NTNU
Norwegian University of Science and Technology

Jobbnorge ID: 276090
Deadline: 3/31/2025
Website: http://www.ntnu.no
Scope: Fulltime
Duration: Temporary

The Department of Electric Energy has a vacancy for a

PhD in Enhancing Grid Stability in Power Converter Dominated Systems

This is NTNU

NTNU is a broad-based university with a technical-scientific profile and a focus in professional education. The university is located in three cities with headquarters in Trondheim.

At NTNU, 9,000 employees and 43,000 students work to create knowledge for a better world.

You will find more information about working at NTNU and the application process here.

Video: https://youtu.be/Xt-yHCN5QS0

About the position

Are you motivated to take a step towards a doctorate and open up exciting career opportunities? Do you have a background in electrical or control engineering, and are you interested in grid stability in power converter dominated systems? As a PhD candidate with us, you will work to achieve your doctorate, and at the same time gain valuable experience that qualifies you for a further career in higher education and research, in and outside academia.

The Department of Electric Energy (IEL) at NTNU is seeking a highly motivated candidate for a full-time (100%) PhD position for 3 years in "Enhancing grid stability in power converter dominated systems". You will join the research group Power System Operation and Analysis at IEL, where we foster an open, inclusive, and collaborative working environment.

Our working environment is characterized by its friendly and supportive atmosphere, with regular gatherings such as professional meetings within the research group, weekly research colloquia, shared lunches, and "Friday coffee" sessions to wrap up the week. Formal and informal gatherings provide opportunities to exchange ideas, celebrate milestones, and strengthen connections. PhD candidates also arrange social activities, open to everyone who wishes to join, creating a welcoming and inclusive community.

Your immediate Line Manager will be the Head of Department.

The PhD position is funded by SecurEL.

About the project

About SecurEL

SecurEL is a Centre for Environment-friendly Energy Research, facilitating a secure, resilient, and sustainable electricity distribution grid that ensures both the security of electricity supply and a path to a net-zero-emissions society. SecurEL aims to develop new knowledge addressing research challenges arising from accelerated electrification and increased use of the existing grid. Reaching these goals requires strong interdisciplinary collaboration among research institutions, user partners, and experts with diverse areas of expertise.

The Centre brings together experts from fields such as electrical engineering, energy systems, information and communication technology, cybersecurity, engineering cybernetics, industrial economics, as well as humanities and social sciences, to develop effective solutions for the power grid. SecurEL is a consortium of 42 partners, including 7 research partners. The centre period is 2025-2032, and the total budget is 398 million Norwegian kroner (NOK). NTNU is represented as a partner mainly by the Department of Electric Energy (IEL) and the Department of Industrial Economics and Technology Management (IØT).

Recruitment and research education is an important part of the mission of SecurEL. The PhD candidates funded by the Centre will contribute with cutting-edge knowledge and research. Overall, the Centre will directly finance 17 PhD and postdoc positions, and also have several associated PhDs from closely related projects. As a SecurEL-funded PhD candidate, you will be employed by NTNU, a university partner in the Centre, and take active part in the research activities. Through the Centre, you will have access to a forum with other PhD candidates affiliated with the Centre, and opportunities for research stays with partners, both nationally and abroad, through its international network.

Read more about the Centre and its research at the website of SecurEL here.

About the PhD position

Control and stabilisation of power systems are necessities for Security of Supply and limiting factors to grid utilisation. Incidents related to instability are rising in number along with the share of power converters, caused by interactions that are hard to identify and understand. In the Nordic distribution grid, these incidents may be driven by large/lumped converter-based loads like EVs and data centers, weakening grids and integration of renewable sources, such as solar PV.

The PhD candidate will contribute to the field by development of methodology to study converter services and dynamic interactions in regional and local distribution grids, using relevant simulation tools with appropriate levels of aggregation and model fidelity, to increase system awareness and design controllers with the overall aim to enhance grid stability. The candidate will collaborate with the grid companies and technology providers in the project consortium to identify and solve stability incidents related to power converters. A research stay with one of the partners of SecurEL is strongly encouraged.

The main supervisor of the PhD candidate will be Associate Professor Sjur Føyen (IEL).

Duties of the position

- Carry out research of high quality within the framework described above.
- Participate in activities of the research group Power System Operation and Analysis (PSOA).
- Complete academic training consisting of coursework corresponding to a minimum of 30 ECTS.
- Contribute to publications in relevant journals and to popular science dissemination.
- Participate in international activities such as conferences and/or research stays at foreign educational institutions.

Be prepared for changes to your work duties after employment.

