated if a green roof is installed above. Onsite vegetation should include indigenous plant species that are suitable for the local climate and species that are known to support native mammal, bird, and insect species. The vegetated area shall provide multiple structural layers (i.e., tree canopy, sub-canopy, groundcover, and soil structure). Rock gardens and bird or bat boxes shall be provided onsite to provide habitats for insects and birds to shelter. All excess rainwater drainage shall be routed through the vegetated plot area before leaving the site. This may be achieved using nature-based drainage systems, including grassed swales, infiltration basins, retention ponds and artificial wetlands (including reed beds). No use of pesticides or herbicides shall be permitted. The correct construction and installation of any landscaping and drainage components especially relevant to design performance shall be ensured by the project manager during the site preparation, construction, and installation stages.** ○ **Should be considered especially for schools and any buildings with a significant plot area. The building**	**Landscaping and habitat creation** From a satellite view, at least 80% of the building plot area, including space occupied by the building, shall be landscaped with vegetation and/or water surfaces. In areas already covered by road or walkway access routes for occupants and visitors, this area could be counted as vegetated if a green roof is installed above. Onsite vegetation should include indigenous plant species that are suitable for the local climate and species that are known to support native mammal, bird, and insect species. The vegetated area shall provide multiple structural layers (i.e., tree canopy, sub-canopy, groundcover, and soil structure). Rock gardens and bird or bat boxes shall be provided onsite to provide habitats for insects and birds to shelter. All excess rainwater drainage and greywater shall be routed through the vegetated plot area before leaving the site. This may be achieved using nature-based drainage systems, including grassed swales, infiltration basins, retention ponds and artificial wetlands (including reed beds). Fountains or similar water features that provide drinking water for birds. A preliminary filtering of greywater via limestone and clay reed beds is recommended before it joins any rainwater irrigation and drainage flows. No use of pesticides or herbicides shall be permitted. The correct construction and installation of any landscaping and drainage components especially relevant to design performance shall be ensured by the project manager during the site preparation, construction, and installation stages. ○ Should be considered especially for schools and any buildings with a significant plot area. The building

management shall take responsibility for maintenance of the landscaped areas directly or via sub-contracted to specialized operators.	management shall take responsibility for maintenance of the landscaped areas directly or via sub-contracted to specialized operators.

Category F: Furnitures

F1 Core Criteria	F2 Comprehensive Criteria
Legal origin and traceability of wood and wood-based materials **All wood and wood-based materials (excluding packaging and recycled wood) must be harvested in accordance with the applicable legislation in the country of harvest. "Applicable legislation" means the legislation in force in the country of harvest covering the following matters:** **- rights to harvest timber within legally gazette boundaries;** **- payments for harvest rights and timber including duties related to timber harvesting;** **- timber harvesting, including environmental and forest legislation including forest management and biodiversity conservation, where related to timber harvesting;** **- third parties' legal rights concerning use and tenure that are affected by timber harvesting; and** **- trade and customs, as far as the forest sector is concerned.**	
Sustainable Wood **At least 50 % of wood in the final furniture product (excluding packaging) shall be covered by valid sustainable forest management certificates issued by an independent third-party certification scheme such as FSC, PEFC or equivalent. Recycled wood, following the definition of recycled material as given in ISO 14021, shall also be considered as sustainably sourced materials.**	**Sustainable Wood** At least 70 % of wood in the final furniture product (excluding packaging) shall be covered by valid sustainable forest management certificates issued by independent third-party certification schemes such as FSC, PEFC or equivalent. Recycled wood, following the definition of recycled as given in ISO 14021, shall also be considered as sustainably sourced materials.
Plastic Parts **Plastic parts with a weight ≥50 g shall be visibly marked in accordance with the requirements of EN ISO 11469 so that materials can be identified to ensure they are able to be recycled, recovered, or disposed of in the correct manner at end-of-life. If a component should be categorized under "other polymer type" designation, the applicant will provide data sheets from the supplier that state the nature of the polymer used in any individual plastic parts. Parts greater than 50g in weight that would be adversely affected by a marking, such as for consumer acceptance and aesthetic reasons, may place the necessary recycling information in the user manual or similar literature.**	

