

Enhancing stakeholders' knowledge and applicability of climate change measures for hospitals and health infrastructures

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Table of contents



□ The Assignment's key data

□ Synthesis of activities undertaken

Conclusions

□ Available outputs for practical use

Relevant recommendations







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The assignment's key information

<u>The concept</u>: the existing approach on climate proofing for health infrastructures is mostly centered upon the ex-ante perspective, at design stage. The lessons learnt from the direct experience of stakeholders after implementing climate change measures are reduced.

The activities:

- A) Selecting hospitals according to an European approach: North-South.
- B) Preparing a questionnaire to understand the situation to date on climate mitigation and adaptation.
- C) Visiting hospitals to understand the field-situation on climate change.
- **D)** Reporting on conclusions.
- E) Preparing project outputs.

Potential beneficiaries:

- i) The Managing Authorities responsible for activating further funds dedicated to CC & hospitals.
- ii) Health infrastructures interested to apply for EC grant funding and EIB loans alternatively the government level managing funds for health care.

Intended results: a framework of action & list of required actions/tools to combat CC at health infrastructures.

Start & completion dates: September 2023 – June 2024.





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Methodology: the nine hospitals visited



- Yjvaskyla Hospital, Finland 12/12/2023
- *Turku* Children's Hospital, Finland 13/12/2023
- Helsinki Bridge University Hospital, Finland -14/12/2023
- Hilvestrum Hospital, the Netherlands 27/11/2023
- Rotterdam Hospital, the Netherlands 28/11/2023
- Szczecin Hospital, Poland 18/01/2024
- Wolica Hospital (Łódz, Poland) 29/02/2024
- Groupe Chirec, Brussels (Braine l'Alleud and Delta sites) - 15/01 & 15/04/2024







Methodology: the hospitals visited, meetings & conferences

Criteria to select hospitals:

- Hospital projects within the EIB sphere of action
- Hospital projects outside the EIB sphere of action to get vicinity to a different way of approaching assignments
- □ Pre-World War II Hospitals
- □ Multi-site and/or multi-building hospitals
- A peculiar feature, i.e. located in a forest
- Personal contacts

Project meetings & conferences attended:

- International Hospital Design Alliance, Finland: project meetings, October 2023
- Health Care Without Harm in-person Conference: Hospital in Transition Conference – Brussels, 19 January 2024
- Brief on-line presentation of the LIFE-Resystal Project with Health Care With no Harm NGO: 25 January 2024
- The Health & Environment Alliance: the Role of the Healthcare Sector. On-line seminar, 13 May 2024







Corporate Use Corporate Use

- Approach at project start: to simply increase as much as possible the use of CC mitigation and adaptation measures.
- Approach matured along implementation: developing a vision & commitment
- ❑ A number of hospitals is <u>concretely committed</u> to implement climate change measures. It has achieved promising results with regard to:
 - energy efficiency
 - ➤ thermo-isolation
 - ➢ initial results on green procurement (anaesthetics).



Quantifying their number is not possible at the moment, it would involve extensive research beyond this assignment.

Said hospitals are considered reference examples in their domain to generate future broader impact to reduce GHG emissions from hospitals and the health sector at large.







Conclusions: Degree of commitment (2/2)

- It is not yet translated into appointing a sufficient number of staff for climate change & environmental protection.
- At the moment the Energy and/or Infrastructure Managers exercise a general role on climate change.
- □ Hiring good Climate Change experts at hospitals is difficult, so hospitals need to rely upon external consultants.









Conclusions: Funding matters

- It is regarded by and large available.
- Rather, the problem is identified in its reported difficult access.
- Hospitals concentrate rather upon technical tasks only, not on climate matters. They are used to be allocated funding by the relevant government level, they do not plan the required funding.
- Some countries such as France, Spain, and Italy have delegated to the regions to manage funds for healthcare. The health's climate dimension is not scaled-up.











