Introduction

The vision for the Norwegian University for Science and Technology (NTNU) is “Knowledge for a better world”. Sustainability is a part of this.

NTNU’s objective is to develop science and technology to address global challenges, such as sustainability, and participate in public debate; find solutions to global challenges, promote human rights and intercultural dialogue.

NTNU has since 2012 an environmental ambition that states that NTNU shall be a frontrunner and use knowledge from own research to ensure a high environmental standard for internal environmental management. The environmental management system at NTNU is integrated with the health, safety and environmental management system, placing responsibility on leaders on all levels to ensure follow-up. The environmental ambition have 15 goals for 2020 covering energy saving, waste handling, transport, procurement, biodiversity and student knowledge. In addition, NTNU has targets on equality and physical planning to ensure equal possibilities for all staff and students, irrespective of sex, ethnicity, beliefs or disabilities.

NTNU’s main contribution for a more sustainable world will be from research and education. NTNU has a number of courses and programmes based on or supporting sustainability targets, e.g. on renewable energy, human behavior, biodiversity, environmental assessments, technological improvements, environmental policy etc.

NTNU has for the period 2014-2023 identified four strategic research areas; energy, oceans, health, and sustainability. All of these are of high importance for new solutions for a sustainable future.

On the Norwegian University of Science and Technology

The Norwegian University of Science and Technology was established on 1 January 1996, as a result of the reorganization of the University of Trondheim. The university has its foundation in three institutions: the Norwegian Institute of Technology (NTH, established in 1910), the College of Arts and Science (previously Norwegian Teacher Training College established in 1922), and the Museum of Natural History and Archaeology (1760). The Faculty of Medicine, the Trondheim Conservatory of Music and the Trondheim Academy of Fine Art were also included as a part of NTNU in the 1996 reorganization. Trondheim’s academic history can be traced back to 1217 and the establishment of Schola Cathedralis Nidrosiensis.

The Norwegian University of Science and Technology has approximately 23 000 students and 5 000 person-years, of which 3 000 are in academic or scientific positions. The university has 48 departments and 7 faculties, covering most scientific disciplines, but with a high focus on technology and natural sciences. NTNU is Norway’s primary institution for educating MSc-level engineers and scientists, but has also comprehensive programmes in social sciences, teacher education, the arts and humanities, medicine, architecture and fine art.

NTNU has about 2 600 international students and dozens of international student exchange programmes and more than 300 cooperative or exchange agreements with 60 universities worldwide. About 40% of all PhDs are performed by international candidates, and approximately 1/3 of the scientific staff are non-Norwegians.
NTNU’s vision is “Knowledge for a better world” and aims to create the basis for the development of knowledge and to create value – economic, cultural and social. NTNU will make the best possible use of our main profile in science and technology, our academic breadth, and our interdisciplinary expertise to tackle the large and complex challenges faced by Norway and the world community.

NTNU’s values are creative, constructive, critical, and respectful and caring.

NTNU’s mission in society is
- In general - Research and development; education based on our research; disseminate knowledge; be a positive influence in society; stimulate to innovation.
- In particular - Develop science and technology to address global challenges.

On this report

This is the first ISCN-GULF Charter Report from NTNU on the work on the principles in the charter. The reporting on the integration of research, education and outreach according to principle 3 is at this point not fully integrated and described in the report.

A more detailed report on the work on the environmental ambition can be found here https://www.ntnu.no/documents/10137/981312606/miljorapport_ntnu_2014_web.pdf/f24c875c-bc41-4f0c-8d8c-fde3191365c4 (in Norwegian).

Contact person for this report is Lindis Burheim, email lindi.burheim@ntnu.no.
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).

Management Approach to Principle 1 Topics

NTNU’s environmental ambition was approved by the meeting of deans in 2012. Of the 15 targets for 2020, targets on energy, waste, green procurement and handling of hazardous waste logically follow principle 1. In addition, NTNU works with reduced water consumption and ensure equal access to all areas.