	Metal Parts The tenderer shall describe the type of metal used in any furniture component (i.e., Aluminum, Steel, Copper etc.). Where relevant, the grade of the alloy and the main metals (>3 % of total alloy weight) included in the alloy formulation shall be stated. Nickel plated stainless steel shall not be used in any furniture components that may come into direct skin contact with end users.
Surface Coating of Wood/Plastic/Metal **Products used for surface coating shall not contain any of the following hazardous substances according to Regulation No. 1272/2008 (H statements) or Directive 1999/45/EC (equivalent R phrases) in concentrations greater than 0.1%:** **☒Carcinogenic: H351(R40), H350(R45) or H350i(R49).** **☒Harmful to the reproductive system: H360F(R60), H360D(R61), H360FD(R60-61), H360Fd(R60-63), H360Df(R61-62), H361f(R62), H361d(R63) or H361fd(R62-63)** **☒Mutagenic: H340(R46) or, H341(R68)** **☒Toxic: H300(R28), H301(R25), H310(R27), H311(R24), H330(R23; R26) or H331(R23)** **☒Hazardous to the aquatic environment: H400(R50), H410(R50-53), H411(R51-53), H412(R52-53) or H413(R53).** **☒Cause heritable genetic damage: H340(R46).** **☒Causes damage to organs through prolonged or repeated exposure: H372 (R48/25; R48/24; R48/23).** **☒May cause damage to organs through prolonged or repeated exposure: H373 (R48/20; R48/21; R48/22).**	
Durability, Reparability and Ergonomics **✓Furniture must meet any relevant national or international quality standards or equivalent regarding serviceability (e.g., safety, abrasion resistance, tensile strength, light fastness, rub fastness, deformation by compression, ergonomics etc.).** **✓Where the furniture consists of more than one component, it must be assembled in such a manner to facilitate manual disassembly into constituent components to allow either repair or replacement of damaged components or to facilitate recycling of components made of different materials.**	**Durability, Reparability and Ergonomics** In addition to the core requirements, the furniture manufacturer shall offer a longer warranty period of at least 5 years from the date of purchase and guarantee the availability of spare parts for a longer period (at least 5 years) from the date of purchase.

✓ **The warranty of the furniture product shall cover a period of at least 3 years from the date of purchase.** ✓ **The manufacturer shall guarantee the availability of spare components and parts for a period of at least 3 years from the date of purchase. If the spare parts are provided for free, this shall be expressly stated. Otherwise, prices for the spare parts shall be clearly stated and shall be related to the value of the spare part in relation to the whole piece of furniture.**	

- *Category F refers to the most important standards that materials used for furniture construction must comply with. In general, these criteria include indoor and outdoor/public furniture. More specifically from the studies conducted to investigate the existing technical and quality standards for public space furniture at European level, it emerged that the following standards should be also considered according to product categories[14]:*

✓ *EN 581-1 Outdoor furniture - Seating and tables for camping, domestic and contract use - Part 1: General safety requirements.*

✓ *EN 581-2 Outdoor furniture - Seating and tables for camping, domestic and contract use - Part 2: Mechanical safety requirements and test methods for seating.*

✓ *EN 581-3 Outdoor furniture - Seating and tables for camping, domestic and contract use - Part 3: Mechanical safety requirements and test methods for tables.*

- *The health sector, especially for gardening activities, because it operates under different conditions and refers to a vulnerable part of society, an important parameter should be taken into account. This parameter refers to the choice of ornamental plants. GPP team with a contribution of expert agronomists and other scientists, should pick plants with less allergenic effects for the protection of staff, patients and visitors. (See Appendix for more information about Allergenicity of urban plants).*

6.2 Energy Services

Data collected from buildings around Europe suggests that the energy used while they are occupied has the biggest influence on the environment. [38] The biggest contributors are ventilation, heating, cooling, and lighting. The building's thermal efficiency and the climate zone in which it is situated determine their

[38] COMMISSION STAFF WORKING DOCUMENT; EU GPP Criteria for Office Building Design, Construction and Management, Brussels, 20.5.2016

respective relevance. This emphasizes the significance of considering a building's overall energy performance, which may include the ability to produce cleaner energy and affect how long it lasts.

The following is the definition of energy services as per Directive 2012/27/EU:

"The physical benefit, utility or good derived from a combination of energy with energy efficient technology and/or with action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered based on a contract and in normal circumstances has proven to lead to verifiable and measurable or estimable energy efficiency improvement and/or primary energy savings."

