Preface

The President of The Technical University of Denmark (DTU) signed the ISCN/GULF Sustainable Campus Charter in February 2014.

Obviously this report cannot include many obtained measured goals. But even though DTU is rather new in working strategic with campus sustainability we are ambitious on sustainability in a broad sense.

In December 2013 the Board of DTU approved the new Strategy 2014-2019 which includes sustainability with these phrases:

Vision
DTU’s vision involves the University acknowledging its role as a driving force in the technical and the natural sciences for Danish society—and taking on responsibility for supporting sustainability as a national capability, while recognizing that it can only fulfil its mission in a globalized competitive world by being of the same calibre as leading international technical universities: i.e. being an elite university.

Education
DTU’s study programmes will be designed to ensure that sustainability is an integrated part of all courses. Similarly, all students will complete programme components intended to boost skills in innovation and entrepreneurship.

Research
Within the framework of the traditions and practices of polytechnic science, DTU will further develop its interaction and scope with adjacent sciences and fields of research. The University will apply significant research strength to laying the foundations for technologies and processes that promote innovation and sustainability, and which address major societal challenges.

Scientific advice
DTU will utilize its scientific knowledge in the fields of the technical and the natural sciences—along with its insight into different sectors and their framework conditions—to work with business sectors and authorities to create means which, through the development of technology and processes, boost public and private sector efficiency, competitiveness and sustainability.


This report will mainly inform about the work being done by Campus Service, CAS, even though there are many other initiatives regarding sustainability in research and education. It is expected that the next Charter Report will be filled out in cooperation with other organizational units so the broad perspective of the sustainability work done at DTU will be shown.

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Contents

1. DTU – Technical University of Denmark.................................................................4
  1.1 Organization........................................................................................................4
  1.2 History ..............................................................................................................4
  1.3 Buildings ..........................................................................................................5
2. Sustainability ........................................................................................................6
  2.1 Policy ...............................................................................................................6
  2.2 Goals ..............................................................................................................6
3. Principle 1 – Sustainability Performance of Buildings on Campus ....................7
  3.1 DTU’s Management Approach to principle 1 topics .......................................7
  3.2 Main initiatives and results for single buildings .............................................8
4. Principle 2 – Campus wide Master Planning and target Settings ......................11
  4.1 DTU’s Management Approach to principle 2 topics ......................................11
  4.2 Overview of Organization’s Principle 2 Goals ..............................................12
5. Principle 3 - Integration of facilities, research and education ...........................15
  5.1 Management Approach to Principle 3 topics ...............................................15
  5.2 Overview of organization’s principle 3 goals ..............................................16
1. DTU – Technical University of Denmark

1.1 Organization

DTU is a financially autonomous university with a Board of Governors as its highest authority. The Academic Council decides certain academic matters. The President (Rector), who is appointed by the Board of Governors, is responsible for the daily management of the University.

DTU is organized as a corporate entity with an Executive Board comprising the President, Provost (Vice-Rector), University Director, and a number of deans. The Board of Governors appoints the Provost and the University Director based on the recommendation of the President. The President appoints the remaining staff of the Executive Board.

DTU is managed as a line/staff organization with an unbroken chain of command and in which managers have personal management responsibility for each organizational unit. This means that the single point of responsibility principle applies throughout the organization, and that all staff have an immediate superior.

The University’s main activities are anchored in line units comprising departments and special university units, as well as subsidiaries when activities are appropriately organized using the arms-length principle. Support activities are organized in staff units.

The structure creates coherence between responsibility and authority, so that the management processes are clear and consistent. DTU’s advisory, collaboration and communication system ensures quality and involvement in the decisions of the management system.

DTU being a managed university throughout the organization entails freedom to act based on dialogue and extensive delegation of management competence, linked to responsibility for completion of the assignment based on culture-borne common sense and consideration at all levels. This also entails a corporate culture that prefers and makes room for considered management decisions rather than a rigid and detailed management by rules.

1.2 History

When the College of Advanced Technology was founded in 1829, Denmark had its first MSc programme in Engineering at a high academic level. The College changed its name to Danish Technical College in 1933 and finally became the Technical University of Denmark (DTU) in 1994.

