UNIVERSITY OF COPENHAGEN

# Master plan 2030
## for campuses and buildings

South Campus. Teaching and study environment.

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The canteen at Panum is also a place for study activities

# Introduction

For over 500 years, the University of Copenhagen (UCPH) has contributed to the development of Copenhagen as we know it today. In close collaboration with the city's two municipalities, UCPH has established four campuses in central Copenhagen with facilities that support research, education and dissemination. UCPH also has campuses in Taastrup and Nødebo as well as a number of minor locations.

The master plan describes the framework for developing the University's campuses and building areas towards 2030. The plan aims to ensure that UCPH continues to enjoy world-class education and research facilities, a good physical working environment and that UCPH has a common framework for collaboration in order to maintain and enhance the University's facilities. This is the case when we draw up campus plans, carry out concrete building projects, maintain the buildings and provide day-to-day service.

Operations, service as well as campus and building development consume resources that generate $CO_2$ emissions. There is a need for a sustainable optimisation of the way in which we work with the University's buildings and facilities. The master plan is based on how UCPH can operate in a socially/academically, environmentally and financially more sustainable manner by:
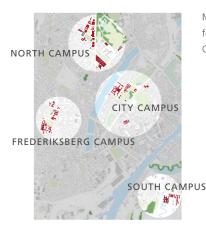
- Ensuring a good framework for research, work and study environments, and coherence
- Setting the green ambitions higher and taking responsibility for the environmental impact of the building area
- Creating equilibrium in the University's building finances

Good educational and research facilities do not come into being on their own. Teaching and research methods evolve, research groups win large grants that call for reconstruction or extension of premises, new equipment requires building adjustments, the virtual university calls for adjustments of the physical environment, dissemination activities require new and modern settings, and so on. The development of the physical environment should always be based on what the core activities need and on supporting the good working environment.

# Good framework and coherence across UCPH

UCPH wants to be one unified and focused university with closer ties between research and education[1]. Staff and students should inspire and improve each other across the University. The physical framework should provide room for interdisciplinarity and meetings. However, collaboration across disciplines arises from core expertise, and so the individual will still need room for immersion and concentration.

UCPH should have a healthy physical work environment for staff and students – as well as world-class buildings and facilities. Campuses should be united and strong, with an attractive standard across the entire university. Facilities in buildings and on outdoor areas should be continuously adapted to how the academic environments evolve, and buildings should more largely be used as shared resources.



NORTH CAMPUS

CITY CAMPUS

FREDERIKSBERG CAMPUS

SOUTH CAMPUS

Map of the University's four campuses in Copenhagen.



North Campus: Outdoor areas used for teaching activities.

# Climate-friendly development of campuses and building areas

For a decade now, UCPH has been working towards reducing $CO_2$ emissions from its energy consumption. In 2020, UCPH will set new and ambitious targets that reflect the desire of management, staff and students that UCPH should lead the way and take on its national and global responsibility for sustainable development.

UCPH is bound by Denmark's ambitious climate target of reducing $CO_2$ emissions by 70 percent in 2030[2]. The environmental and climate transition is probably the biggest task for the coming decades – in Denmark and in the world, and UCPH must contribute to realising the ambition. Through research and education, the University will be part of resolving national and global sustainability challenges just as UCPH should contribute to raising students' sustainability literacy. But efforts are also called for in the campus and building area. Climate and environmental considerations should be given high priority in operations, construction and campus development.

## CLIMATE FOOTPRINT AND RESOURCE CONSUMPTION MUST BE REDUCED

Through waste production and the daily energy consumption, UCPH is a source of major climate and environmental impact in the form of $CO_2$ emissions, but even more so through the construction and renovation of buildings as well as procurement of products, equipment and services. The building area accounts for a significant part of the University's environmental impact with climate footprint and resource consumption as two key issues.

Energy consumption (electricity, heating and cooling) and ventilation in buildings generate a huge climate footprint, but the use of buildings and spaces, and their maintenance, has an 'embedded' impact of up to 25-30 percent of the University's total climate footprint.