The procurement of energy services is primarily focused on the provision of low or zero carbon emission energy to a building by energy service providers, such as energy service companies (ESCOs) or, as defined by Directive 2012/27/EU, energy performance contracting, must meet the GPP criteria for buildings.

The criteria provided by EU green procurement practices cover the most important environmental effects of office buildings, which are related to greenhouse gas emissions from energy use in the building's operation and the use of resources in the production of building components. While these criteria have been specifically developed for office buildings, many of the requirements could also be used as a reference for the procurement of other types of building. So, it can easily be generated for Health Sectors as they show many similarities.

In the next paragraph the basic technical specifications criteria for minimizing the energy consumption in health sectors are given. Tables are ordered in the same way as in paragraph 6.1.1.

Category A: Detailed design and performance requirements	
A1 Core Criteria	**A2 Comprehensive Criteria**
Building energy management system **A building energy management system (BEMS) shall be installed and commissioned that provides occupants and facilities managers with real-time information on the building's energy use by using networked sensors and a minimum of half hourly utility metering. The user interface shall allow for information on the buildings' energy use to be analyzed and downloaded by occupants and facilities managers without requiring significant training. The performance of key aspects of the building that can be controlled**	**Building energy management system** The performance of key aspects of the building that can be controlled by the system shall be easy to adjust i.e. lighting, heating, cooling. Additionally, the system shall allow for: Analysis and control of energy uses for different zones within the building (as a minimum for heating, cooling, lighting); Performance optimization according to ambient conditions inside and outside the building, and; Diagnosis of the reason for any deviations from design performance.

by the system shall be easy to adjust i.e. lighting, heating, cooling. ○***The Design team or the Design & Build tenderer or the DBO tenderer shall provide specifications for the BEMS including information about the user interface. They shall additionally demonstrate how information will be displayed, reported and made available to at least the facilities and/or energy managers for the building.***	○*The Design team or the Design & Build tenderer or the DBO tenderer shall provide specifications for the BEMS including information about the user interface. They shall additionally demonstrate how information will be displayed, reported and made available to at least the facilities and/or energy managers for the building.*
Low or zero carbon energy sources **Where the building is located to benefit from the potential to connect to a high efficiency and cost-effective alternative energy systems, the building's energy systems shall be designed to connect to this infrastructure.** ○ ***The Design team or the Design & Build tenderer or the DBO tenderer shall identify where existing infrastructure exists and determine whether it would be beneficial environmentally for the building to connect to this infrastructure. The primary energy savings shall be quantified*.**	**Low or zero carbon energy sources** A minimum of 10% of the primary energy demand for the building shall be supplied/generated by localized renewable energy sources or high efficiency and cost-effective alternative systems installed within the curtilage of the building or which are shared with other buildings. The minimum requirement could be varied depending on the local context. This could be set with reference to local planning policies and/or a scoping study for the site. ○ *The Design team or the Design & Build tenderer or the DBO tenderer shall provide designs and drawings for the energy systems to be installed together with calculations of their modelled energy generation and the net contribution to the building's primary energy use.*
Lighting control systems **Lamps and lighting design are recommended to be procured with reference to the indoor lighting EU GPP criteria. Where lighting control systems are not a minimum requirement in a Member State or their contribution is not considered in the national calculation method, occupancy sensors shall be installed in line with Technical Specification 3.2.3 of the indoor lighting EU GPP criteria (published in 2012). The indoor lighting EU GPP criteria are available here: http://ec.europa.eu/environment/gpp/pdf/Indoor%20Lighting%20-%20EU%20GPP%20Criteria%20Final%20draft.pdf** **In addition, occupiers shall be able to control or override lighting systems in local zones or rooms within the building.**	