- > Procurement represents the main source of GHG emitted.
- Green procurement can strongly reduce conventional CO₂intense procurement.
- It requires establishing a reference procedural framework and it is an immense task, largely beyond this project. It requires reorientating the existing offer of goods and services for healthcare to become low GHG-emitting.
- Procurement needs to be complemented by the so-called "ecoplanning approach" hospitals' daily activity considers ENV & CC.
- The positive example of green procurement for anaesthetics represents a relevant case to move forward – about 5% of total health sector GHGs.









Conclusions: Energy demand and efficiency

- It represents the second source of GHG emitted, whilst at the project start it was regarded by far the main GHG emitter. Decreasing GHG emissions from energy can be most adequately approached by undertaking an energy audit according to various levels as first action.
- Expenses saved via energy efficiency are an important investment driver. They become internal funds triggering further climate investments allowing decreasing OPEX.
- Some hospitals visited have started implementing the innovative concept of thermo *"over-insulation"* insulating premises beyond legal requirements, strongly decreasing the OPEX.













Conclusions: Pre-World War II & multi-building hospitals

- They represent the most difficult, and a very recurrent case with regard to climate change.
- Once refurbished, these hospitals can achieve concrete results.
- The refurbishing option is gaining increased attention due to the rising costs of construction materials.
- Demolishing old hospitals and building new ones is becoming excessively costly.











Conclusions: Climate Adaptation

- The potential benefits generally remain not appreciated, mostly regarded as a positive sideeffect from thermo-isolation.
- Further adaptation measures based upon naturebased solutions (NBS) and the hospitals' bio-climatic design generally require space, so they are more suitable for hospitals located outside urban areas – generally new hospitals.
- Nonetheless hospitals located within urban areas can achieve concrete results, contributing to combat the urban heat island effect.
- Further, NBS and bio-climatic design are important solutions to increase the quality of life of patients and those working at hospitals, helping to increase the reputation and the effectiveness of health delivery.









Sustainability: The available assignment outputs

- Output 1: How to organise and allocate tasks to a Climate Change Team, according to the principles of EMAS and ISO 14000.
- Output 2: The climate change questionnaire to identify the main issues at stake.
- Output 3: Standard Terms of Reference to plan and execute energy audits.
- Output 4: Methodological framework to organise green procurement within hospitals.
- Output 5: Overview on the emerging climate adaptation options.
- > **Output 6**: Template to prepare a Climate Change Action Plan.









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Sustainability: **Output 1**: How to organise and allocate tasks to a Climate Change Team, according to the principles of EMAS and ISO 14000.

The EU Environmental Management and Audit Scheme (EMAS) is a voluntary management scheme, which aims at reaching a continuous improvement, with associated cost reduction, in the environmental performance of companies.

Climate considerations, even if are not listed in the acronym, are part of the company's performances.

The EMAS' concepts and tasks relevant for health infrastructures are:

Improved environmental performance, relating to six core environmental topics over time:

- Energy efficiency and consumption
- Material efficiency
- Water used along one year
- > Waste
- Land use with regard to biodiversity
- \blacktriangleright Annual emissions of GHG and non-GHG gases (CO₂-eq.)

Cost savings.





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Sustainability: Jasper Output 1: How to organise and allocate tasks to a Climate Change Team, according to the principles of EMAS and ISO 14000.

- **Commitment:** it shall be at all levels at the health infrastructure.
- Staffing: carefully selecting the team composition, including managerial positions, individual roles and responsibilities. CC teams for small & large health infrastructures.
- Overall approach: developing a Strategic Plan (main overall objectives), originating an associated Action Plan (Output 6) implementing specific tasks (= what, when, who, intended results).

The Strategic Plan and the Action Plan shall coordinate.

- Focus shall be on the climate/environmental targets, especially how to achieve them?
- > Adequate training and supporting instruments shall be made available.
- The procedures and intended results should evolve and develop over time, not remain the same. To this, regular reviews need to be established, based upon the approach of external audits.
- Preparing emergency procedures setting how to operate the hospital in case of, and along incoming climate hazards, relevant for climate change adaptation. These procedures require modifying operations to reduce climate impact.