A reduction of the climate footprint from the building area calls for a comprehensive and lifecycle-based approach[3] to significantly reduce the embedded footprint.

The building area is a large-scale consumer of materials for new buildings, maintenance and operations. Solutions and products that limit resource consumption and increase recycling options should be prioritised.

Climate footprint and resource consumption from the building area can be reduced through:

- Continued energy optimisation of buildings and energy-friendly operations
- Imposed use of sustainable materials and solutions in a lifecycle perspective in construction and maintenance projects
- Measurable overviews of the University's total climate footprint and resource impact in campus and operational plans
- Intensified use and sharing of areas.

North Campus: New sustainable research and teaching facilities.

# From burning platform to sustainable economy

UCPH has experienced and is facing several major cost overruns in the building area. Among other things, this is due to factors such as the rent scheme UCPH is subject to, overruns and delays of large construction projects and the lack of reserves for new investments in buildings and technology. It is also a result of recent years' external funding growth, while funding for rent, operations and maintenance – and other overheads – has not followed suit.

The goal is to keep the cost of campuses and buildings at a maximum of 20 percent of total revenue. This can be achieved through a responsible combination of the University's own priorities and actions, see the principles of this master plan, with the necessary support and partnering from the external parties that set out the framework for UCPH and the other Danish universities. This will help to prioritise funds for the core activities in the academic environments and for disseminating new knowledge broadly in society. In 2020, the total cost is approaching 25 percent with a risk of rising toward 30 percent. UCPH has introduced a qualified building stop, which, among other things, contains tight requirements for funding and prioritising of building projects. However, this is not sufficient to ensure a sustainable building economy at the University with less bricks and mortar spending and more funding for the core tasks.
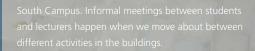
South Campus



North Campus

Frederiksberg Campus Many areas, including hallways, are designed for study environments.

# PRINCIPLES
## for campus master plan 2030

In order to achieve socially/academically, environmentally and financially sustainable governance of the University's buildings and facilities, UCPH introduces four main principles for the building area:

Principle 1:   Joint use of facilities

Principle 2:   Higher quality in fewer square metres

Principle 3:   Transparent data and key figures

Principle 4:   Sustainable campus planning

South Campus. Informal meetings between students and lecturers happen when we move about between different activities in the buildings.

# Joint use of facilities

UCPH wants to have attractive and united campuses, where world-class research facilities are in proximity to excellent joint facilities such as cafeterias, libraries, student workspaces, formal and informal meeting places and proximity between classrooms and group rooms. Along with virtual digital facilities, this will create the physical prerequisites for an inspiring and active academic and working environment.

The University's buildings are a shared resource, and, on a sustainable campus, the areas are put to optimal use. Through activity measurements, targets will be set for a more intensified flexible use with sharing of facilities across units and campuses.

### EXCELLENT PHYSICAL STUDY AND WORK ENVIRONMENTS ARE AT THE CORE

Attractive study and work environments are best established in well-maintained and flexible buildings. Building solutions must be robust and resilient to allow for ongoing adjustments to fit with activity developments in the academic environments. Campuses will have differentiated study and work environments with room for both interaction and immersion.

Student needs and student life should drive the planning and development of common areas and facilities at UCPH. The physical environment should support an active, dynamic and attractive study environment, and areas must be used flexibly for both social activities and student workspaces. Many students need a physical location at UCPH to belong to, a place that is their academic 'home'. However, the study environment on the individual campuses should not be a secluded place. Libraries, study spaces, group rooms, etc. should attract and welcome students from all over UCPH. This will give a more intensive use of the areas, which will boost studies collaborations and the identity of being a 'UCPH student'. Many students also need proximity to their lecturers. The physical environment should support both formal and informal meetings between researchers/lecturers and students. Researchers/lecturers should be visible to the

students and it should be possible to disseminate research results in the study environments. UCPH will have more common solutions for how teaching and learning environments should be designed to inspire new forms of instruction, project-oriented teaching and collaboration.