○***The Design team or the Design & Build tenderer or the DBO tenderer shall provide technical specifications for the lighting control systems to be installed.***	
Recyclable waste storage **Dedicated storage space shall be provided within the building, or within the curtilage of the building, to facilitate the segregation of recyclable materials and end-of-life products by occupiers. The waste collection area(s) shall be sized based on the likely occupation level to accommodate sufficient containers to maximize recycling whilst handling residual waste.** ○***Design teams or contractors shall provide plans of the building showing the space(s) that have been designated for waste segregation and collection as well as the assumptions made to estimate the space provision.***	
Ventilation and air quality **The ventilation system shall be specified to supply indoor air with a quality rating of IDA 2 according to EN 15251 or equivalent. In locations with poor outdoor air quality, the ventilation systems of the building shall be designed to ensure that clean air is supplied to the offices in compliance with the following criterion:** **☒No air intake should be positioned on a façade, or facades exposed to busy roads (road to be indicated in the ITT). Where this is not possible, the opening should be positioned as high above the ground as possible. The design shall additionally follow guidance A2.2 in EN 13779;** **✓Ventilation system filters shall follow the specifications in table A.5 of EN 13779 or equivalent. Poor air quality is defined as outdoor air (ODA) class 2 or 3 according to EN 13779.** ○***The design team or the DBO contractor shall demonstrate the buildings compliance with the IDA quality rating criteria in EN 15251 or equivalent. Drawings and plans of the ventilation services detailing the air intake locations shall be provided. These shall be provided at the detailed design stage and upon completion. They shall also obtain local air monitoring data from the local public authority enabling classification of the location according to EN 13779.***	**Ventilation and air quality** The ventilation system shall be specified to supply air with a quality rating of IDA 1 according to EN 15251 or equivalent. In locations with poor outdoor air quality the ventilation systems of the building shall be designed to ensure that clean air is supplied to the offices in compliance with the following criterion: ✓Air intakes shall be located at least 20 meters from sources of poor air quality (as defined below). Where this is not possible, the opening should be positioned as high above the ground as much as possible. The design shall additionally follow guidance A2.2 in EN 13779; ✓Ventilation system filters shall follow the specifications in table A.5 of EN 13779 or equivalent. Poor air quality is defined as outdoor air (ODA) class 2 or 3 according to EN 13779. ○*The design team or the DBO contractor shall demonstrate the buildings compliance with the IDA quality rating criteria in EN 15251 or equivalent. Drawings and plans of the ventilation services detailing the air intake locations shall be provided. These shall be provided at the detailed design stage and upon completion. They shall also provide local air monitoring data from the local public authority enabling classification of the location according to EN 13779.*

Category B: Facilities management	
B1 Core Criteria	**B2 Comprehensive Criteria**
Building energy management system **The facilities manager shall produce monthly reports for the occupier using data from the Building Energy Management System (BEMS). The arrangement shall be reviewed annually. The reports shall disaggregate heating, cooling, ventilation and lighting energy use seasonally.** ○***Potential facilities management contractors or DBO contractors shall submit their proposed format for the reports as part of their ITT response.***	**Building energy management system** The facilities manager shall produce monthly reports for the occupier using data from the Building Energy Management System (BEMS). The arrangement shall be reviewed annually. The reports shall identify trends in energy use within the building, disaggregated so that heating, cooling and lighting can be identified seasonally and by zone or department. The reports shall include recommendations on remedial action and/or further energy savings that could be made. ○ *Potential facilities management contractors or DBO contractors shall submit their proposed format for the reports as part of their ITT response.*
Low or zero carbon energy sources **Where the building is located to benefit from the potential to connect to a high efficiency and cost-effective alternative energy systems, the building's energy systems shall be designed to connect to this infrastructure.** ○***The Design team or the Design & Build tenderer or the DBO tenderer shall identify where existing infrastructure exists and determine whether it would be beneficial environmentally for the building to connect to this infrastructure. The primary energy savings shall be quantified.***	**Low or zero carbon energy sources** A minimum of 10% of the primary energy demand for the building shall be supplied/generated by localized renewable energy sources or high efficiency and cost-effective alternative systems installed within the curtilage of the building or which are shared with other buildings. The minimum requirement could be varied depending on the local context. This could be set with reference to local planning policies and/or a scoping study for the site. ○The *Design team or the Design & Build tenderer or the DBO tenderer shall provide designs and drawings for the energy systems to be installed together with calculations of their modelled energy generation and the net contribution to the building's primary energy use.*

