Climate Positive Organisation

Definition Health

CREATING MEANINGFUL EXPERIENCES

ER&IM

<Date>

Breda University OF APPLIED SCIENCES

CPO Health: Executive Summary

BUas will create campus environments where optimal comfort and meaningful connections to nature drive both climate action and the wellbeing of all who learn, work and visit.

1. Why it matters
Health directly impacts learning outcomes, staff productivity and our ability to attract talent in an increasingly competitive higher education landscape. As we pursue climate positive status by 2035, we must ensure our buildings support rather than compromise human wellbeing. Poor indoor climate generates complaints, undermines concentration and creates reputational risks, whilst strategic comfort improvements reduce energy waste and operational costs. Our commitment to becoming a ZoOP organisation requires us to consider not just carbon reduction but regenerative value for all living beings.

2. Health at BUas
Health encompasses actions and design measures supporting the physical, psychological and social wellbeing of people. Within the CPO framework, BUas focuses specifically on comfort: thermal comfort, ventilation, air quality, lighting and acoustic comfort.

3. Our ambition
BUas aims to be a good example in comfort, establishing realistic and measurable minimum standards across all existing and future projects. Our priority hierarchy focuses first on thermal comfort with individual zone control where possible, followed by ventilation and air quality with Co2 and humidity control, then visual comfort maximising daylight access with dimmable controls, and finally acoustic comfort addressing issues based on actual complaints. Annually, we engage an ecological consultant to guide regenerative interventions as part of our ZoOP commitment.

4. Making it happen
Implementation begins with baseline assessment (2026–2027) measuring temperature, CO_2, humidity and lighting across representative zones in all buildings. We will establish smart monitoring systems in collaboration with the Smart Campus team, deploying continuous automated monitoring through building management systems. Short-term actions (2026–2028) focus on winter temperature management campaigns, building setpoint optimisation, GACS compliance for building management systems, and HVAC replacements in Frontier. The Health Action Plan integrates with Energy theme FastLane scenarios to ensure comfort criteria complement energy reduction targets, avoiding the false economy of energy improvements that degrade wellbeing.

5. Investment
Short-term (2026–2028): €75,000–€100,000 GACS compliance and building management system enhancement, CO_2 sensors and demand ventilation controls, monitoring equipment and dashboard development.

Medium-term (2029–2030): €80,000–€115,000. Enhanced zone controls and ventilation optimisation, expanded CO_2 monitoring networks.

Long-term (2031–2035): Integrated with building system replacement cycles and sustainable MJOP planning.

NB: all above costs are still mainly estimated and shall be integrated into the standard multi annual budget forecast cycle for approval.

The investment in Health is an investment in BUas' competitive position as an institution that demonstrates how climate ambition and human flourishing advance together.

1. Available information

The 9 foundations of a healthy building – *principles:* framework created by a multidisciplinary team of experts from the Healthy Buildings Program at the Harvard T.H.Chan School of Public Health. It is designed to be a clear and actionable distillation of the core elements of healthy indoor environments, which are: air quality, thermal health, moisture, dust & pests, safety & security, water quality, noise, lighting & views, ventilation.

WELL Standard – targets and KPIs: performance-based certification system that focuses on enhancing human health and well-being within buildings. It provides a framework for creating healthier environments through design, operations, and behaviour, guided by scientific research on the connection between buildings and occupant wellness. Although not currently pursued as formal certification, WELL preconditions and features are used as voluntary guidelines for target-setting (referenced throughout this document and in the Roadmap).

Biophilic Design – *principles:* methodology for designing buildings and landscapes that nurture the relationship between people and nature by introducing various natural features into the built environment.

Regulatory Context
National Standards:

- **Arbowet (Working Conditions Act):** Requires adequate ventilation, thermal comfort, and lighting for all employees working at BUas facilities.
- **BBL (Besluit Bouwwerken Leefomgeving)**: Sets minimum requirements for ventilation rates, daylight access, and acoustic performance in educational buildings (effective January 1, 2024, replacing Bouwbesluit 2012).
- **Frisse Scholen Programme**: Provides CO_2 guidelines specifically for educational buildings (≤1200 ppm maximum recommended, ≤1000 ppm preferred for optimal learning conditions).

Voluntary Standards/Certifications:

- **NEN-EN-ISO 7730 / ASHRAE 55**: International thermal comfort standards.
- **Frisse Scholen Class B**: Target indoor climate classification for Dutch education buildings.