DTU has always had a strong theoretical grounding. H.C. Ørsted, the scientist who discovered electromagnetism, founded the College in the image of École Polytechnique in France. The objective was to educate young men to work in industry, but in the beginning DTU was not able to teach practice, so the college mainly educated technical teachers.

Not until industrialisation really took off in the beginning of the 1870s did engineers from DTU begin to fill public-sector posts and they began to play a major role in industry. Still, most major engineering projects were carried out by foreign companies. But in the 1880s, foreign companies lost their influence and Danish engineers gradually began working abroad.

Just after the turn of the last century, under the headship of the great industrialist, G.A. Hagemann, DTU finally achieved an international level of excellence. In the first two decades of the 1900s, Danish
engineers captured the international scene in structural engineering, shipbuilding and electrical engineering. DTU was now ready to educate the engineers needed to create the modern industrial society.

1.3 Buildings

The College was founded in a professor's manor in the heart of Copenhagen, Studiestræde/Skt. Pedersstræde. The new buildings at Sølvtorvet from 1889 did not have the laboratory facilities a modern institution needed. A boom in the number of students also meant that the buildings were too small. Immediate expansion was necessary. On its 100th anniversary in 1929, DTU laid the foundation stone for a new building complex at Østervoldgade. From 1962 to 1974, DTU moved to its current premises in Lundtofte near Lyngby, north of Copenhagen. Lyngby Campus is the biggest of its campi with approx. 100 buildings. DTU still have campi situated all over Denmark but concentrated on Sealand. In 2013 the total gross area was 550,000 square meters.

DTU had 9.990 students and 5.721 man-year staff in 2013.
2. Sustainability

2.1 Policy

DTU has had a sustainability policy since the summer of 2011.

The policy covers the work area and responsibilities of Campus Service, CAS, who is the facility management organization of DTU.

The main targets of the policy are:

- To reduce our environmental footprint
- To incorporate sustainability considerations into maintenance and planning of its campi.
- To monitor, map and visualize the energy consumption and environmental impact as part of the annual Green Report, thus documenting the effect of reduction initiatives.
- To establish quantitative simulation models to document the effect of sustainability initiatives where it is possible.
- To encourage all staff to exhibit a common responsibility and sustainable behavior by e.g. turning off electricity consuming devices and lighting when not in use.
- To make use of its special prerequisites as a leading technical university by prioritizing technically and scientifically well-founded, systems integrated and effective sustainability initiatives.

In 2012 Campus Service employed a sustainability coordinator which was a new position at the university. The coordinator works within the frame of the sustainability policy and should ensure strategic and coordinated efforts with the topic sustainability.

Therefore DTU is rather new within the campus sustainability area and has not yet achieved many measurable results but DTU has set goals and is working seriously with many topics regarding sustainability. Campus Service focuses on sustainable planning, building, facility management and operations.

The policy will be renewed in 2014 and is expected to include new areas.

DTU’s sustainability policy acts as the overall framework for the sustainability efforts of the university relating to maintenance and physical layout. Specific action points are outlined in action plans anchored at section level in CAS. During 2013 workshops have been held for all members of staff in operation and maintenance sections. One of the main focus points were sustainability. The outcome is a development plan in which the employees can find some of their own ideas and everybody feel a sense of ownership.

2.2 Goals

In 2012 the university announced that it committed to improve by 15% on energy and waste in 2015 from a baseline in 2010. As one of few universities in Denmark, DTU incorporated these two sustainability goals in the Development Contract between the university and the Ministry of Research and Education.

Regarding energy DTU’s target is to reduce the energy consumption by 15% per man-year (staff and students). Regarding waste the goal is to achieve a higher recycling rate of waste within certain waste fractions and with a special emphasis on general waste and behavior.
3. Principle 1 – Sustainability Performance of Buildings on Campus

Principle 1: To demonstrate respect for nature and society, sustainability considerations should be an integral part of planning, construction, renovation, and operation of buildings on campus.