The workplaces at the University should provide a safe and calm setting for the focused day-to-day work efforts. The physical environment should support varying needs for quiet, immersion and collaboration.

### SHARED AND INCREASED USE OF AREAS

The most sustainable building is a building there is no need to build. The most sustainable product is a product that can be reused. UCPH needs buildings, equipment and well-functioning facilities that support research and education, but the better the University is able to ensure optimal utilisation of buildings, areas, expensive, advanced equipment and facilities, the less the need for new products or construction, which generate a large climate and resource impact. On a sustainable campus, areas and facilities are used optimally and flexibly.

There is great potential in buildings and rooms being used across UCPH, also beyond normal hours. Whole buildings or sections of buildings can be used by new users across faculties if a unit relocates. And the joint utilisation of rooms and facilities can be significantly increased. This particularly applies for classrooms, core facilities and offices. At the same time, many rooms can be used more flexibly for multiple purposes. More shared use of areas should be measurable by increased research and education revenue per unit area.

### BETTER UTILISATION OF CLASSROOMS

Better utilisation of classrooms holds a big potential. It could be realised by better coordinating timetabling and room allocation, by spreading classes over more hours of the day and by using the facilities more widely across the organisation. Within and across campuses. However, it is important to seek

to ensure as much as possible that students and lecturers do not have to travel across campuses within the same day.

## BETTER UTILISATION OF OFFICES AND MEETING ROOMS

Offices and meeting rooms should be used optimally by both academic staff and technical/administrative staff. A strong core expertise as the focal point for research-based education is fostered in academic environments that work with both physical and virtual attendance.

This builds on the concept of 'faculty' with professors, associate professors and assistant professors who from their offices are academic pivots that are available for postdocs, PhD students and guests, some of whom are often able to study and work in more flexible workplaces. And, often, it could be an option to use an out-of-office professor's room as a shared resource just as larger offices can be used for meeting rooms when colleagues are away at a conference or a meeting. The physical environment at UCPH should be used more intensively, which calls for innovation, flexibility and cultural change. Virtual meeting facilities can increasingly supplement the physical framework.

## MORE SHARED CORE FACILITIES

Experimental facilities, advanced infrastructure and equipment should be used as much as possible, and by more people across UCPH. The University has much useful experience in this area. There is a potential for thinking more in terms of shared use of facilities such as workshops, storage rooms, stables, etc. The more people who use the facilities, the better the financial and skills-related foundation for ensuring ongoing maintenance, upgrades, procurement, etc., to constantly keep the facilities up-to-date and attractive. Using core facilities can also promote interdisciplinary contact between employee groups and inspire innovation and development.

## ONE COHERENT CAMPUS[4]

Many of the University's facilities are located in Copenhagen, including Frederiksberg, and the city provides the infrastructure that connects campuses. Students and staff can travel quickly and efficiently through the city, between South and City Campuses or from North Campus to Frederiksberg

Campus. When travelling between campuses, the city and its facilities, such as cafés, squares and parks, can be an attractive and active part of particularly the study environment.

## ATTRACTING EXTERNAL USERS – ALSO OUTSIDE NORMAL HOURS

Being open towards the business community will enhance UCPH's position as an internationally top university. Today, UCPH has a strong collaboration with external partners in research projects, start-ups and the like. When space is available, UCPH should continue to sublet areas and facilities to partners who can contribute to knowledge dissemination, to creating new private-sector jobs, and to growth and prosperity.

UCPH should also provide a setting for conferences and continuing education that can attract employers and businesses. This will contribute to boosting the use of the facilities and campus activity in the evenings and at weekends.

## THE VIRTUAL AND THE PHYSICAL UNIVERSITY

UCPH wants to have an active physical environment with a high culture of in-person attendance. The virtual university is a good and sustainable supplement and an alternative to, for example, resource-heavy air travel.