2. BUas definition

This sustainability theme refers to actions or design measures that support the physical, psychological and social well-being of people. Healthy buildings aim to promote the health of their occupants and boost their productivity. **The most important subthemes are related to comfort**, where BUas has indicated the ambition to be a **good example**, as well as nature and biophilia where Buas wants to be a frontrunner.

Since nature and biophilia are comprehensively addressed in the Biodiversity and Nature chapter, this document focuses on comfort. However, one strategic aspect warrants attention here: BUas's commitment to becoming a ZoOP, and lead its sustainability journey through regenerative initiatives. This commitment includes engaging an ecologic consultant (the external speaker for the living) annually to review the organization's yearly planning and provide guidance on interventions that create regenerative rather than degenerative value.

Comfort

Comfort encompasses all aspects that ensure a building environment is thermally, visually and acoustically pleasant for occupants. This is related to the physical environment and is affected by parameters such as temperature, humidity, lighting and noise levels.

BUas set an ambition to be a **good example** in this subtheme, which resulted in a set of realistic, specific and measurable targets to be used as minimum requirements for existing and future projects as provided in below order of importance:

- **Thermal comfort**: Meet thermal comfort standards NEN-EN-ISO 7730/ASHRAE 55/Frisse Scholen Class B for temperature and humidity and keep thermal conditions consistent throughout the day. Provide individual level thermal control, where possible. Survey the space and occupants regularly to identify zones that underperform
- **Ventilation & air quality:**
    - Exceed local outdoor air ventilation rate guidelines to control indoor sources of odours, chemicals and CO2 . Filter outdoor air with a minimum removal efficiency of 75% for all particle sizes. Implement WELL Building Standard preconditions and features from the Air category.
    - Maintain humidity levels between 30-60%. Measure, track and identify zones that underperform, and initiate mitigation project. WELL Building Standard preconditions and features from the Air category to provide guidelines on this subject.
- **Lighting (Daylight/Electric):** During day provide as much daylight as possible while maintain visual comfort and avoiding glare. . Aim to provide direct lines of sight to exterior windows from all workstations. Accommodate office and classrooms with dimmable lighting. Implement WELL preconditions and features from the Light category.
- **Accoustic:** Consider implementation of noise cancelling measures or furniture based on actual complaint or challenges.

3. Scope

Comfort: Indoor environment quality

Note: below elements are presented in order of priority.

Thermal Comfort

- Temperature control and consistency through the day
- Air movement & thermal stability
- Individual zone control where possible

Ventilation & Air quality

- Outdoor air supply exceeding local guideline
- Demand-based ventilation using CO2 sensors
- Filter maintenance and air quality monitoring
- CO2 monitoring and control
- Humidity control to prevent mold and maintain comfort

Visual Comfort (Daylight/Electric lighting/visuals)

- Direct lines of sight to exterior windows from workstations
- Daylight-dependent and dimmable lighting controls
- Low stimuli colour and material design elements (see also Material chapter)

Acoustic comfort

- Sound isolation between spaces with different acoustic requirements (on demand)
- Control of indoor noise from mechanical equipment, office equipment, machinery

Out of scope

- Interaction, Nutrition & Water: Originally included in the Roadmap under the Health theme, these sub-themes were taken out from the entire Climate Positive Organization scope as a strategic choice as the core team recognized the limited impact it could make.
- Biophilic design, contributing to Health but fully developed in the chapter of Biodiversity and Nature.
- Ergonomy: contributing to improve employees' working condition, health and well-being, but out of scope of this chapter. This aspect is being covered by Buas Occupational Health & Safety Policy (6.3.2. ergonomic workstations).
- Visual comfort elements as blue enriched lightings which can be experienced as unpleasant for some members of the community.
- Hygiene and cleaning services (supported by sustainable products and practices). Although relevant in with regards to air quality, this item is more relevant to the sub-theme of Procurement, Materials (scope 3). Additionally, Buas just complicated the lasts cleaning services European tender in 2025, and selected a party proving innovative and sustainable practices.
- Heat stress baseline assignement, developed under Climate adaptation chapter.

4. Relation to other CPO themes

Energy: Many comfort improvements are embedded in FastLane scenarios. The team must specify health criteria (thermal stability, air quality) alongside energy targets to avoid compromising wellbeing while pursuing WEii reductions.
Key Integration Points:

- Building envelope upgrades: Add thermal comfort consistency criteria
- HVAC replacements: Include CO2/humidity monitoring
- Lighting: Ensure controls support both energy savings and visual comfort
- Ventilation: Balance WELL air quality standards with heat recovery efficiency

Nature & Climate Adaptation: Green infrastructure serves dual functions—biophilic experience (Health) and climate resilience (Adaptation). Requires clear role division.
Materials; Circularity requirements must not compromise indoor air quality; health-focused materials should align with circular principles.