A sustainable campus infrastructure is governed by respect for natural resources and social responsibility, and embraces the principle of a low carbon economy. Concrete goals embodied in individual buildings can include minimizing environmental impacts (such as energy and water consumption or waste), furthering equal access (such as nondiscrimination of the disabled), and optimizing the integration of the built and natural environments. To ensure buildings on campus can meet these goals in the long term, and in a flexible manner, useful processes include participatory planning (integrating end-users such as faculty, staff, and students) and life-cycle costing (taking into account future cost-savings from sustainable construction).

3.1 DTU’s Management Approach to principle 1 topics

Campus Service, CAS, demand that our consultant teams must use a structured way of working with sustainability on all our future buildings. This way of thinking and working with projects must be followed all the way through design phase, tender and during construction phase. DTU prefers that our consultants use DGNB for the process. DGNB is a certification tool which originally comes from Germany and which was recently adapted to the Danish market. However it is only possible to use the entire method on office buildings so far. DGNB offers a broad approach to sustainability issues from an environmental, social and economic point of view. The tool contains 47 different criteria which i.e. covers the following issues: Materials, LCA (life cycle analysis), global and local environment, resource use, energy, water, waste, LCC (life cycle costs), indoor comfort, outdoor spaces, safety, availability, flexibility, public access, bicycles, design and art, technical quality, possibility for demounting and recycling, the planning process, sustainability in all phases, environment on the construction site, quality management, commissioning and site quality.

CAS has recently adopted a new requirement linked to the DGNB method. We will ask the consultants to make a screening in the first phases. This total score is used as a baseline and the project is not allowed to decrease from the start to the end of the project. In every shift of phase in the design process a new screening has to be made in order to follow up on the total sustainability profile. However a screening does not include the “heavy calculations” such as LCA and LCC.

The broad view on sustainability is also ensured through our internal comment process where all maintenance departments are asked about their opinion. This is “an old challenge” between project departments and maintenance but at DTU we try to respect each other’s qualifications and knowledge and we try to improve continuously. The sustainability coordinator and the environmental coordinator are also used as extra advisors for the project managers on every project.
### 3.2 Main initiatives and results for single buildings

<table>
<thead>
<tr>
<th>Topics</th>
<th>Goals and Initiatives</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority topics (with units of measurement)</td>
<td><strong>Objectives and targets</strong> (for reporting year, for the following year, and/or beyond)</td>
<td><strong>Key Initiatives</strong> (in reporting year, and/or planned for the following and beyond)</td>
</tr>
<tr>
<td><strong>Resource use</strong></td>
<td><strong>CAS is looking into the possibility of setting detailed demands as a supplement to DGNB.</strong></td>
<td><strong>It might be these issues:</strong></td>
</tr>
<tr>
<td>Resources are investigated as part of DGNB</td>
<td><strong>Avoid use of scarce resources</strong></td>
<td><strong>Aim and targets were not set.</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Avoid substances from the REACH-candidate list</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>At least 80% of wood is from a sustainable source</strong></td>
<td></td>
</tr>
<tr>
<td>Energy demands on new buildings</td>
<td><strong>DTU-Lyngby has a demand to make new buildings 25% more energy efficient than energy-demands in the Danish Building Regulations.</strong></td>
<td><strong>On every project it is simulated / calculated by our consultants to prove that the criteria is achieved.</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Goal achieved</strong></td>
<td><strong>Goal achieved</strong></td>
</tr>
<tr>
<td>Energy demand in new lab-buildings</td>
<td><strong>A main focus for new lab buildings is to make sure that it is possible to shut down energy-using installations when there is no demand</strong></td>
<td><strong>A close cooperation between the project manager, the consultants and several persons from maintenance &amp; operation is aimed for.</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Aim and targets were not set.</strong></td>
<td><strong>Aim and targets were not set.</strong></td>
</tr>
<tr>
<td>Waste, recycling, local emissions, and non-compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste is investigated as part of DGNB.</td>
<td>The sustainability coordinator is part of the internal screening team on new projects and i.e. comments on space requirements for waste management, how many fractions, how long to walk etc.</td>
<td>Aim and targets were not set.</td>
</tr>
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</tbody>
</table>