Project sustainability: <u>Output 2</u>: Climate change questionnaire



		Climate issues	Effectiveness to date & supporting reasons	Lessons learnt, recommendations
		Did the health infrastructure appoint any responsible person to manage climate change issues?		
General	Management	Does the health infrastructure have a climate strategy, does it publish a climate or sustainability report?		
		Any result from cross-feeding with other health infrastructures		
		Is there dedicated funding supporting climate change actions?		
	Certification/ Construction standards	Requiring sustainable construction standards that take into account climate change, such as BREEAM or (extended) LEED (Leadership Energy & Environment).		
	Pilot actions	Did pilot/innovative actions include any climate-related action (mitigation or adaptation) such as on thermo-isolation, energy efficiency, urban mobility, nature-based solutions etc. originating from general technical progress?		







Climate issues			Effectiveness to date &	Lessons learnt,
			supporting reasons	recommendations
		Installing energy-efficient medical equipment.		
		Using high-quality materials leading to a high thermal resistance, so the health infrastructure overall reduces strongly energy demand to		
		Application of technologies improving the <u>energy efficiency</u> of buildings: heat exchangers, free-cooling towers, LED lighting, energy		
	Energy	management systems for heating and cooling as well focusing upon differentiating energy requirement.		
	consumption	Electricity storage facilities to be activated during power cuts, replacing conventional fossil fuel-based generators.		
		Replace old vehicles (especially ambulances) with new vehicles with improved fuel performances, or e-vehicles.		
nol		Installing equipment, and/or orientate the hospital conveniently to reduce the penetration of solar radiation.		
gat		Implementing other measures to reduce GHG emissions (please list the measures below):		
		Installing low-carbon & renewable energy production to stop using fossil energy: photo-voltaic panels (quantity and location), solar panels for		
Ite	Energy	Not water, neat pumps. Wherever technically & financially feasible, <u>preparing buildings</u> to use future climate-neutral technologies, such as heaters burning hydrogen		
Ĕ	production	only.		
5		Is the health infrastructure connected to any <u>district heating</u> network?		
		turn it helps reducing land requirement, which could support CC adaptation by maintaining its vegetation.		
		Bicycle: facilitating access to the health infrastructure, providing parking spaces for bikes.		
	Mobility	Fostering access to the hospital via <u>public transport</u> .		
		Integrating the health infrastructure into <u>municipal transport planning</u> , modal-shift, Sustainable Urban Mobility Plans, or any Sustainable Urban Development scheme.		
		Switching to electro-mobility, including installing recharging points for electro-mobility.		
		Has the health infrastructure assessed the risks to the infrastructure and its operations related to climate change (i.e. physical climate risks such		
	nce (Preparing emergency response plans addressing climate hazards?		
	ilie	Establishing nature-based solutions (green and blue areas), with intended additional side-effects upon well-being of patients and staff,		
limate res (adaptat		resulting in requiring less energy to function. Maintaining unchanged or restoring average $($ here are a solution of the area $($ here areas within the project area $($ contributing to reduce ambient temperature in the areas $($ here $($ areas		
		of the health infrastructure.		
		Installing rainwater collection system or water saving equipment such as low-consumption toilets, re-using rain water for non-medical purposes, sensor taps etc. to reduce water consumption.		
	0	Implementing other climate adaptation measures (please list the measures below):		
\$	on on	Using high-quality materials leading to a high <u>thermal resistance</u> , so the health infrastructure strongly reduces energy demand for cooling,		4
ion	non gatio nd tati	Installing green roofs and walls, contributing to thermo-isolation.		
Act	comr miti _§ a adap	Thermo-isolation via adequate materials, reducing thermal bridges.		

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Sustainability: <u>Output 3</u>: Terms of Reference to plan and execute energy audits (1/3)

• Key points

- 1. Decide upon the level of audit and the main purpose: Level 1, Level 2, Level 3
- 2. Practical recommendations, which cover:
- Purpose
- Geographical scope
- Who are those taking decisions
- Approving the audit's ToR



- The principle of "Energy-Efficiency-First" shall be the guiding principle during the execution of the audit.
- Recommendations shall elaborate as main pillars: available options, and associated costing.







Sustainability: <u>Output 3</u>: Terms of Reference to plan and execute energy audits (2/3)

• <u>Key points</u>

3. <u>Recommendations for reporting</u>:

- □ The reporting format shall be compatible for both the technical and the executive personnel.
- □ The intended energy-saving interventions shall cover:
 - High-cost measures: the building envelope, technical building equipment, etc.
 - > Low-cost measures: adaption or operation mode, reduction of supply losses.
 - Review requirements of comfort health and well-being such as temperature, air quality- and humidity-level, room size, etc.
 - > Training, awareness, and behavioral changes.









Sustainability: <u>Output 3</u>: Terms of Reference to plan and execute energy audits (3/3)

<u>Key points</u>

4. The most common challenges:

- Inadequate <u>review of audit reports</u> which are of poor quality. <u>Quality assurance</u> & proof-reading are often missing.
- The <u>energy bills</u> shall be analyzed: energy costs are an important source of information, not always sufficiently appreciated.
- Poor <u>improvement selection</u> improvements have a payback period longer than improvements' lifetime.
- The <u>time frame to implement improvements</u> is excessively long, or is not determined.
- > There is lack of a clear description of the scope of energy-saving measures.







Sustainability: <u>Output 4</u>: Methodological framework to organise green procurement at hospitals (1/2)

Reference to Green Public Procurement criteria: <u>GPP Criteria and Requirements - European</u> <u>Commission (europa.eu)</u>. These criteria cover <u>Electrical and Electronic Equipment used in the</u> <u>Health Care Sector</u> (2014) [JRC assessment on need for criteria update (2022).

The six pillars identified:

- The EC Corporate Sustainability Reporting Directive (CSRD) 2022/2464 plays an important horizontal role, it constitutes the overall framework of action by requiring a GHG-footprint of goods and services. So those with a reduced GHG footprint can be procured.
- GWP associated to the production of goods to be purchased.
- Transportation of the same goods.
- Food production, delivery, and disposal.
- Medical devices to be installed at hospitals, and
- Behavioural changes.







Sustainability: Output 4: Methodological framework to organise green procurement at hospitals (2/2)

COCIR (the European Trade Association representing the medical imaging, radiotherapy, health ICT and electromedical industries), help to improve energy efficiency, material efficiency, and ecodesign of medical imaging equipment which have an important climate impact. Relevant Internet references to access further information:

COCIR: EU Green Public Procurement (peak-sourcing.com)

<u>COCIR: Equipment Maintenance (peak-sourcing.com)</u>

COCIR: Ecodesign Initiative (peak-sourcing.com)

COCIR: Good Refurbishment Practice (peak-sourcing.com)







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Project sustainability - Output 5: Climate adaptation

Climate bazard	Adaptation measure	Urban environment	Outskirts of	
			urban areas	
Temperature	Passive cooling & heating	In principle would not work, generally it requires some space not always available in urban environments	Yes, generally there is available space	
	Thermo-isolation &	Voc	Yes	
	thermo over-isolation	165		
	Green roofs	Yes	Yes	
	NBS & Biophilic Design, with focus on planting vegetation	Partially, they are limited only to any available marginal area.	Yes. This can include any available small natural area which can host minor,	
			temporary flooding.	
Storms & potential floodings	External spaces minimising non-permeable spaces to allow infiltration of rainwater into the soil, reducing	In principle would not work, generally it requires some space not always available in	Yes	
(water-related risks)	storm-water runoff.	urban environments		
	Checking that the design specifications of the sewerage network include an extra allowance for climate change.	Yes	Yes	
	Separating the sewerage system from the water runoff system.	Yes	Yes	
	Sensitive machines and equipment (i.e. emergency generators, medical imaginery) shall be located at higher floors to remain unaffected by floodings.	Yes	Yes	
The basement's sewage network is adequately dimensioned to accommodate accidental flooding from any breakdown of furthe pipes in the building. The network can accommodate receiving an above-average quantity of rainwater.		Yes	Yes	
Non-critical equipment is located at the ground floor or the basement, such as laundry or environmental services.		Yes	Yes	

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Project sustainability - <u>Output 6</u>: Template, Climate Change Action Plan (1/3)

Template for a Climate Action Plan for h	nospitals & health infrastructures						
Overall task (= what to do)	Specific task	Expected result(s)	Estimated time frame	Responsible party	Estimated cost	Likely complicating issue, mitigation solutions	Additional information
	Appoint a Climate Manager	Responsible person on climate issues is in place	TBD	Hospital Director	TBD	Availability of good candidates. Mitigation: offering attractive employment conditions	n./a.
Staffing matters	Verification of adequacy of staff at the health infrastructure: number, qualifications, roles including those experienced in proposal preparation to increase access to funding, and <u>recruitment needs</u> , so as resulting from Output 1 Climate Change Team	The hospital's climate and environmental staff is adequate to needs	TBD	Hospital Director, Energy/Climate Manager, Infrastructure Manager	TBD	Availability of good candidates. Mitigation: offering attractive employment conditions	n./a.
Knowledge-sharing	Exchanging lessons learnt with other hospitals on <u>all climate topics</u> , to decrease the required efforts to search for solutions in miscellaneous climate change domains	Awareness on the most recent technologies and procedures on	TBD	Energy/Climate Manager,	TBD	n./a.	n./a.
	Participating to sector workshops/ conferences to increase the possibilities to exchange information	climate change for hospitals	TBD	Manager	TBD	n./a.	n./a.
<u>Climate mitigation</u> : investigating required activities to decrease energy consumption and GHG emissions (Scope 1 and 2)	Executing a Level 1 Energy Audit (= simply taking a picture of the situation with no measurements) to map and flag issues at stake, and identify the quick-wins to generate immediate results	Identification of the main & most urgent issues at stake. Information baseline to decide on/if executing Level 2 and 3 audits, if required	1 month	Energy/Climate Manager, Infrastructure Manager	TBD	n./a.	n./a.
	Preparing ToR for Level 2 or 3 energy audits (with measurements and cost estimates) according to the results from Level 1 audit. Approving the ToR	Refining available information: detailed list of required interventions	3 months	same as above, in case external energy consultants	TBD	Need to prepare good-quality ToR	Considering legislative requirements, any new available technology, renewable energies, marginal areas to install PV panels, fostering e-mobility and soft mobility
	Selecting and approving the interventions required following the audits' results.	List of works to be done	1 month	same as above, in case external energy consultants	TBD	n./a.	n./a.





Project sustainability - Output 6: Template, Climate Change Action Plan (2/3)

	Estimating the required budget & funding channels to execute relevant interventions	Definition of the required costs, identification of funding possibilities	TBD	Energy/Climate Manager, Infrastructure Manager	TBD	Funding possibilities, difficulty to access available funding	n./a.
	Preparing and approving the ToR to execute works, procuring contractor, executing the works	Works are completed, equipment is tested and running	TBD	same as above, in case external energy consultants	TBD	Availability of good Energy Consultants	n./a.
	Estimating the potential financial savings from interventions	Estimating cash-flow generated for further climate investments (internal funding)	TBD	Energy/Climate Manager, Infrastructure Manager	TBD	n./a.	n./a.
Green procurement: decreasing GHG emissions from the procurement of external goods and services (Scope 3)	Ranking goods and services on the basis of their GWP or GHG emissions at production and/or use	Ranking on the basis of GWP is available	TBD		TBD	Data availability	n./a.
-	Find alternatives with reduced GWP, on the basis of the Corporate Social Responsibility Directive	Reliable alternatives with reduced GWP are identified	TBD		TBD	Availability of alternative products	n./a.
	Accessing relevant national schemes to learn which less GHG-emitting products are registered and employed at national level		TBD		TBD	Existence of national schemes	n./a.
	The hospital adopts less GHG-emitting products, with associated awareness- generation sessions for all staff to have the products are used daily	GHG from purchasing goods and services decreases	TBD		TBD	n./a.	n./a.







Project sustainability - Output 6: Template, Climate Change Action Plan (3/3)

<u>Climate adaptation</u> : preparing a path to increase resilience	Executing a Climate Vulnerability and Risk Assessment (CVRA) exercise	Mapping needs, setting the specific intended results to increase the hospital's climate resilience	TBD		TBD	n./a.	n./a.
	Setting and approving the required engineering interventions	Relevant adaptation measures are implemented, the hospital	TBD	same as above, in case external	TBD	n./a.	n./a.
	Implementing the engineering interventions required	s hazards such as heat vawes, floodings, storms, etc.	TBD	energy consultants TI	TBD	n./a.	n./a.
	Setting the required nature-based interventions (green and blue areas)	TBD	TBD		TBD	n./a.	n./a.
	Preparing the required soft measures to operate the hospital in case of incoming hazards	Climate hazards disrupt as less as possible operations	TBD		TBD	n./a.	n./a.
	Prepare emergency procedures in case of occurrence of climate hazards that could affect the assets and the operation of the hospital		TBD		TBD	n./a.	n./a.
	Awareness-raising across staff on adaptation measures	Potential to implement adaptation measures increases	TBD		TBD	n./a.	n./a.
Subject areas common for climate mitigation and adaptation	Identification of issues and tasks common for climate mitigation and adaptation	Topics of common interest are addressed with regard to mitigation and adaptation: thermo-isolation for instance	TBD	Infrastructure Manager	TBD	Mitigation: developing a holistic view upon the health infrastructure	n./a.
	Storing rain water for non-medical purposes, as emergency supply in case of droughts	Non-medical operations operations based upon rain water can continue during droughts	TBD		TBD	In relation to legislative requirements	n./a.



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Final consideration: EU Taxonomy compliance

Reference to Reg. 2020/852 establishing Taxonomy.

Article 10 - Substantial contribution to CC mitigation: avoidance or reduction of GHG, increasing GHG removals

(RE, EE, CC-neutral mobility, renewable materials, energy decarbonization).



- Article 11 Substantial contribution to <u>CC adaptation</u>: include adaptation solutions that reduce the adverse present and future impact of the climate on the hospital, people and nature. Measures shall be location-specific and context-specific.
- Article 13 Substantial contribution to transition to a <u>circular economy</u>: increase durability and reparability of medical equipment, reducing the content of hazardous substances.
- Article 14 Substantial contribution to pollution prevention and control: include adaptation solutions that reduce the adverse present and future impact of the climate on the hospital, people and nature. Measures shall be location-specific and context-specific.





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Sustainability: Recommendations (1/2)

- Prepared on the basis of the project's outputs.
- Aim at a practical use, all together they constitute a simple but effective <u>methodological</u> <u>framework</u>:
 - Appointing a <u>Climate and Environmental Team</u> to initiate climate activities, including funding opportunities Output 1.
 - Executing an <u>energy audit</u> according to relevant levels, to identify the required results on energy – Output 2 and Output 3.
 - Executing an **audit of all goods and services** (to be) purchased externally *Output 4*.
 - Adapt health infrastructures to incoming <u>climate hazards</u> *Output 5*.
 - Developing a vision on climate change: the required overall intended targets covering climate mitigation and adaptation.
 - Implementing said vision by preparing a <u>Climate & Environment Action Plan</u>: immediate targets (= quick-wins), later targets, responsibilities for implementation, required budget & funding channels, and potential complicating issues *Output 6*.







Sustainability: Recommendations (2/2)

- Supporting the development of an evolving, new mentality, which considers climate protection alongside health delivery. This is important to implement the intended structural changes.
- Appointing the Climate Change Team could partially address the reported difficult access concerning climate funding.
- Regional governments, when responsible for triggering funds for health care, shall become more attentive to foster investments targeting climate change & health at the same time.
- The latter two items are expected to contribute to the so-called "financial resilience" for health & climate change.

The **<u>EIB</u>** intends to contribute to address financial resilience.







Questions & answers





















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