

Norwegian University of Science and Technology

Energy Research





NTNU - Norwegian University of Science and Technology



The Norwegian University of Science and Technology (NTNU) is Norway's biggest university and has a strong international focus. Its headquarters are in Trondheim, Norway, with campuses in Ålesund and Gjøvik.

NTNU has a main profile in science and technology, a variety of programs of professional study, and great aca-

ademic breadth that includes the humanities, social sciences, economics, medicine, health sciences, educational science, architecture, entrepreneurship, art disciplines and artistic activities. More than 30% of the teaching and research personnel are from outside Norway, and 42% are women.



NTNU



NOK 10 billions
annual budget



Strong connection
with industry partners

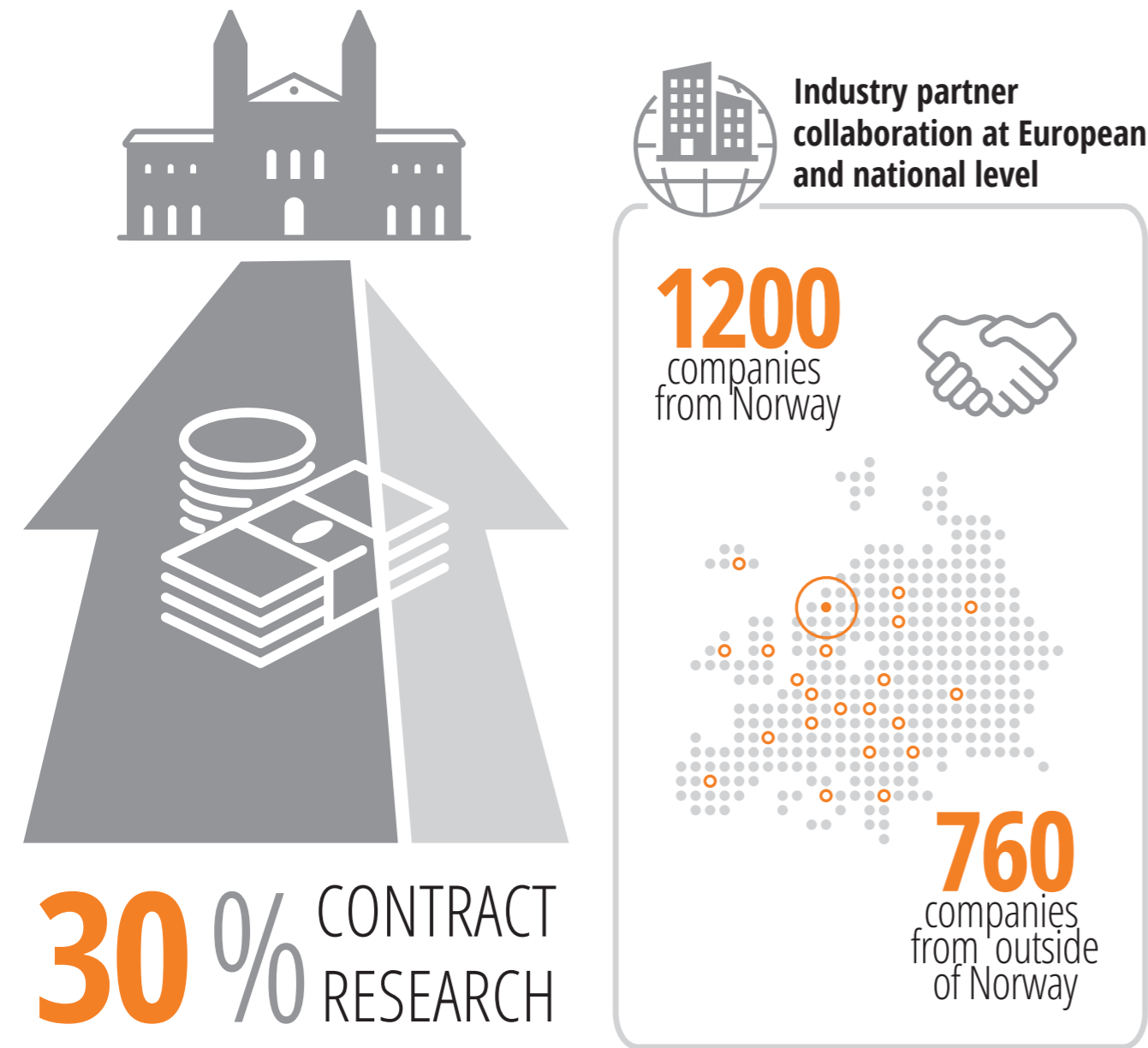


44 000
students



400 graduated
PhD per year

Facts
&
Figures



Energy research at NTNU

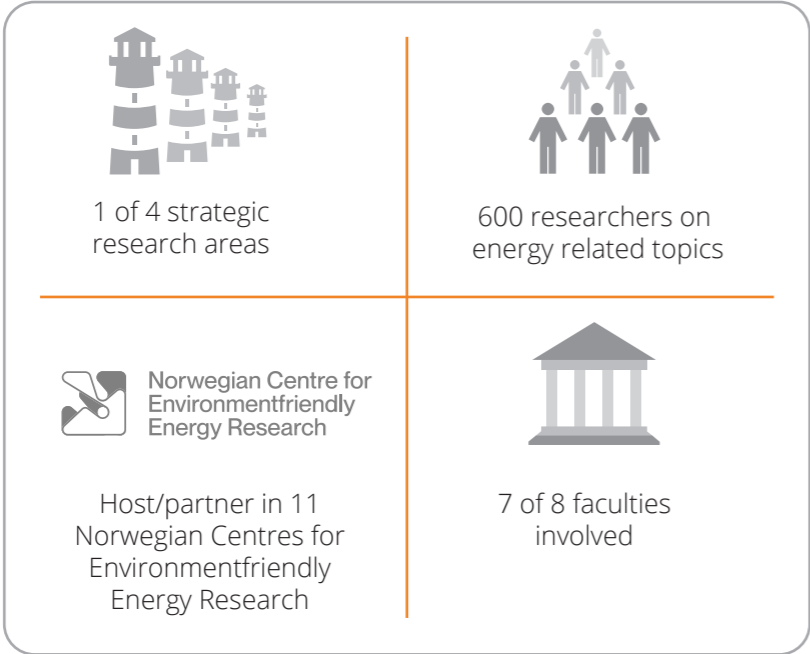
The energy research at NTNU covers a large range of activities. It includes but is not limited to stationary energy systems, energy in transport systems, energy efficiency, energy in buildings, neighbourhoods and industry, etc.