At the beginning of 2020, UCPH went almost completely virtual within two weeks on account of the corona crisis. The crisis has only revealed the upper layer of this potential: Less transport, new forms of meeting and teaching, etc. A cultural change has begun aimed at taking full advantage of the opportunities offered by digitalisation.

Acquiring basic knowledge in virtual labs to complement the ordinary teaching is already an option, as is virtual simulation of complex scientific challenges. UCPH should further leverage these options.

If digital opportunities are realised to a greater extent, the resulting changes may also influence on the needs relating to the physical environment. Major global players have showed that success is a symbiosis of the virtual and physical realms, and not a question of either/or. The continued work on the campus and building area should go hand in hand with the development of the University's virtual existence.

North Campus: Teaching in chemical lab.

Learning happens everywhere. In tomorrow's campus, we will use all the facilities – home, city, company and university – as places of learning and development.

**WORKING ON CAMPUS**

**DISCUSSING WITH FELLOW STUDENTS IN THE COMMON KITCHEN**

**GROUP WORK IN A PARK**

**DOING EXPERIMENTS ON CAMPUS**

**BUMPING INTO A FELLOW STUDENT/LECTURER**

**EXHIBITION OF NEW RESULTS**

**SPONTANEOUS LUNCH MEETING**

**THE CITY IS PART OF THE ACTIVITIES ON CAMPUS**

| OFFICES | DORM | HOTEL | CAFÉ | TEACHING | RESEARCH | READING ROOM | SHOP | RESTAURANT |

City Campus. The qualities of older buildings can be supplemented by modern facilities to augment the overall use.

Special-purpose rooms such as labs and workshops should be used across departments.

# Higher quality in fewer square metres

UCPH must continue to reinforce its campuses. Buildings located on the edge of a campus, and which for other reasons are no longer optimal for university purposes, may be disposed of to other value-generating activities. This will release rent and operating funds and allow UCPH to invest in fewer and more central buildings.

The physical environment must have a uniform and high quality that is upheld by ensuring optimised maintenance and operation, and by planning investments with a sustainable mindset. UCPH should have better and more attractive facilities in fewer square metres.

### LONG-TERM MAINTENANCE

The maintenance of the University's buildings needs long-term planning. Even before a construction project kicks off, maintenance planning and funding must be in place.

To keep track of renovation and maintenance efforts in UCPH's buildings, regular and systematic maintenance inspections should be carried out in order to register the buildings' state of repair. In a subsequent prioritisation, the funding and timeframe for relevant projects must be estimated. Planned maintenance should be a central part of campus and building management and operations.

Long-term maintenance planning for the building stock will give the University a good overview of 5-year, 10-year and 20-year periods. This will contribute to a healthy and robust operating economy, which can accommodate planned maintenance as well as any need for urgent maintenance. Drawing up maintenance plans is therefore an important element in campus planning.

UCPH should raise the overall maintenance level, with all buildings in good repair and well maintained, and with technical facilities supporting the requirements of the core activities.

# Transparent data and key figures (for distribution of m²)

Allocation and use of physical spaces and facilities at UCPH should be optimised through improved options for flexible use and joint booking. The aim is to increase the use of the facilities in order to employ the physical resources efficiently as possible, and to free up funds for the core activities of research and education.

The use of spaces and rooms should be transparent across the University. Data and key figures[5] support the Rectorate's dialogue with UCPH units about their current and anticipated use of space (for example at goal plan meetings). Data and key figures must be made available in digital form in order to ensure transparency as well as a coherent and efficient prioritisation of areas across the entire university. The Rectorate will regularly set targets for the units' sustainable use of areas and spaces.

### DIGITAL KEY FIGURES ARE IMPORTANT PARAMETERS IN AREA OPTIMISATION

The IT system for facility management provides a comprehensive overview of the University's areas, divided into categories such as normal, special-purpose and educational[6]. It also shows which units use which facilities. These data are linked to information from UCPH's other systems, for example from HR and educational activities.