Required selection criteria

- You must hold a Master's degree within Electric Power Engineering, Electrical Engineering, Engineering Cybernetics, or equivalent.
- Your course of study must correspond to a five-year Norwegian course, where 120 credits have been obtained at the Master's level. Master's students can apply, but the Master's degree must be obtained and documented before starting the position and no later than 31 August 2025.
- You must have a strong academic background from your previous studies and have an average grade from your Master's degree study, or equivalent education, which is equal to B or better compared to NTNU's grading scale. If you do not have letter grades from previous studies, you must have an equally good academic foundation. If you have a weaker grade background, you may be considered if you can document that you are particularly suitable for a PhD education, i.e., by having relevant work experience and/or published/publishable scientific papers.
- You must meet the requirements for admission to the Faculty's Doctoral Programme.
- You must have proficient programming skills in one of the following: Python, Matlab, C/C++, or similar scientific programming languages.
- You must have Norwegian, Swedish, or Danish language skills corresponding to the scale A2 in the Common European Framework of Reference for Languages (CEFR). If you cannot document those skills upon employment, you must take Norwegian courses corresponding to at least 15 credits before the end of the employment period. NTNU will facilitate this. The Norwegian training comes in addition to the PhD candidate's three-year doctoral work. The language requirements only apply if a decision on employment in the position takes place from 1 August 2025.
- You must have English language skills, both written and spoken, corresponding to the scale B2 in the Common European Framework of Reference for Languages (CEFR). Applicants from non-English speaking countries outside EU/EEA/Switzerland must provide preliminary documentation of English language proficiency, in terms of an approved test. One of the following test scores could be documented for this purpose:
    - TOEFL internet-based test (iBT) - Score equivalent to the B2 level: 79 - 101.
    - IELTS - Score equivalent to the B2 level: 5.5 - 6.0
    - Cambridge English: Score equivalent to the B2 level: 160 - 179.

Further assessment of both written and oral English language skills and the ability to communicate fluently will be conducted in the continued selection process and during any interviews for all applicants.

PLEASE NOTE: For detailed information about what the application must contain, see paragraph "About the application".

As a result of the new Act relating to universities and university colleges with associated regulations of 01.08.2024, NTNU has, during a transitional period (for decisions on employment in recruitment positions before 1 August 2025), chosen to use the terms of employment in the old regulations of 31 January 2006 no. 102 on terms of employment for positions such as postdoctoral fellow, research fellow, scientific assistant and specialist candidate.

Preferred selection criteria

- A Master' thesis that is of relevance to the project description.
- Specialization in electric power systems.
- Work experience in a field related to the project description.
- English language skills, both written and spoken, corresponding to the scale C1 in the Common European Framework of Reference for Languages (CEFR). See which scores are equivalent to the C1 level here.
- Norwegian, Swedish, or Danish language skills, both written and oral, corresponding to the scale B2.

Personal characteristics

To complete a doctoral degree (PhD), it is important that you are able to:

- Work independently and structured, set goals, and make plans to achieve them
- Present and discuss your research with other professionals
- Engage and contribute constructively with feedback

- Work constructively under pressure or in the face of adversity
- Show curiosity and have a strong motivation for the subject
- Analyze data, assess different perspectives, and draw well-founded conclusions
- Be flexible and open to adjusting the plan for the project as needed

Emphasis will be placed on personal qualities.

We offer

- An exciting job with an important mission in society
- Developing tasks in a strong and international professional environment
- Follow-up during the PhD period
- Open and inclusive working environment with committed colleagues
- Working capital that can be used to implement the project
- Mentor programme as a new employee at NTNU
- Training during working hours and company sports at NTNU
- As a public employee, you have favourable benefits as a member of the Norwegian Public Service Pension Fund (SPK)

You will be employed as a PhD candidate at NTNU and will have access to employee benefits and discounts.

Diversity

Diversity is a strength, and at NTNU we aim to be an employer that reflects the diversity in society and that makes use of the potential of the population's collective skills. Our vision is Knowledge for a better world and our values are creative, critical, constructive and respectful. We believe that an organization that is equal, diverse and gender-balanced is essential for us to achieve our goals.

We strive to attract employees with different skills, life experiences and perspectives to contribute to even better problem solving of our societal mission in research and education.

If you think this position is relevant and interesting, we encourage you to apply, regardless of gender, functional ability and cultural background, or whether you have been out of work for a period of time.

At NTNU we want to increase the proportion of women in scientific positions. We have a number of measures to promote equality.

Salary and conditions

In the position of PhD Candidate, code 1017, your gross salary will normally be NOK 536 200,- per annum depending on qualifications and seniority. A 2% statutory contribution to the State Pension Fund is deducted from the salary.

The employment period is 3 years for the doctoral work, with the possibility of an additional 6 months or more of employment in connection to duty work.

The option of duty work may be offered to a candidate with clear motivation and ability for such work, and if the Department sees the need. This will be clarified with the candidate during and after any interview.

If learning Norwegian (level A2 corresponding to at least 15 credits) is to be completed before the end of the employment period, the employment period can be extended by 10 weeks. The language requirements only apply if a decision on employment in the position takes place from 1 August 2025.

For employment as a PhD candidate, it is a prerequisite that you gain admission to the PhD programme in Electric Power Engineering within three months of your employment contract start date, and that you participate in an organized doctoral programme throughout the period of employment.

The position is conditional on external funding.