NTNU ENERGY

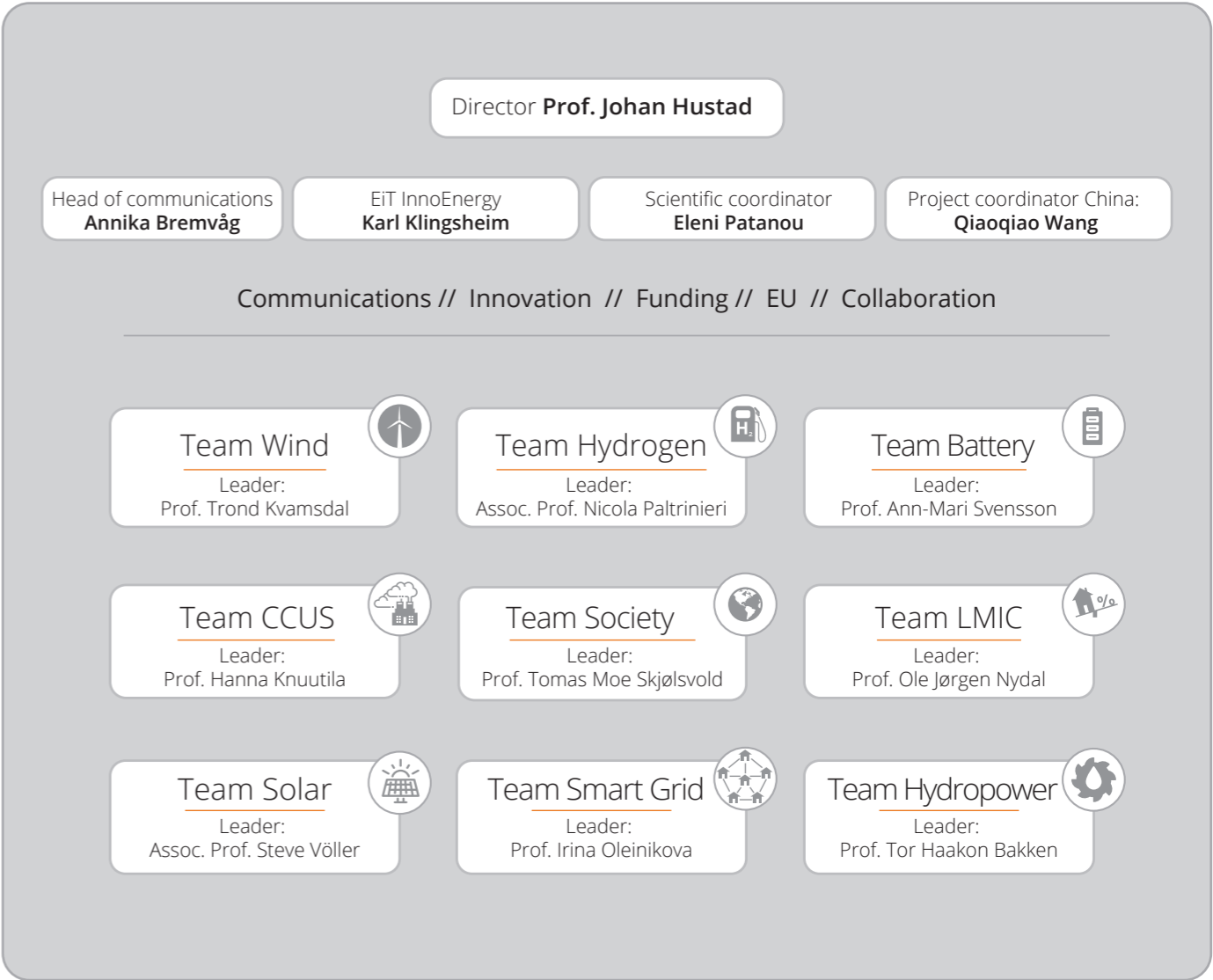
NTNU Energy is one of the university's four strategic research areas and gathers 600 competent energy researchers, teaching and technical personnel that work on energy-related topics. In total, researchers from seven out of NTNU's eight faculties conduct energy research.

NTNU Energy is an entry point to the energy research at NTNU for industry, authorities and researchers. We boost interdisciplinary research, collaboration and innovation through developing strategies, initiating activities and creating meeting places. In addition, we raise important issues and give research-based input to energy-related topics in the public debate.

One of NTNU Energy's central activities is to establish and support nine interdisciplinary research teams that address current issues in the energy field and society at large. The teams' topics are hydrogen, batteries, wind power (on- and offshore), carbon capture, utilisation and storage (CCUS), low- and middle-income countries, society, smartgrid, solar energy and hydropower.



THE NINE INTERDISCIPLINARY ENERGY RESEARCH TEAMS





Norwegian Centre for
Environmentfriendly
Energy Research



NORWEGIAN CENTRES FOR
ENVIRONMENTFRIENDLY ENERGY RESEARCH

NTNU Energy collaborates with eleven Norwegian Centres for Environmentfriendly Energy Research which are funded by the Research Council of Norway and work closely with industry and public authorities. NTNU Energy supports them by taking strategic initiatives across disciplines and providing communication assistance in order to generate more innovation from energy research.

The Norwegian Centres for Environmentfriendly Energy Research carry out long-term research targeted towards renewable energy, energy efficiency, CCS and social science aspects of energy research. The centres must demonstrate the potential for innovation and value creation. Research activities are carried out in close collaboration between research groups, trade and industry, and the public administration, and key tasks include international cooperation and researcher training. The centres are established for a period of maximum eight years.