### Research/IT facilities and sustainability

<table>
<thead>
<tr>
<th>Campus Service will try to include these topics in the coming revised sustainability policy</th>
<th>No targets at present</th>
<th>Aim and targets are not set.</th>
<th>Aim and targets are not set.</th>
</tr>
</thead>
</table>

### Users

<table>
<thead>
<tr>
<th>Involvement of users</th>
<th>CAS makes a big effort to involve user in pre-design phases to ensure awareness raising. CAS has made a leaflet to describe the involvement in all the design phases.</th>
<th>‘Operation and Maintenance’ is increasingly seen as a user and is asked to comment on projects in all phases.</th>
<th>Succesfull</th>
<th>Succesfull</th>
</tr>
</thead>
</table>

### Building design aspects

| Design aspects are investigated as part of DGNB | CAS asks our consultants for a screening in early | This is a new target set in 2014. | This is a new target set in 2014. |
stages and demands that the total score does not drop.
4. Principle 2 – Campus wide Master Planning and target Settings

**Principle 2:** To ensure long-term sustainable campus development, campus-wide master planning and target-setting should include environmental and social goals.

Sustainable campus development needs to rely on forward-looking planning processes that consider the campus as a whole, and not just individual buildings. These processes can include comprehensive master planning with goals for impact management (for example, limiting use of land and other natural resources and protecting ecosystems), responsible operation (for example encouraging environmentally compatible transport modes and efficiently managing urban flows), and social integration (ensuring user diversity, creating indoor and outdoor spaces for social exchange and shared learning, and supporting ease of access to commerce and services). Such integrated planning can profit from including users and neighbors, and can be strengthened by organization-wide target setting (for example greenhouse gas emission goals). Existing low-carbon lifestyles and practices within individual campuses that foster sustainability, such as easy access for pedestrians, grey water recycling and low levels of resource use and waste generation, need to be identified, expanded and disseminated widely.

4.1 DTU’s Management Approach to principle 2 topics

The two goals set in 2012 on energy and waste are monitored and reported every year in the annual Green Report which is a part of the DTU Annual Report. The Head of Operations is responsible for the goal achievements as well as sustainable maintenance and operation in general.

The Head of Real Estate is responsible for sustainable master planning.
### 4.2 Overview of Organization’s Principle 2 Goals

<table>
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#### Institution-wide carbon targets and related achievements

| Energy consumption (15% saved on kWh per man-year student and staff per year) | Baseline is 2010 and the goal is to reduce with 15% in 2015. The energy use is a sum of electricity and heat (degreer day adjusted). Sub-targets on savings: 2012: 6% 2013: 9% | Head of Operations has formed an ‘Energy task force group’ working intensely on ideas and projects to reach the goal. In Sep. 2013 a behaviour campaign was organized by CAS. Follow up on this is to be desided. | Sub-target achieved. Obtained saving: 8% | Sub-target achieved. Obtained saving: 15% |

| Publication of energy and water consumption (the goal is to have meters on all buildings on electricity, heat and water in 2017) | CAS wants to be able to show users the ongoing energy and water consumption per building and per hour. In this way campus can be used as a ‘living lab’ and behavior campaigns will be more efficient. | A new energy management system is to be implemented in 2014 and we want to be able to show the total use/payed use on the 3 biggest campi (Lyngby, Risø and Ballerup). Installation of meters is ongoing until 2017. | Many meters but only shown in cts which is not user-friendly. | Almost meters in all buildings in Lyngby Campus but only shown in cts which is not user-friendly. |

| CO2-emmission should decrease | It is the goal to minimize our global footprint but it is not set as a target figure. In the green account it includes energy use but not i.e. transport. | In 2014 we will change the heat supply on Risø Campus from gas to district heating based on combined heat and power and waste incineration. | Goal achieved | Goal achieved |
| Waste: the recycling rate on specific fractions should rise with 15% (the unit is recycle-% and the goal is 40%) | Baseline is 2010 where the recycle percentage on the chosen fractions is 35%. In 2015 the goal is to reach 40%.
Sub-targets: 2012: 37% 2013: 38% | It should be noticed that the total recycling rate of all waste from DTU is much higher (>80%) due to very good handling of soil, stones and compost production.
In Feb 2013 CAS made a campaign about waste—it helped on the rate. New initiatives are to be desided. | Goal not achieved. 33% | Goal not achieved but rising: 36% |

