

Department strategy

Department of Process, Energy and Environmental Technology (PEM)

Faculty of Technology, Natural Sciences and Maritime Sciences (TNM)

Key information

The Department of Process, Energy and Environmental Technology (PEM) is one of six departments at the Faculty of Technology, Natural Sciences and Maritime Sciences at the University of Southeast Norway. PEM is responsible for bachelor's education in Mechanical Engineering, Chemistry and Construction, master's education in Process Technology and Energy and Environmental Technology, preliminary courses and doctoral education.

There are two research groups at the institute, "Energy and Environmental Technology" and "Process Safety, Combustion and Explosions", with research into hydrogen technology, biogas production, gasification, CO2 capture and electrification, but employees also participate in research groups led by other institutes. Both teaching and research activities take place in collaboration with local, regional and national industry.

376

Students (2022)

6

Study programs BSc,
MSc and PhD studies

11

PhD students

58

Employees (2022))

Study program BA and M A studies

Bachelor in engineering civil engineering (145 registered students H22)

Bachelor of Engineering, Chemical Engineering (45 registered students H22)

Bachelor of Engineering Mechanical Engineering (50 registered students H22)

Master Energy and Environmental Technology (50 reg. students H22)

Master Energy and Environmental Technology online (15 reg stud H22)

Master Process Technology (55 registered students H22)

Master Process Technology online (30 registered students H22)

Clean energy and process technology (5 registered students H22)

Single subjects (10 registered students H22)

Priority research areas

Process technology,

Hydrogen technology

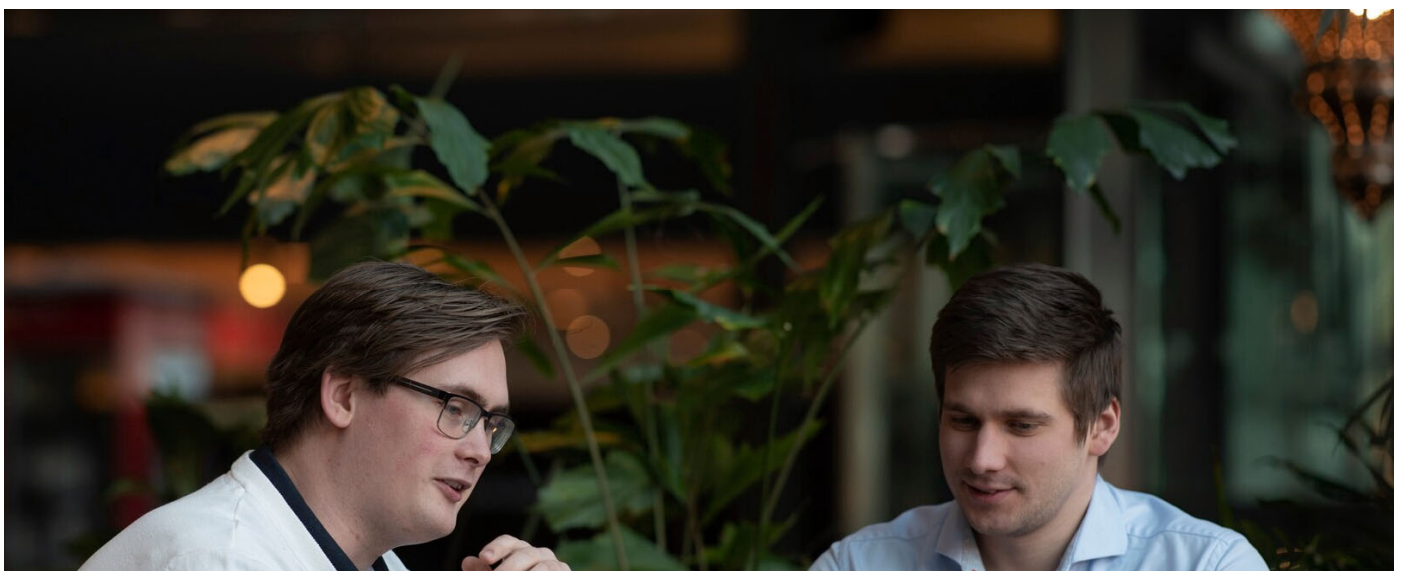
CO2 capture and storage

Biogas production

Gasification

Electrification

Circular economy



Research groups

Process safety, combustion and explosions

- Process Safety
- Combustion
- Explosions
- Hydrogen technology

Energy and environmental technology

USN Research Group for Energy and Environmental Technology (URGENT)

- CO2 capture, transport and storage
- Biogas production
- Biogas upgrade
- Resource recovery
- Gasification and pyrolysis
- Electrification of industry
- Wind power
- Circular economy

Research and innovation center

Center for sustainable process industry

- CO2 capture
- Hydrogen technology
- Bioprocess technology
- Circular economy
- Electrification

Research Center for Environmentally Friendly Energy (FME): MoZEES

- Battery safety
- Hydrogen technology
- Process safety
- Combustion
- Explosions

Research Center for Environmentally Friendly Energy (FME): Bio4Fuels

- Bioprocess technology
- Circular economy

Department strengths and strategic advantages

The department has strong professional environments in areas of technology that are important contributions to fulfilling the UN's sustainability goals, and the goals that the EU, Norway and the region have set for the environment, climate and social development.