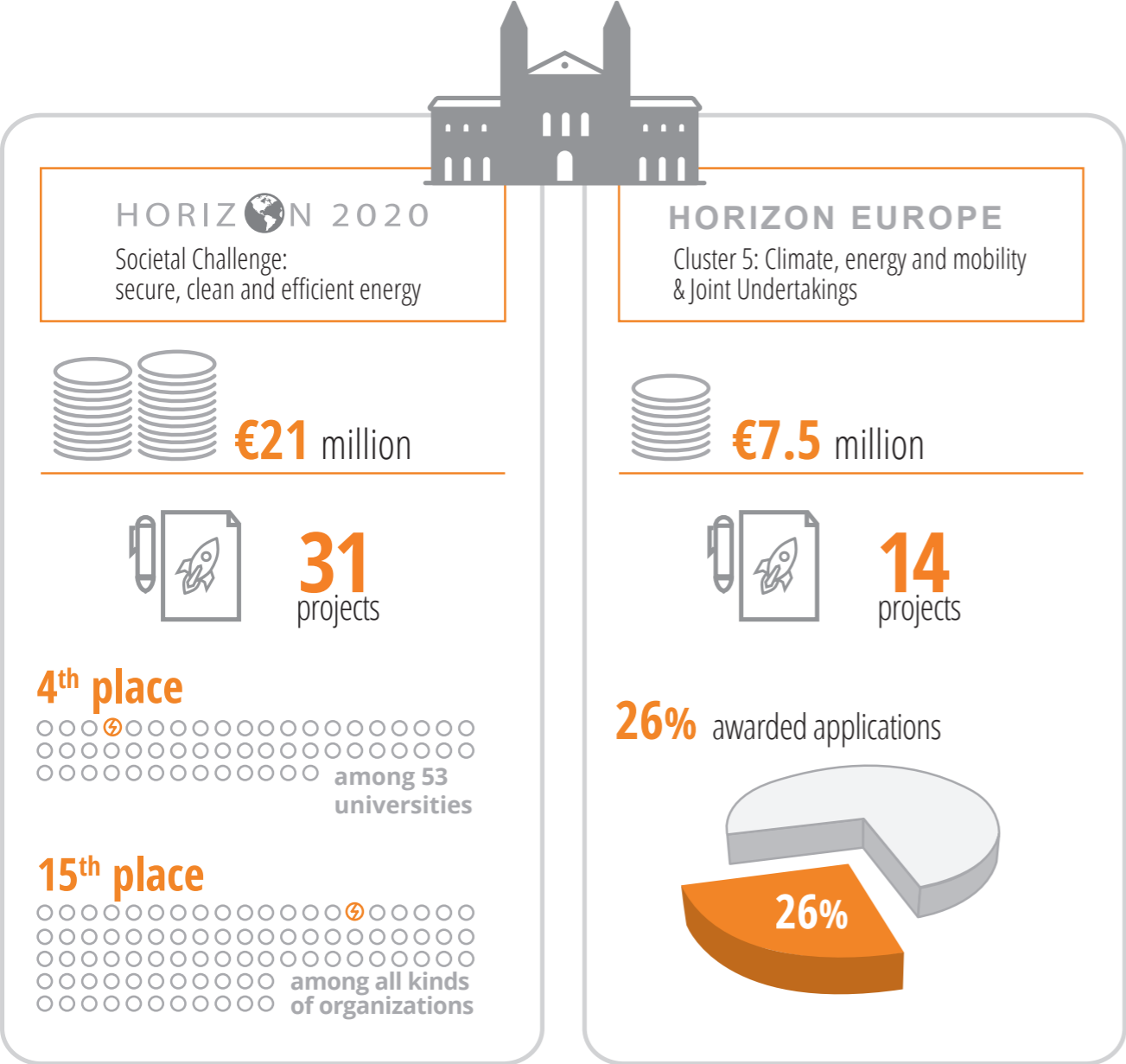
Out of the eleven Norwegian Centres for Environmentfriendly Energy Research, NTNU hosts three: Hydrocen on hydro power, NTRANS on the role of the energy system in the energy transition and ZEN on zero emission neighborhoods in smart cities. The eight remaining Centres NTNU is a partner in: NorthWind, NCCS, CINELDI, HighEFF, Bio4Fuels, MoZEES, SUSOLTECH and HYDROGENi.