This has produced key figures for, among other things, the number of square metres in relation to the number of employees and students, The key figures should be used as one of several elements in analyses of how area use at UCPH can be optimised in such a way that all units can have an attractive research and learning environment, and where any local resource waste can be eliminated for the benefit of a stronger community. This will be one of the outcomes of making campus plans (see Principle 4).

### USING THE KEY FIGURES

Optimising standard rooms (offices and meeting rooms) holds a particular potential. Research and occupational health and safety requirements for these rooms are comparable across UCPH, and any current variations can be transformed into a more level, yet attractive standard. Other key figures for special-purpose facilities, driven by the research-related foundation, are not comparable in the same way – as some research and educational activities require many more square metres than others, for example large greenhouses, aquariums, swimming pools and stables. In addition, UCPH has a motley collection of building stock, including buildings of cultural-heritage value, and it can be difficult to make the most of the old buildings, some of which are listed. Still, they represent a significant value for UCPH.

Special-purpose rooms also have the potential of sharing more facilities in the form of core facilities. Other relevant key figures, for example financial, climate footprint, occupancy rates, $CO_2$ emissions, should also be used in the campus and building area, particularly in the efforts to make local campus plans and ensure sustainability through renovation work, building and facility adaptations and development projects.



City Campus. UCPH has many office workplaces; open-plan office in the Central Administration.

North Campus: Pharma Science Building, maintenance and transformation of existing facilities.

# Sustainable campus planning

Since 2007, the University has gathered its activities at four urban campuses in Copenhagen. Among other things, this was due to a decision by the Danish Parliament in 2006 to merge several universities and sector research institutions into large and internationally competitive universities. The campuses have subsequently been successfully reinforced and renewed through new facilities and landmarks such as South Campus and Mærsk Tower.

Together with the City of Copenhagen and a number of other partners, UCPH will be part of maintaining Copenhagen's position as one of the world's best student cities. UCPH contributes by creating more life in the city with campuses that evolve and integrate with the University's surroundings.

New sustainable campus plans are to be prepared for each campus. These plans must be sustainable in a broad sense (social/academic, financial and environmental). A campus plan aims to:

• Set the framework for a coherent and sustainable development of the campus
• Support the University's core tasks through optimal use of indoor and outdoor areas at each campus
• Identify local and cross-organisational physical development potential

The master plan provides the framework for working with campus plans.
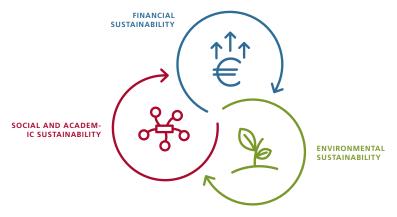A campus plan describes, for example:

• Development of building complexes or units on the campus in question, or physical development plans for units across academic environments and geographies
• Maintenance, including financial and resource-related consequences in connection with planned maintenance and renovations for the individual campus

A campus plan sets out the framework for the physical development and will accommodate future, unknown area needs and utility requirements for both virtual and physical premises and facilities.

An example of the difference between a campus plan and a specific project: In the course of working with campus plans, analyses will be performed showing the potential for better utilisation of, for example, standard rooms at some campus units. This is described in the campus plan. Subsequently, a specific project will be launched to describe and implement increased density in relevant units, typically in connection with needs-driven renovation and/or maintenance work, or adjusted and new facilities.

South Campus. The 'green rooms' are suitable for course-related conversations and group work.

FINANCIAL
SUSTAINABILITY

SOCIAL AND ACADEM-
IC SUSTAINABILITY

ENVIRONMENTAL
SUSTAINABILITY

# Conclusion

The sustainable use of areas and the development of the University's physical framework and facilities are indefinitely ongoing and circular processes that carry on the tradition by which UCPH for more than 500 years has helped shape Copenhagen and Danish society. This work will continue in both the current area use and operations and in the long-term planning and development. The efforts will be based on this master plan for the University's campus and building area.

Frederiksberg Campus.
Sustainability is best achieved when there is a balance between the financial, social/academic and environmental factors.

City Campus. Teaching and study environments are housed in buildings that were originally designed for other purposes.