PEM has a close collaboration with industry and business players nationally and in the region and will thereby contribute to fulfilling important objectives for TNM and USN.

The department has many research-active employees and has had high research publication factors in recent years.

PEM belongs to the Porsgrunn campus, which is located in a highly industrialized area, and the department has good cooperation with many of the industrial companies in the area.



Vision, values and community assignment

Vision

**Regionally rooted
and internationally recognized.**

Values

Close to communities and working life, where people live and work

Sustainable

Innovative

Social mandate

Having wise, knowledgeable citizens is the key to good social development. The USN will develop and present new, groundbreaking knowledge and offer education of a high international standard. The university's main profile is profession and work-oriented, providing socially relevant education. Its research and education are both characterized by close interaction with regional society and working life.

Our eight campuses provide us with unique strength and their locations shall enable the university to make higher education and research more readily accessible. We shall be an active driving force behind knowledge-based development in partnership with society and working life.

The university shall highlight social challenges and contribute towards solving them by combining research, basic research, education, artistic development work, knowledge transfer and innovation. Challenges relating to climate change, energy, green value creation, social inequality, democracy, human rights, sustainability of the welfare state and the foundations for a vibrant local environment shall be met with knowledge and expertise.

Institutional autonomy, academic freedom and the development and transfer of knowledge based on scientific methods, objectivity norms, formation, critical reflection, open research and allowing space for opposing views are all decisive for the university's activities.

The department's long-term ambition

PEM will develop and disseminate new, cutting-edge knowledge and offer education of high international quality.

PEM must be an important part of USN's main profile as a profession-oriented, working life-oriented and socially relevant university.

Research and education at PEM are characterized by close interaction with industry in the region.

Contributing to solving challenges related to climate, energy and green value creation is central to PEM's activities, both in research and teaching.

The department's values relate to USN's values

The department's values	
Close to social and working life	Teaching and research must be relevant to working life and must be developed in close collaboration with the regional industry.
Sustainable	Teaching, research and dissemination shall contribute to society becoming more sustainable, locally, regionally, nationally and globally. Sustainable means fulfillment of the UN's 17 sustainability goals.
Innovative	Teaching, research and communication must contribute to new activities, locally, regionally, nationally and globally.
Reflected	
Conveying	

USN's overall goals

Ministry of education and research's (KD) sector goals

High quality in education and research

Sustainable social development, welfare, and innovation

Good access to education and skills throughout the country

Goals in the development agreement between KD and USN

To be an open University that offers work-life-integrated and flexible education.

To be a future-oriented university that contributes to a knowledge-based critically reflected and sustainable social development in collaboration with society and working life.

To be an innovative multi-campus university that collaborates with community and working life in the region.

USN's institutional

- 1 Research-based and work-life-integrated educations of high international quality that promote critical reflection and strengthen innovative skills.
- 2 Several outstanding and internationally competitive professional environments, and research at a high international level.
- 3 Student-active learning processes and digital competence in all educations.
- 4 Flexible courses for lifelong learning.
- 5 New knowledge, insight and solutions with relevance for social and working life in the short and long term.
- 6 Partnership with community and working life and become a role model for such cooperation.
- 7 Competence and knowledge for green transition and sustainable economic, social, and cultural innovation.

Department goals:

Goal 1	Relevant study programs Maintain and further develop the bachelor's programs at campus Porsgrunn	Based on business objective no: 1 and 3
Goal 2	Leading research Maintain and further develop the master's programs at campus Porsgrunn	Based on business objective no: 1 and 3
Goal 3	Quality in education Increase the number of R&D publications.	Based on business objective no: 2 and 5
Goal 4	Flexible further and further education Strengthen research activity in general and increase turnover on contribution and commissioned research.	Based on business objective no: 2 and 6
Goal 5	Visible and relevant in society Increase R&D cooperation with business and increase the number of business PhDs. Strengthen student collaboration with local businesses and increase opportunities for local student summer jobs.	Based on business objective no: 4, 5 and 6
Goal 6	Good working environment Increase awareness of holistic thinking among students and staff at PEM, TNM and USN. Make PEM's R&D within Energy, Climate and Environment visible.	Based on business objective no: 7
Goal 7	Economic room for action Increase the visibility of USN Campus Porsgrunn Increase public-oriented activity at Porsgrunn Campus in the evening.	Based on business objective no: 3, 4 and 6

Selected areas of effort

Regional collaboration

PEM has good regional cooperation and wants to:

- increase the number of business visits for students
- arrange for summer jobs in local businesses
- further develop the scheme with professional advice
- develop university schools, especially Porsgrunn and Skien Secondary Schools
- increase R&D cooperation with companies in the region

Internationalization

PEM has international cooperation and wants to:

- arrange for all our students to be able to carry out an exchange
- arrange for offers to international students
- establish arrangements that make it natural for students from the EU to start one of PEM's master's programmes
- develop the R&D activity with the aim of participating to a greater extent in EU projects

Interdisciplinary ventures

PEM has an interdisciplinary focus in particular:

- with EIK in e.g. the subject Interdisciplinary project
- with EIK in the center "Sustainable Process Industry"
- with the other engineering institutes, IRI, IMS and IMA
- with national institutions in energy, climate and environment (USN focus area)

PEM has potential for and wants:

- increased collaboration with the ecology institute INHM in Bø
- increased cooperation with the Norwegian Business School(HH-USN)