According to NTNU’s safety, health, and environmental (SHE) strategy, all units should establish own targets for environmental impact from the unit. The fulfilment of the goals in the environmental ambition is thus a common responsibility for all parts of the organization.

Main initiatives and results

NTNU has an ongoing activity to reduce energy consumption. Over the last years this has primarily been focused on heat recovery and increasing the efficiency of the district heating system at the Gløshaugen campus. In 2014 the total energy consumption was 120 245 915 kWh, representing a 14.3% reduction compared to the baseline year 2010. In the same period the number of employees and students have increased from 25 999 to 28 527.

In 2014 NTNU initiated a project to increase recycling and reduce the amount of waste. In particular, more possibilities to recycle waste at the units as well as a pilot project on collection of food waste was introduced. Attention is given to reuse of furniture and a web-based tool for advertising surplus furniture is introduced. Hopefully results will start to show in 2015.

A number of actions are taken to increase green and ethical procurement. From November 1 2014 all contracts have the following standard terms (translated from Norwegian):

- Actions to reduce negative effects on health and environment is to be implemented throughout the value chain; minimize emissions, promote efficient and sustainable resource consumption, including energy and water, and minimize greenhouse gas emissions from production and transportation. The local environment at the production site should not be exploited ruthlessly or degraded by pollution.
National and international environmental laws and regulations must be followed and relevant discharge permits obtained.
## Overview of NTNU’s Principles and Goals

### Goals and Initiatives

<table>
<thead>
<tr>
<th>Energy use</th>
<th>Performance 2013</th>
<th>Performance 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTNU will reduce energy consumption with 20% compared to 2010 levels by 2020.</td>
<td>126 923 478 kWh</td>
<td>120 245 915 kWh</td>
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<table>
<thead>
<tr>
<th>Waste</th>
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<tbody>
<tr>
<td>NTNU will reduce the quantities of waste by 15% compared to 2011 levels.</td>
<td>1 821.8 tons</td>
</tr>
<tr>
<td>NTNU will increase the recycling rate to 85% by 2020</td>
<td>-</td>
</tr>
<tr>
<td>NTNU will reduce the use of hazardous chemicals by raising awareness on the environmental impacts caused by the chemicals and potential substitutions</td>
<td>All units are requested to substitute chemicals included in annex XIV in REACH.</td>
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<table>
<thead>
<tr>
<th>Procurement</th>
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<tbody>
<tr>
<td>NTNU will reduce its climate footprint from procurement by reducing procurement quantity, raise environmental requirements in all procurement and give environmental requirements a minimum weight of 20% whenever relevant. For scientific equipment a minimum weight should be 10%.</td>
<td>Total procurement on 1.8 billion NOK. Environmental criteria weighted 10-20% when included. All contracts from November 1 2014 have terms on environmental and ethical subjects.</td>
</tr>
<tr>
<td>NTNU will require environmental documentation for products and services in order to take environmental impact throughout the products life cycles into account, and ask for quantified targets for improvements of environmental performance in all procurement contracts.</td>
<td>From November 1 2014 all contracts have terms on compliance with ILO-conventions, anti-corruption and environmental standards.</td>
</tr>
<tr>
<td>By 2020, 80% of purchases should be delivered by environmentally certified suppliers and 50% of products should have an eco-label, 100% for products groups where eco-labeled products are well available. These targets must be communicated to suppliers in order to be prepared.</td>
<td>No complete list is made. Among the 100 largest suppliers approximately 50% have some kind of environmental certificate.</td>
</tr>
<tr>
<td>By 2020, all catering and fruit purchased should be ecological produced.</td>
<td>100% on cakes, approximately 50% on catering. Fruit will be gradually more introduced</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water*</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total water consumption</td>
<td>198 638m²</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Universal design*</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NTNU has an ambition that all buildings and outdoor areas should be accessible for all.</td>
<td>Universal design is a topic in all building and renovation projects</td>
</tr>
</tbody>
</table>

*) No explicit targets set in the environmental ambition
Principle 2 – Campus wide Master Planning and Target Setting

**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.

**Management Approach to Principle 2 Topics**

The management approach to principle 2 is in most aspects equal to the approach to principle 1. Of the 15 targets for 2020, targets on energy, transport and biodiversity logically follow principle 2.

NTNU does not have an explicit target for overall reductions in greenhouse gas emissions; a reduction is achieved through the targets on e.g. energy and transport. NTNU is still conducting an overall assessment of total GHG-emissions from tier 1, 2 and 3 emissions covering all activities related to the university.¹

According to NTNU’s safety, health, and environmental (SHE) strategy, all units should establish own targets for environmental impact from the unit. The fulfilment of the goals in the environmental ambition is thus a common responsibility for all parts of the organization. For most of the targets under principle 2, the responsibility is at the moment on the central administration for completing overall plans.

**Main initiatives and results**

NTNU is at present working on a strategy for meeting the ambition on a climate neutral travel policy. This will include how to reduce number of travels when possible, use more environmental friendly transport, and potentially compensate for necessary travels.

¹ The GHG-reporting does not include travel to and from campus by employees and students. The GHG-reporting system is based on the financial system with some additions of physical values, thus this transport is not included.
NTNU has put great effort in changing the travel habits for students and employees. In 2014 a parking fee was introduced at all campuses. At the same time, better facilities for people going by bike were established; more showers and changing rooms at most campuses and more areas for parking and locking bikes, including areas under roof. More electric cars available for all employees are also provided so people who need a car during the working day still can travel to campus without a car.

The table below show that this has had a significant effect on travel habits of employees, less personnel now go by car and more go by bike. The numbers are from questionnaires on travel habits in the last weeks of April in 2013 and 2015 respectively and the habits might be different in other seasons.

<table>
<thead>
<tr>
<th>Travel mode</th>
<th>2013</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car driver</td>
<td>36%</td>
<td>22%</td>
</tr>
<tr>
<td>By bike</td>
<td>24%</td>
<td>33%</td>
</tr>
<tr>
<td>Walking</td>
<td>15%</td>
<td>16%</td>
</tr>
<tr>
<td>Public transport</td>
<td>18%</td>
<td>16%</td>
</tr>
<tr>
<td>Other*</td>
<td>7%</td>
<td>13%</td>
</tr>
</tbody>
</table>

*) also includes combined travels, e.g. public transport combined with biking or driving to station, and passenger in private car.

The figure below shows the distribution of the generated GHG-emissions (tier 1-3) sorted by activity².

NTNU is working for a better gender balance in staff and among students. This work is specified in an action plan for gender balance³.

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² The full GHG-emission report can be found here http://www.ntnu.no/documents/10137/323403/Klimaregnskap+NTNU+2013/82bd43c3-fa13-403a-b527-c9c2942d9f0f (in Norwegian)
## Overview of NTNU’s Principle 2 Goals

<table>
<thead>
<tr>
<th>Goals and Initiatives</th>
<th>Performance 2013</th>
<th>Performance 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By 2020, 5% of the buildings have energy label class A.</td>
<td></td>
<td>1 building, constituting 1.4% of total area, satisfy the requirement for label A</td>
</tr>
<tr>
<td><strong>Transport</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NTNU should have a climate neutral travel policy</td>
<td>12 098 flights¹&lt;br&gt;866 168 km car²</td>
<td>13 249 flights¹&lt;br&gt;825 692 km car²</td>
</tr>
<tr>
<td><strong>NTNU will increase the use of video conferences and be a driving force among employees and partners to increase the use</strong></td>
<td>527.5 hours³</td>
<td>744 hours³</td>
</tr>
<tr>
<td><strong>NTNU make it easier for employees and student to choose environmental friendly transport on everyday travels to campus</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Biodiversity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By 2016 NTNU should have a plan on how biodiversity on campus can be managed</td>
<td></td>
<td>Under development as an integrated part of the outdoor plan</td>
</tr>
<tr>
<td><strong>Greenhouse gas emissions</strong></td>
<td>Total GHG-emissions from tier 1, 2 and 3</td>
<td>99 522 tCO₂eq⁴</td>
</tr>
<tr>
<td><strong>Gender equality</strong></td>
<td>Number and percentage female PhD defenses</td>
<td>141 / 38.1%</td>
</tr>
<tr>
<td></td>
<td>Percentage female professors</td>
<td>21.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>161 / 44.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>23.1%</td>
</tr>
</tbody>
</table>

¹ includes only flights booked through the travel agency. Total number of flights might be higher  
² includes use of private cars for work related travel, does not include use of NTNU's cars  
³ includes use of equipment on Multimedia Center at NTNU, does not include use of meeting facilities at units and programs on personal computers such as Skype  
⁴ The action plan for better gender balance can be found here  
4) A full GHG assessment is not performed annually. See http://www.ntnu.no/documents/10137/323403/Klimaregnskap+NTNU+2013/82bd43c3-fa13-403a-b527-c9c2942d9f0f (in Norwegian) for last report (2013-numbers)

*) No explicit targets set in the environmental ambition
**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.

**Management Approach to Principle 3 Topics**

NTNU’s vision is “Knowledge for a better world” and the strategic document opens with the following paragraph:

NTNU aims to create the basis for the development of knowledge and to create value – economic, cultural and social. We will make the best possible use of our main profile in science and technology, our academic breadth, and our interdisciplinary expertise to tackle the large and complex challenges faced by Norway and the world community.

This is followed by NTNU’s view on the university’s mission:

Our mission in society encompasses the expectations placed on NTNU by the nation as well as the world community, and the challenges in society that the university wishes to address. This is a governing principle for our activities

As a university, NTNU has a particular responsibility for long-term basic research and academic development. We aim to offer research-based education at all levels, emphasizing postgraduate studies and doctoral degrees. We will disseminate knowledge and manage expertise in nature, culture, society and technology. NTNU will be a bearer of culture and will contribute to innovation in society, industry, and public-sector activities.

Our main profile in science and technology gives us a particular responsibility to develop the technological foundation for the society of the future. Programmes of professional study at master’s degree level are a strong point at NTNU.

We will also work at the interface of technology, natural science, medicine, architecture, the humanities and social science. NTNU has a responsibility to offer university education in art and to undertake artistic development work.
We will use our academic breadth and interdisciplinary expertise to solve complex problems and increase understanding of the relationships between technology, society and environment. We will take advantage of our unique qualifications to promote innovation and develop the knowledge base for sustainable value creation and a competitive business sector.

It is the university's mission to participate in a knowledge-based public debate about important issues in society. We will use our knowledge to benefit society, and contribute to competence development in developing countries. We will engage in solving global challenges in health and welfare, energy and climate, the environment and use of resources. Our activities will promote human rights and intercultural dialogue.

**Main initiatives and results**

NTNU is planning a new campus to concentrate more activities and integrate more activities with the city of Trondheim. This is still on an early planning phase, but sustainability is a core issue in the planning. A vision for the campus development is proposed:

- A future campus at NTNU should be a model for a holistic sustainable campus development and be based on knowledge from NTNU’s own research.
- A future campus should be viewed as a relevant case for research, teaching and demonstration also long time after the construction phase is completed

Of the 15 targets for 2020 in the environmental strategy, two of them logically follow principle 3;

- All students who graduate from NTNU should have basic knowledge on sustainable development
- NTNU should use the knowledge on environmental systems analysis and initiate a collaboration with other Norwegian universities to make environmental performance reporting systems comparable

The first one of these will be better defined so make it possible to measure progress. The second is under development where NTNU and some of the other Norwegian universities have established a, for now, informal network to share ideas, data and knowledge.

NTNU has from 2014 identified 4 strategic research areas; energy, health, oceans, and sustainability.

**Energy**
The aim of the strategic research area energy is to contribute to interdisciplinary research as well as an integrated and coherent solution to energy challenges while ensuring better fulfilment of NTNU’s responsibility to society.

At the forefront of NTNU’s commitment:

- Technological solutions for new renewable energy, especially solar energy, bioenergy, wave power and offshore wind power. Development of technology for producing new renewable energy is important for achieving a substantial increase in eco-friendly energy.
- Energy efficiency and restructuring of energy systems in buildings. The buildings of the future will produce more energy than they consume. A prerequisite will be the
combination of greater energy efficiency with solutions such as solar panels and solar heating systems.
- Continued exploitation of fossil resources demands efficient methods of carbon capture, storage and transport.
- Safe and effective recovery of oil and gas from existing fields in the North Sea.
- Innovation and new ways of thinking to promote sustainable transformation of the Norwegian energy system, including design of effective political strategies, an extended knowledge base for innovation, commercialization in enterprises, knowledge transfer from research to business, and involvement of the public.
- Smart energy systems (smart grids). Integration of renewable energy sources and exploitation of the existing grid require smart solutions. ICT, communication and smart control help to improve flexibility and reliability.

Health
The strategic area of health research is divided in three main research topics;
- Health promotion, prevention and empowerment; including topics as health promotion, preventive medicine, housing and residential environment, social, geographical and ethnic differences in health and welfare, work and health, and health communication
- Diagnostics and therapy; including topics as neuroscience, bionanotechnology, regenerative medicine, biotechnology, medical imaging, palliative medicine, inflammation, age and lifestyle related diseases, and major widespread diseases
- ICT-systems, welfare technology and organization of health services; including topics as ICT in health services, electronic patient records, search engine and database technology, welfare technology, health service organization, health management and leadership, and health policy.

Oceans
The strategic research area of oceans has the ambition to coordinate and initiate new multidisciplinary activities within research, education and innovation, to contribute to increase the knowledge base in the maritime, oil and gas and aquaculture industry, and to identify and develop future knowledge needs in shipping, deep ocean and artic exploration, seafood production, marine resources and energy, marine environment and society through basic research and joint projects with the industry.

The research is organized in five sector-specific focus areas that reflects the activities in the blue economy, and one overarching area is concerned with the marine environment and society; maritime transport, into the deep ocean, polar science and technology, sustainable seafood and marine bioresources, marine minerals and renewables, and marine environment, society and sustainability.

The goal is to combine research efforts in natural science, marine engineering, humanities and social sciences to create new multidisciplinary solutions supporting a sustainable production of marine resources, energy and minerals.

Sustainability
The strategic area of sustainability is build on the acknowledgement that sustainability is a global challenge. This societal challenge is twofold; poverty and injustice must be combated,
and at the same time, local and global environment must be taken care of for present and future generations.

NTNU's research on sustainable development of society includes environmental, economic and social aspects in the broadest sense:

- Institutional framework, including knowledge areas such as philosophy, economics, sociology, political science, geography, history, interdisciplinary studies of culture, industrial economics and technology management and industrial ecology
- Sustainable urban and regional development, including knowledge areas such as architecture, building conservation, urban design and planning, civil and transport engineering, computer and information science, geography, sociology, political science, psychology and interdisciplinary studies of culture.
- Biodiversity and ecosystem services, including knowledge areas such as biology, natural history, geography, economics, archaeology and cultural history, sociology and political science, ethics, industrial ecology, architecture, urban design and planning.
- Environment and sustainability assessments, including knowledge areas such as industrial ecology, economic analysis and society.