*Find out more about the energy research at NTNU,
the interdisciplinary energy research teams and the
Norwegian Centres for Environmentfriendly Energy
Research on our website:*

<https://www.ntnu.edu/energy>

ENERGY TRANSITION TOPICS AT NTNU

- Renewable energy sources (solar, hydropower, wind, bio energy)
- Energy storage and carriers (batteries, hydropower, hydrogen)
- Energy efficiency in industry, buildings and neighbourhoods in smart cities
- New energy systems (smart grids)
- Zero emission mobility (land-based and maritime)
- Carbon capture, utilization and storage (CCUS)
- Politics, innovation and public engagement for sustainable energy
- A just energy transition

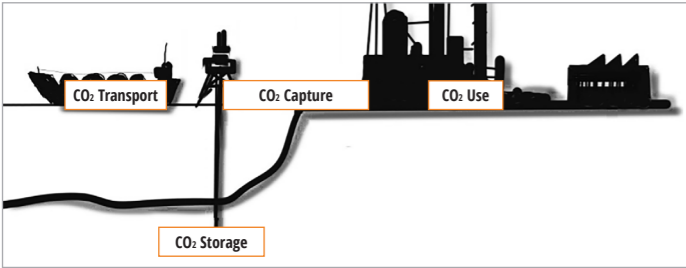


All data on this page as of 15 August 2022

 European Energy Research Alliance	 Bridging the Innovation Gap	 european academy of wind energy	 EUROPEAN BATTERY ALLIANCE
 RawMaterials	 FUEL CELLS AND HYDROGEN JOINT UNDERTAKING		 BATTERIES EUROPEAN PARTNERSHIP (BEPa)
 HySafe	 InnoEnergy	 European Clean Hydrogen Alliance	 EUROPEAN GREEN HYDROGEN ACCELERATION CENTER (EGHAC)



NTNU has more than 200 laboratories. Some of NTNU's labs relevant to energy research are displayed on the following pages.

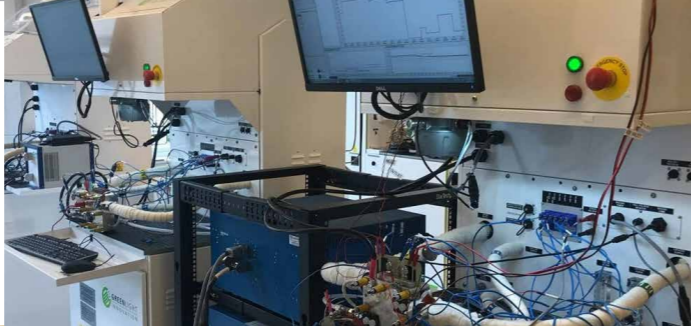


The European Carbon Dioxide Capture and Storage Laboratory Infrastructure (ECCSEL) is a permanent pan-European distributed research infrastructure, ERIC (European Research Infrastructure Consortium). 21 service providers, NTNU being one of them, offer open access to more than 79 world class CCS research facilities across Europe.
More information: www.eccsel.org/

The Norwegian Fuel Cell and Hydrogen Centre is a set of advanced laboratories with the required instrumentation and personnel to facilitate high quality research, the development of components, and the testing and validation of systems for fuel cells and electrolyzers.
More information: www.sintef.no/projectweb/nfch/



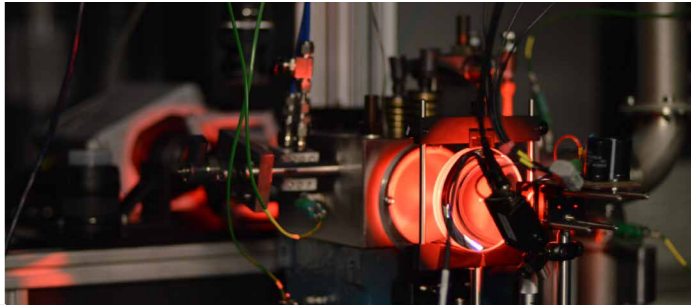
The National Smart Grid Laboratory provides state-of-the-art infrastructure for the demonstration, verification, and testing of a wide range of smart grid use cases, testing the smart grids of tomorrow.
More information: www.ntnu.edu/smartgrid



NTNU NanoLab is one of 4 cleanrooms within the Norwegian Micro- and Nanofabrication Facility (NorFab). It is run by a staff of 9 engineers and has 700 m2 cleanroom facilities with cleanliness ranging from ISO7 to ISO5 and vibration reduced zones at VCF-level.
More information: www.ntnu.edu/nano/nanolab

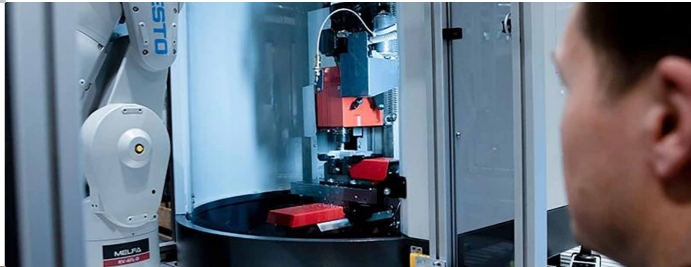


In the **Internal Combustion Engine Laboratory**, a Mercedes compression ignition engine is fitted to a Stuska water brake and used with a range of fuels, including 1st generation and 2nd generation biofuels.
More information: www.ntnu.edu/ept/internal-combustion-engine-laboratory



The Hybrid Power Systems Laboratory provides experimental facilities to test different types of hybrid power systems applicable to green shipping for educational and research purpose.
More information: www.ntnu.edu/imt/lab/hybrid

The MANULAB has 11 laboratories for state-of-the-art manufacturing research. It comprises advanced scientific equipment and facilities, a scientific database and e-infrastructure.
More information: www.ntnu.edu/ivb/manulab



The Micro- and Nanoscale Design Laboratory is funded by the ERC Starting Grant 2020 and addresses functional materials from the nano- to the mesoscale.
More information: www.microandnanoscaledesign.com/



In the **High Current / Circuit Breaker Laboratory**, a grid-connected high current test facility together with precise synchronization and control circuitry enables experimental investigations on various switching phenomena in power circuit breakers as well as high current testing of other power equipment.

More information:

www.ntnu.edu/iel/high-current/-/circuit-breaker-laboratory

The **Fluid Mechanics Laboratory and Wind Tunnel** include several facilities designed for the investigation of fundamental fluid mechanics problems.

More information:

www.ntnu.edu/ept/laboratories/aerodynamic



The **Ocean Basin Laboratory** has a depth of 10 metres and a water surface of 50x80m. It is excellent for investing existing or future challenges within marine structures and operations. A total environmental simulation including wind, waves and current offers a unique possibility for testing models in realistic conditions.

More information:

www.sintef.no/en/all-laboratories/ocean-laboratory/

The **Waterpower Laboratory** offers state-of-the-art facilities that are unique in Europe. It includes a high-pressure pumping system, a long conduit to investigate discharge measurement techniques, and several other test facilities for basic research in fluid mechanics including turbines, hydraulics, geology/tunnels, etc.

More information:

www.ntnu.edu/ept/laboratories/waterpower#/view/about



The **Solar Simulator Laboratory** is used for absorber testing with an assembly of strong 7 lamps as a setup.

More information:

www.ntnu.edu/ept/solarlab#/view/publications



NTNU's **20 kW Solar Rooftop Installation** is connected to the National Smart Grid Laboratory and consists of 62 panels in 11 different angles and azimuth orientations.

More information:

www.ntnu.edu/web/energy/solar/infrastructure

The **Daylight Laboratory** includes an artificial overcast sky, an artificial sun for research, and an artificial sun for teaching.

More information:

www.ntnu.edu/web/energy/solar/infrastructure



The **Norwegian Ocean Technology Centre** is Norway's future national knowledge centre for ocean space technology. It includes updated, state-of-the-art laboratories on a floor-space of 49.000 m². The budget is around NOK 7.7 billion.

More information: www.ntnu.no/norskhavteknologisenter/