Energy performance contract	
The building operator or facilities manager (as appropriate) shall agree, based on the preliminary modelling of the building's energy consumption, limits on energy consumption associated with lighting, heating, cooling, ventilation and auxiliary power. This shall exclude predicted loads relating to the users such as servers and small power loads. The contract shall be based on at least ten years' average weather and degree days' data for the location. The contract shall also define adjustments to account for possible future variations in occupancy, extreme weather events and market energy costs. **If energy usage were to exceed these limits, the building operator or facilities manager (as appropriate) would be liable for the additional costs. If energy usage were to be below these limits, the savings would be shared 50:50 (or an alternative agreed apportionment of the savings) with the contracting authority. The arrangement shall be reviewed annually.** ○***The building operator or facilities manager shall make a contractual commitment to the agreed arrangement, including the scope and energy limits. A process for independent collation and presentation of the annual data shall be provided.***	
Waste management system **The building manager shall implement systems that allow occupiers to segregate paper, cardboard, food and drink packaging (glass, plastic and other materials for which local separate collection systems exist) into separate streams for recycling. Batteries, ink and toner cartridges, IT equipment and furniture shall also be collected and arranged for re-use or recycling where possible.** ○***Facilities managers or DBO contractors shall submit a proposal for the systems to be used including details of the waste streams, the segregation systems, working arrangements and contractors to be used.***	**Waste management system** The building manager shall implement systems that allow occupiers and on-site catering services to segregate paper (at least two grades), cardboard, food and drink packaging (glass, plastic and other materials for which local separate collection systems exist) and food/catering waste into separate streams for recycling. Batteries, ink and toner cartridges, IT equipment and furniture shall also be collected and arranged for re-use or recycling where possible. ○*Facilities managers or DBO contractors shall submit a proposal for the systems to be used including details of the waste streams, the segregation systems, working arrangements and contractors to be used.*

APPENDIX: Allergenicity of urban plants

With the climate crisis to be present, human health and biodiversity are under a significant hazard. Cause of climate change, more and more extreme climate events, such as heat waves, flooding etc. are becoming more frequently posing a threat for human health and the ecosystem.[39] Furthermore, it is well known that pollen emitted by urban plants is a significant factor for the allergenic potency and for air pollution cause of the way that contributes to atmospheric particulate matter.[40] For grass pollen, is considered to be in the first place for pollinosis cases in Europe.

Climate change and pollen allergies cases are high correlated. For example, high intensity weather phenomena like thunderstorms, causes a long-range transport of pollen. Based on the European Academy of Allergy and Clinical Immunology, more than 100 millions European citizens will develop allergic rhinitis in the next years because of the impacts of climate change and pollen emissions. As for the Mediterranean area, because of its geographical and urban features, it differs from the rest European continent. The climate change conditions with sunny days most of the year and mild winters affect the life cycle of the urban plants followed by high rates of pollen production. Grass pollen is by far the most important because of pollinosis throughout the European continent, including the Mediterranean area. Between 8% and 35% of young ages in EU show Ige antibodies to grass pollen allergens.[41]

The last decades an increased use of ornamental plants in parks, roads, public buildings and houses is observed. This has as a consequence the creation of new sources of aeroallergens causing in some cases health problems. Is also notable that pollen emissions come from urban tree species planted for ornamental use in public spaces. According to the World Health Organization cause of climate change is more necessary than ever specific measures for air quality improvement in the urban centres to be taken from the authorities in charge. Local municipalities must generate new tools and methods for gardening activities based on the need to transform the urban green areas into healthier and sustainable places for citizens.

The development of new strategies in designing green areas must start with the choice of the plants and their interaction with the urban characteristics of the area. From the above paragraphs is clear that plants must selected with as less allergenic effects as possible. According to the Mediterranean Garden Society and the Asthma & Allergy Foundation of America some plants that are not allergy-friendly and should be avoided are Euphorbia characias, Ailanthus altissima, Olea europea, Chrysanthemums, Daisies, Gerber Daisies, English Lavender, Chamomile etc. In any case for gardening activities, stakeholders must personalize and specialize the selection of the ornamental plants according to their needs, climate condition of the surrounding area etc. The advice from agronomics experts in high pollen plants, ornamental and invasive plants is necessary to be asked especially if the project refers to healthcare sectors.

[39] Melissa R. Marselle, Jutta Stadler, Horst Korn, Katherine N. Irvine, Aletta Bonn, Biodiversity and Health in the Face of Climate Change: Challenges, Opportunities and Evidence Gaps, Springer Open

[40] Paloma Cariñanos, Francesca Marinangeli, An updated proposal of the Potential Allergenicity of 150 ornamental Trees and shrubs in Mediterranean Cities, Urban Forestry & Urban Greening
Volume 63, August 2021, 127218

[41] G. D'Amato, L. Cecchi, S. Bonini4,5, C. Nunes, I. Annesi-Maesano, H. Behrendt, G. Liccardi, T. Popov, P. van Cauwenberge, Allergenic pollen and pollen allergy in Europe. 2007 The Authors Journal compilation