### Master Planning

|  | The plan will be finished in 2014 |

### Transportation

| Minimize the need for flying | It is considered to enclose this topic in the revised sustainability politic. | A revised sustainability politic is to be approved by DTU’s executive board during Summer 2014. This might include transportation as a subject. | Aim and targets are not set. | Aim and targets are not set. |

### Food

| Monitoring food waste in canteen kitchens | Registration system has been implemented in several canteen kitchens monitoring food waste in order to facilitate qualified efforts in terms of reducing food wasted. | Monitoring was not started. | Monitoring started up. |
| Organic food in campus canteens | Minimum requirements for the amount of organic food served in campus canteens have been implemented in tenders for Ballerup Campus. | Minimum requirements will be included in future tenders. | To be evaluated. The new tender was made in 2013. |

Social Inclusion and protection

This should be filled out by other administrative sections in the next Charter Report.

Land-use and biodiversity

| Land-use | When DTU builds a new building on a landscape site we want to “give something back to nature”, i.e. a green roof, green facade or higher biodiversity on the area which is left. | This is a new target set in 2014. | This is a new target set in 2014. |

| Biodiversity | CAS wants the biodiversity to rise. The goal is not set as a target figure. | In 2013 - 2015 the following initiatives are planned:  
- 500 Nesting boxes are set up.  
- Thousands of bulbs are planted.  
- Beehives are planned for.  
- Wilfully wild areas are planned for. | This is a new target set in 2014. | This is a new target set in 2014. |
5. Principle 3 - Integration of facilities, research and education

Principle 3: To align the organization’s core mission with sustainable development, facilities, research, and education should be linked to create a “living laboratory” for sustainability.

On a sustainable campus, the built environment, operational systems, research, scholarship, and education are linked as a “living laboratory” for sustainability. Users (such as students, faculty, and staff) have access to research, teaching, and learning opportunities on connections between environmental, social, and economic issues. Campus sustainability programs have concrete goals and can bring together campus residents with external partners, such as industry, government, or organized civil society. Beyond exploring a sustainable future in general, such programs can address issues pertinent to research and higher education (such as environmental impacts of research facilities, participatory teaching, or research that transcends disciplines). Institutional commitments (such as a sustainability policy) and dedicated resources (such as a person or team in the administration focused on this task) contribute to success.

5.1 Management Approach to Principle 3 topics

In the next report this chapter will be filled out by another administrative section and CAS will supplement it. DTU is ambitious on many of the principle 3 topics since they are described in the university strategy 2014-2016 (look in the preface) but targets are yet to be described in action plans.

However CAS is actively engaged in activities relating to Principle 3 topics. First of all a sustainability policy has been adopted for DTU and it will be revised in 2014. CAS employs two dedicated sustainability workers and has made a sustainability course mandatory to all employees, and stresses sustainability as a quality parameter.

CAS prioritises the cooperation with departments regarding the operation and maintenance of DTU’s campus areas for student projects in the field of sustainability. As a technical university, DTU has been able to commit students to projects in the fields of e.g. energy conservation, waste management, materials in new buildings as well as transportation and commuting. CAS provides the campus as a living lab by putting the campus areas and human resources at the disposal of students, who provide concrete suggestions to improve the sustainability practice of DTU facilities management. Students are given academic credits for their projects.

Further, DTU hosts a variety of skilled academics in different fields of sustainable facilities management. CAS is actively cooperating with researchers, who provide knowledge, quality control and general input into the efforts of creating a sustainable campus.

DTU hosts the biannual GREEN CHALLENGE, in which students from a wide range of universities participate. GREEN CHALLENGE is an educational initiative at DTU promoting the development of
projects related to sustainability, climate technology and environment within all fields of study. Students are given the opportunity to present their projects, and participate in the contest.

5.2 Overview of organization’s principle 3 goals

Refer to 5.1.