Implementation Requirements
Projects should integrate Health requirements and consideration for all living creatures at design phase. Building systems monitor both energy (WEii) and comfort (temperature, CO2, humidity) simultaneously. Occupant surveys assess health outcomes while informing energy management adjustments.

5. Stakeholders and partners

Stakeholders & Partners

Internal Stakeholders:

- CPO core team
- Campus & Workplace Services (Back Office, Janitors, Service Desk)
- Purchase and Contract Management teams
- Building users (students, staff and renters)
- Academies and research: BE faculty, Facility Management faculty, Student research projects
- Health and safety committee
- People & Organization department
- Marketing & Communication
- Smart Campus project team
- Campus Development team
- Learning Community

Eternal partners

- Consultants and technical experts
- Suppliers & Services providers (HVAC, lighting, materials, cleaning, catering,)

Knowledge partner & Network

- Speaker for the living (ZoOp)
- Dutch Universities Sustainability Network
- Building Research Institutes (e.g., TNO, TU Delft)

Roles and responsibilities

Strategy and oversight

- Health Theme Leader: Sets priorities, coordinates cross-theme integration, monitors overall progress, reports to CPO Core Theme and respective Director
- CPO Core Team: Approves major initiatives, resolves cross-theme conflicts, request additional resources

Operational implementation

- Back Office team: Executes comfort improvements, operates monitoring systems, responds to occupant feedback, maintains equipment
- Procurement: facilitates procurement processes where needed. Implements health-focused material specifications, manages supplier relationships
- Campus Development team: Integrates health requirements in projects from design phase

Technical Expertise

- External Consultants: Provide specialized knowledge, conduct assessments, develop implementation strategies
- Back Office and Janitors teams: Technical execution, system optimization, data collection

Engagement and communication

- Marketing and Communication: Awareness campaigns, behavioural guidance, progress reporting

- Building Users (Students/Staff): Feedback provision, participation in surveys, adoption of healthy building practices

Quality assurance

- Safety and Health committee: Regular audits of comfort performance (RI&E cycle)
- Back Office and Janitors teams: Ongoing monitoring, corrective action when targets not met

6. Action plan

Short-Term Actions (2026-2028): first actions and baseline assessment

2026

- Winter Temperature Management Campaign: maintain all radiators at setting 2 and ensure windows remain closed throughout winter.
- Optimisation of building temperature set points (in collaboration with service supplier).
- Baseline Assessment Framework Development on the comfort elements:
    - Request quotations and identify implementation partners
    - Determine required financial resources
    - Define measurement scope: Indoor temperature, CO_2 levels, humidity, air filter performance and maintenance cycles, identify areas requiring dimmable lighting
    - Establish measurement locations through comprehensive room inventory
    - Determine capacity requirements and budget for sensors (CO_2, humidity) and equipment
    - Create appropriate measurement timeline
- Strategic Planning & Budget
    - Annual consultation with ecological consultant on regenerative interventions
    - Submit baseline assessment budget to Executive Board within annual forecast cycle
- Infrastructure Projects
    - Tender for HVAC units 3 and 5 in Frontier building (reference: Energy chapter and WKO feasibility study)
    - Implement mandatory GACS compliance for Priva building management system
    - Phase in Fastlane scenario 3 measures into Sustainable MJOP (Multi-Year Maintenance Plan)

2027

- Execute baseline assessment and develop strategic recommendations
- Develop detailed Health Action Plan with budget
- Annual ecological consultant consultation on regenerative interventions
- Submit updated action plan and budget to Executive Board for integration into sustainable MJOP
- Complete HVAC 3 and 5 replacement in Frontier building

2028

- Deploy Health Strategy and Fastlane action plans

Medium and Long-Term Actions (2029-2033)

To be defined following baseline assessment results and strategic recommendations.

7. Timeline

See action plan

8. Measuring and monitoring

Baseline Measurement

Current Situation Assessment (2026-2027)

Data needed:

- Temperature, Co2 and humidity levels in representative spaces across all buildings
- Dimmable lighting inventory: current and desired state
- Occupant comfort complaints log (existing facility management records)
- Current HVAC system operating schedules and setpoints

Collection methods:

- Install temporary/permanent sensors in 10-15 representative zones per building
- Review facility management complaint records (past 12 months)
- Document existing building management system capabilities and current control strategies

Key Performance Indicators (KPIs)

Thermal Comfort

- Percentage of occupied hours within NEN-EN-ISO 7730 Class B temperature range (20-24°C winter, 23-26°C summer)
- Temperature stability: maximum daily temperature variation <3°C
- Number of thermal comfort complaints per 1000 occupants per month

Air Quality

- Percentage of occupied hours with CO2 <800 ppm (target: >90%)
- Number of spaces exceeding CO2 1000 ppm threshold
- Air filter replacement adherence rate (100% on schedule)

Visual Comfort

- Percentage of workstations with direct sight lines to exterior windows (target: >80% by 2030). Goal already achieved, shall remain a standard.

System Performance

- Building management system uptime and connectivity (target: >98%)
- Control system response time to comfort deviations
- Maintenance completion rate for comfort-critical systems (target: 100%)

Integration Metrics

- WEii performance vs. comfort satisfaction correlation (ensure energy improvements don't degrade comfort)

Monitoring Approach

Continuous Automated Monitoring

- Temperature, humidity, CO2: Real-time via building management system sensors
- HVAC system performance: Automated alerts for setpoint deviations or system failures
- Lighting controls operation: Usage patterns and energy consumption tracking

Periodic Manual Assessments

- Quarterly: Facility managers conduct walk-throughs in all buildings; spot-check comfort parameters in complaint areas
- Semi-annual: Review complaint logs; identify recurring problem zones

Reporting Frequency

- Daily: Automated comfort alerts to facility management team(s) for immediate response
- Quarterly:
    - Comfort performance dashboard review with trend analysis
    - Health Theme Leader briefing on KPI status and underperforming zones
- Annual: Executive report on health theme progress toward 2035 targets; occupant survey results analysis

Data Management

- Centralized comfort data repository integrated with building management system
- Dashboard accessible to facility managers showing real-time and historical performance
- Annual data validation and sensor calibration program

9. Budget and resources

Financial Resources

Short-Term (2026-2028): Estimated €75,000-€100,000

- GACS compliance and building management system enhancement: €30,000-€40,000
- CO2 sensors and demand ventilation controls: €35,000-€45,000 estimated
- Monitoring equipment and dashboard development: €10,000-€15,000 estimated

Medium-Term (2028-2030): Estimated €80,000-€115,000

Enhanced zone controls and ventilation optimization: €50,000-€75,000 estimated
CO2 monitoring network expansion: €30,000-€40,000 estimated

Long-Term (2031-2035): Integrated with Building System Replacement Cycles

Still to be defined

Funding Sources

- Energy Saving Obligation (Energiebesparingsplicht) compliance budget
- Building maintenance and renewal reserve
- Sustainability investment fund
- Potential subsidies for WELL Building Standard preconditions implementation

Human Resources

Dedicated Capacity

- **Health Theme Leader**: 0.1-0.2 FTE (strategic oversight, coordination, reporting)
- **Facility Management**: 0.3-0.5 FTE additional capacity for comfort and energy monitoring, system optimization, occupant response (distributed across building managers)
- **Technical Specialists** (HVAC, building automation): 0.1-0.2 FTE additional for enhanced monitoring and control strategies
- **Project Management**: 0.1 FTE for coordinating health requirements in Energy and Materials theme projects

Periodic/External Support

- WELL Building Standard consultants: 10-15 days annually for target verification and guidance
- Training delivery: 3-5 days annually for facility management and technical staff

Existing Staff Integration

- CPO Core Team: Health coordination within existing scope
- Communications Team: Occupant engagement within existing capacity

Facilities and Materials

Monitoring Infrastructure

- Temperature/humidity/Co2: # units across three buildings to be defined
- CO2 sensors: # units across three buildings to be defined
- Data logging and building management system integration hardware

IT Infrastructure

- Comfort performance dashboard software and hosting
- Data storage for continuous monitoring (integrated with existing building management systems)
- Survey platform (digital and mobile-accessible)

Occupant Engagement Materials

- Behavioral guidance signage (window operation, thermostat use, reporting mechanisms)
- Digital communication templates and graphics

- Feedback collection tools (suggestion boxes, digital platforms, QR codes)

Technical Documentation

- Updated control sequences and operating procedures reflecting comfort priorities
- Health-Energy coordination protocol documentation

10. Risks and barriers

What potential obstacles could we face (financial, organisational, cultural, technical), and how can we anticipate or mitigate them? What mitigating measures will be implemented?

Financial Risks

Limited Budget Availability

- Risk: Competing priorities for sustainability investments; insufficient funding for comprehensive comfort improvements
- Mitigation: Prioritize quick wins with short payback periods; leverage Energy theme FastLane budget for integrated envelope/HVAC projects; pursue subsidy opportunities; phase implementations across multiple budget cycles

Cost Overruns in Renovation Projects

- Risk: Low-VOC materials and monument-compatible solutions carry premium costs; budget pressure may compromise comfort specifications
- Mitigation: Establish non-negotiable health criteria in project briefs; conduct early cost-benefit analysis; identify value engineering opportunities in other project areas; build 10-15% contingency into health-related specifications

Organizational Risks

Coordination Complexity

- Risk: Health requirements conflict with Energy, Materials, or Nature & Climate Adaptation theme priorities; unclear decision-making when trade-offs required
- Mitigation: Establish Health-Energy coordination protocol with clear escalation pathways; monthly cross-theme meetings; executive-level conflict resolution mechanism; document shared vs. exclusive priorities

Insufficient Facility Management Capacity

- Risk: Existing staff lack time/expertise for enhanced monitoring and optimization; comfort issues unresolved due to competing demands
- Mitigation: Secure 0.3-0.5 FTE additional capacity or redistribute responsibilities; prioritize training in WELL standards and comfort optimization; implement automated alert systems reducing manual monitoring burden; external support for complex troubleshooting

Stakeholder Engagement Gaps

- Risk: Occupants unaware of comfort improvements or how to provide feedback; underutilization of health features
- Mitigation: Launch awareness campaigns at each implementation phase; make feedback mechanisms highly visible and accessible; share occupant survey results and responsive actions to demonstrate listening; celebrate quick wins publicly

Cultural Risks

Behavioral Resistance

- Risk: Occupants override automated controls (opening windows during mechanical cooling, adjusting thermostats excessively); undermines system optimization
- Mitigation: Provide clear rationale for control strategies via communications; allow individual control where feasible; respond quickly to legitimate comfort complaints to build trust; emphasize health benefits not just energy savings

Competing Individual Preferences

- Risk: Thermal comfort preferences vary significantly; impossible to satisfy all occupants simultaneously in shared spaces
- Mitigation: Set expectations that targets reflect majority comfort (Class B standards); provide localized control options (desk fans, task lighting); enable zone-based adjustments where technically feasible; transparent communication about target ranges and rationale.

Technical Risks

Monument Constraints (Horizon)

- Risk: Heritage protection limits insulation, glazing, and system interventions; unable to achieve same comfort performance as other buildings
- Mitigation: Engage heritage specialists early; explore innovative monument-compatible technologies (vacuum glazing, interior insulation systems); accept building-specific performance variations; focus on operational optimization within constraints

System Integration Challenges

- Risk: Existing Priva building management system incompatible with advanced sensors or controls; data silos prevent holistic comfort optimization

Mitigation: Conduct compatibility assessment before sensor procurement; invest in integration middleware if needed; phase implementation to validate integration before full rollout; maintain manual override capabilities**Legacy Building Limitations**

- Risk: Older building systems (Frontier, Horizon) cannot achieve same control precision as newer construction; persistent comfort challenges despite interventions

Mitigation: Set realistic building-specific KPI targets; prioritize highest-impact improvements; plan for eventual full system replacements in long-term timeline; communicate inherent limitations to occupants**Data Quality and Sensor Reliability**

- Risk: Sensor drift, calibration issues, or connectivity problems yield inaccurate monitoring data; decision-making based on flawed information
- Mitigation: Annual sensor calibration program; automated data quality checks flagging anomalies; redundant sensors in critical zones; periodic manual verification against portable reference instruments

External Risks

Supply Chain Disruptions

- Risk: Specialized equipment (sensors, low-VOC materials, monument-compatible systems) unavailable or delayed
- Mitigation: Identify alternative suppliers and product equivalents during planning; maintain buffer stock of critical sensors; build flexibility into implementation timeline; early procurement for long-lead items

Regulatory Changes

- Risk: Updated building codes or WELL standards require revised targets or additional interventions mid-implementation
- Mitigation: Monitor regulatory developments through DGBC and WELL networks; build adaptability into specifications (e.g., "meet current WELL Air category requirements"); maintain contingency budget for compliance adjustments

Mitigation Success Factors

- Executive commitment to health as non-negotiable alongside energy performance
- Clear accountability for Health Theme Leader with decision-making authority
- Robust occupant feedback loops ensuring responsive, visible improvements
- Celebration of milestones maintaining organizational momentum
- Transparent communication about constraints, trade-offs, and rationale for decisions

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