As an employee at NTNU, it is important that you keep yourself up to date with academic and organizational changes and adapt to them.

For the necessary academic and social interaction, it is a prerequisite that you are physically present and available to the institution at campus Trondheim on a daily basis.

The appointment is carried out in accordance with the principles of the State Employees Act, and Export control (legislation that regulates the export of knowledge, technology and services). Candidates who, after assessment of the application and attachments, are considered to be in conflict with the criteria in the latter act, will not be able to be employed.

Please note that the person hired will work with critical infrastructure and areas affected by controls on the export of strategic goods, services and technology. Candidates who do not meet the requirements for the necessary security clearance, access clearance and authorization as described in the National Security Act, the Export Control Act and the Act on the Implementation of International Sanctions (Sanctions Act) cannot be considered (e.g., candidates from, among others, Russia, Iran, North Korea, China). Relevant countries are listed as examples and as such the list is not exhaustive (as a result of any changes in the world situation, other countries may be added at short notice).

About the application

The attachments (including a description of your scientific work) must accompany the application as these documents form the basis of the application assessment. The documents must be in Norwegian/a Scandinavian language or English.

Please note: The application will only be assessed on the basis of the information we have received by the application deadline. Therefore, make sure that your application clearly shows how your skills and experience meet the criteria described above. The application and all attachments must be sent electronically via Jobbnorge.no. If you are invited to an interview, you must bring certified copies of certificates and diplomas upon request.

The application must include:

- A cover letter where the applicant describes personal motivation, summarizes scientific work, and how the applicant sees her/his background as suitable (400 words/1 page).
- Project outline containing proposals for an overall description of research questions, theoretical perspectives, methodological design for the project, and progress plan (maximum 1500 words/4 pages, including references). This proposal will be neither final nor binding for the project.
- CV.
- If you have testimonials of work experience, submit them
- Transcripts and diplomas for Bachelor's and Master's degrees. If you have not yet completed your Master's thesis, you must provide confirmation on your estimated date for the submission of the Master's thesis, or confirmation that your Master's thesis has been submitted.
    - Applicants from universities outside Norway are requested to send a diploma supplement or a similar document, which describes in detail the study programme and grading system. See also specific documentation requirements for education obtained outside of Norway, applicable to certain regions/countries, here.
- A copy of the Master's thesis. If you recently submitted your Master's thesis, you are encouraged to attach a draft of the thesis. Documentation of a completed Master's degree must be presented before taking up the position.
- If you have publications or other relevant research work, submit them.
- English language proficiency documentation.
- Name and contact information of three referees.

If all, or parts, of your education has been taken abroad, we also ask you to attach documentation of the scope and quality of your entire education, both Bachelor's and Master's education, in addition to other higher education. If your institution uses “diploma supplement” (normal for most European institutions), you must attach this. A description of the documentation required can also be found here. If you already have a statement from Norwegian Directorate for Higher Education and Skills (HK-dir), please attach this as well.

Joint works will be considered. If it is difficult to identify your contribution to joint work, you must attach a brief description of your participation.

When assessing the best qualified, we emphasize necessary qualifications such as education, experience and personal suitability. Motivation for the position, ambitions and potential for research will also count when assessing the candidates.

NTNU recognizes a wide range of academic contributions and has committed itself to The San Francisco Declaration on Research Assessment and CoARA (responsible assessment of research and recognition of a greater breadth of academic contributions in accordance with NTNU's social mission).

General information

A public list of applicants with name, age, job title and municipality of residence is prepared after the application deadline. If you wish to be exempt from entry on the public applicant list, this must be justified. Assessment will be made in accordance with current legislation. You will be notified if the exemption is not granted.

If you think this position looks interesting and in line with your qualifications, you are welcome to apply.

If you have any questions about the position, please contact Associate Professor Sjur Føyen by email at foyen.sjur@ntnu.no. If you have any questions about the recruitment process, please contact HR consultant Sven Robert Storø by e-mail at sven.r.storo@ntnu.no.

Application deadline: 31.03.2025

For practical information about working at NTNU, please visit this webpage.

The city of Trondheim is a modern European city with a rich cultural scene. Trondheim is the tech capital of Norway with a population of 200,000. The Norwegian welfare state, including healthcare, schools, kindergartens and overall equality, is probably the best of its kind in the world. Professional subsidized day-care for children is easily available. Furthermore, Trondheim offers great opportunities for education (including international schools) and possibilities to enjoy nature, culture and family life and has low crime rates and clean air quality.

NTNU - knowledge for a better world

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The Norwegian University of Science and Technology (NTNU) creates knowledge for a better world and solutions that can change everyday life.

Department of Electric Energy

The Department of Electric Energy is one of the seven departments at the Faculty of Information Technology and Electrical Engineering. Our department is Norway’s leading in the field, and our vision is to be at the centre of the digital, green shift. We have excellent collaboration with business and industry as well as other universities and research organizations internationally. This gives us outstanding opportunities for interdisciplinary research with high relevance for the society, addressing industrial needs and global challenges.

Additional information

Place of service: