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M Environmental and Energy Management
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Project code P2402

Contents

Summary

Standard 1. Intended learning outcomes

The master's programme MEEM at the University of Twente has a unique profile, equipping students with a holistic understanding of sustainability challenges, with a strong focus on organizing and managing stakeholder engagement regarding regulation of commons. The three areas of specialization, Environmental Management, Energy Management and Water Management, are well chosen and reflect the key areas where such challenges arise. The intended learning outcomes are formulated at the required academic master's level and reflect the profile and curricular content of the programme. MEEM is well aligned with the professional field through stakeholder connections and a Professional Advisory Board. For future improvement, the panel advises the programme to consider the role of student literacy in quantitative approaches to sustainability challenges.

Standard 2. Teaching-learning environment

The panel found that the MEEM programme has a well-developed curriculum that is closely aligned with the intended learning outcomes and strikes a good balance between domain-specific and interdisciplinary knowledge. Students are well trained in research and professional skills. Interdisciplinarity and intercultural skills are clear strengths of the MEEM, although the panel recommends more explicit teaching and assessment of these interdisciplinary skills, as well as more deliberate use of intercultural learning in teaching. The diverse academic and cultural backgrounds of the students provide a strong foundation for this. The use of English as the language of instruction is appropriate given the international scope of the programme and the field of study. The programme's broad admissions criteria promote interdisciplinary learning and are supported by clear language requirements and a well-designed pre-master's track for students who need additional preparation.

Student guidance, support and information provision are well implemented in MEEM, with approachable teaching and support staff guiding students throughout their studies. The curriculum is feasible, supported by a small-scale teaching and learning environment and strong student guidance, resulting in high success rates. The panel considers the teaching staff to be a major asset. The staff members are experienced researchers with international recognition and expertise relevant to the programme content. The facilities in Leeuwarden are up to standard and contribute to a strong sense of community. However, the location also presents challenges related to MEEM's relatively isolated position with respect to the rest of the university. The panel believes that a move to Enschede, which is currently under consideration, could be beneficial for the programme and recommends that MEEM reflect on this and make a decision that takes these challenges into account.

Standard 3. Student assessment

The assessment system of the programme is well designed, with varied assessment methods and clear checks and balances to promote assessment quality. The Examination Board fulfils its legal duties and has sufficient mechanisms in place to safeguard assessment quality and the exit level, of which the thesis carrousel is considered a best practice by the panel. Thesis assessment procedures promote reliable and valid assessment, with well-designed criteria and rubrics. A point of attention is ensuring that all examiners implement these procedures and tools as intended. This encompasses expectations for feedback on course assignments and substantiation of the considerations used for giving specific grades on the assessment form. Furthermore, the panel recommends a stricter separation of supervision and assessment: it feels that the second examiner of the thesis should be independent from the process and not fulfil a double role as

supervisor and examiner. Finally, the panel advises a programme-wide reflection on AI-proofing assessment. This includes a broad reflection on skills assessment, as well as promoting AI literacy for staff and students.

Standard 4. Achieved learning outcomes

The quality of the master's theses as well as the job market position of graduates demonstrate that students achieve the intended learning outcomes of the programme. The theses are generally good with solid research competencies. Graduates find relevant jobs after graduation, using the knowledge and skills obtained in the programme.

Score table

The panel assesses the programme as follows:

Master's programme Environmental and Energy Management

Standard 1: Intended learning outcomes	meets the standard
Standard 2: Teaching-learning environment	meets the standard
Standard 3: Student assessment	meets the standard
Standard 4: Achieved learning outcomes	meets the standard
General conclusion	positive

Prof. dr. Diego Vazquez-Brust, panel chair
Date: 10 June 2025

Peter Hildering MSc., panel secretary

Introduction

Procedure

Assessment

On 8 April 2025, the master's programme Environmental and Energy Management of the University of Twente was assessed by an independent peer review panel. The assessment followed the procedure and standards of the NVAO Assessment Framework for the Higher Education Accreditation System of the Netherlands (April 2024). Quality assurance agency Academion coordinated the assessment upon request of the University of Twente. Peter Hildering acted as process coordinator and panel secretary. He has been certified and registered by the NVAO.

Preparation

Academion composed the peer review panel in cooperation with the institution and taking into account the expertise and independence of the members. On 14 January 2025, the NVAO approved the composition of the panel. The panel secretary instructed the panel chair on his role in the site visit according to the Panel chair profile (NVAO 2016).

The programme management composed a site visit schedule in consultation with the secretary (see appendix 3). The programme management selected representative partners for the various interviews. It also determined that the development dialogue would be made part of the site visit. A separate development report was made based on this dialogue. The site visit was organized in Enschede, as the UT campus has more facilities to host the site visit. and most staff associated with the programme is located in Enschede. The programme management ensured that the panel was informed about the Leeuwarden location through descriptions, images and discussions with staff and students.

The programme management provided the secretary with a list of graduates over the academic years 2022-2023 and 2023-2024. In consultation with the secretary, the panel chair selected 15 theses of the programme. They took the diversity of final grades and examiners into account, as well as the various specializations. From the specialization Environmental Management 6 theses were selected, from the specialization Energy Management 6 theses were selected, and from the specialization Water Management 3 theses were selected. This selection reflected the number of graduates in each specialization proportionally. Prior to the site visit, the programme management provided the panel with the theses and the accompanying assessment forms. It also provided the panel with the documentation (see appendix 4).

The panel members studied the information and sent their findings to the secretary. The student member did not study the theses. The secretary collected the panel's questions and remarks in a document and shared this with the panel members. In a preliminary meeting, the panel discussed the initial findings on the self-evaluation report and the theses, as well as the division of tasks during the site visit. The panel was also informed on the assessment framework, the working method and the planning of the site visits and reports.

Site visit

During the site visit, the panel interviewed various programme representatives (see appendix 3). The panel also offered students and staff members an opportunity for confidential discussion during a consultation hour. No consultation was requested. The panel used the final part of the site visit to discuss its findings in an internal meeting. Afterwards, the panel chair publicly presented the preliminary findings.

Report

The secretary wrote a draft report based on the panel's findings and submitted it to an Academion colleague for peer assessment. Subsequently, the secretary sent the report to the panel for feedback. After processing this feedback, the secretary sent the draft report to the management of the master's programme Environmental and Energy Management and the University of Twente in order to have it checked for factual irregularities. The secretary discussed the ensuing comments with the panel chair and changes were implemented accordingly. The panel then finalized the report, and the secretary sent it to the management of the master's programme Environmental and Energy Management and the University of Twente.

Panel

The panel assessing the master's programme Environmental and Energy Management at the University of Twente consisted of the following members:

- Prof. dr. D. (Diego) Vazquez-Brust, professor in Global Business Sustainability and Strategy and director of the Agile Centre for Equitable Sustainability at the University of Portsmouth (UK) [panel chair];
- Prof. dr. K.T. (Karin) Rebel, principal Fellow at the Centre of Academic Teaching and Learning, and full professor Sustainability Science & Education, and director of Education of the Copernicus Institute of Sustainable Development at Utrecht University;
- Dr. B.G.J.S. (Ben) Sonneveld, associate professor emeritus at the Athena Institute of the VU Amsterdam;
- L. (Laurens) Stuijvenberg BSc., student of the master's programmes International Land and Water Management, and Climate Studies at Wageningen University & Research [student member].

Each panel member, the panel secretary and the programme has filled out the Statement of Impartiality and non disclosure agreement, as required by the NVAO.

Information on the programme

Name of the institution:	University of Twente
Status of the institution:	Publicly funded institution
BRIN:	21 PH
Result institutional quality assurance assessment:	Positive
Programme name:	Environmental and Energy Management
ISAT number:	69319
Level:	Master (NLQF 7)
Orientation:	Academic
Number of credits:	60 EC
Language of instruction:	English
Specializations:	Environmental Management Energy Management Water Management
Location:	Leeuwarden
Mode(s) of study:	Fulltime
Awarded degree:	MSc
Submission date NVAO:	1 November 2025

Description of the assessment

Organization

The Master of Environmental and Energy Management (MEEM) is organized by the Faculty of Behavioural, Management and Social Sciences (BMS) of the University of Twente (UT). It is offered in Leeuwarden, using the facilities of Van Hall Larenstein (VHL) University of Applied Sciences, where students have their own classroom and study facilities. Most staff is located in Enschede, but regularly travels to Leeuwarden for lectures and to engage with students. The programme management consists of the programme director, programme coordinators and the study adviser. Additionally, there are coordinators for each of the three specializations as well as the pre-master's programme. The programme has its own Programme Committee consisting of three students and three staff members, and an Examination Board shared with the other Governance Sciences programmes at BMS.

Recommendations previous panel

The previous accreditation panel provided several suggestions for improvement, such as updating the ILOs to better reflect the programme's profile, streamlining group assessment and formalizing the different steps in the thesis trajectory. The panel found that these advices have been followed up carefully, leading to further improvement of the programme. See for further discussion the respective sections in the report on these topics.

Standard 1. Intended learning outcomes

The intended learning outcomes tie in with the level and orientation of the programme; they are geared to the expectations of the professional field, the discipline, and international requirements.

Findings

Profile

MEEM is a social science master's programme focusing on sustainability in the ecological key domains of environment, energy and water, which also form the programme's three specialization domains. The programme combines the disciplines of management, governance, policy and law with natural science and technology to develop sustainable solutions to socio-technical challenges, such as climate change, environmental pollution, resource depletion and social inequality. Specifically, the programme aims to transform these global challenges into local solutions (global-local perspective), focusing on both rural and urban contexts (rural-urban perspective), and help students become leaders who create lasting impact. The programme is organized on a small scale, attracting 25-30 students annually.

The programme views its graduates as change-makers who are able to work in intercultural and multidisciplinary teams in sectors such as business, government, consultancy and research, all with the goal of advancing sustainability worldwide. They should be able to lead socio-technological changes, while adopting a critical and analytical attitude towards responsible development and use of technologies: putting people first and empowering communities to shape a better, more sustainable future. The programme's personal and intercultural nature is reflected in the student population (see standard 2).

The panel appreciates the unique profile of the programme. MEEM equips students with a holistic understanding of sustainability issues and addresses topical challenges that both local and global communities are faced with. The panel particularly appreciated the programme's acknowledgement of the

role of so-called *commons* in energy and environmental challenges. *Commons*, which are free resources such as water and clean air shared and managed by communities, are highly relevant in developing collaborative approaches to managing shared resources. Activating stakeholder engagement, which is key in addressing challenges related to *commons*, is appropriately emphasized in the programme, educating students to organize and manage such processes. The three specialization areas of environment, energy and water are well chosen, and reflect the key domains in which such challenges take place. The panel feels that these unique strengths of the programme could be further highlighted to attract more students. It has the impression that the programme's approach to sustainability challenges would be interesting to a larger group of students than is currently attracted to the programme.

One point of reflection that the panel wants to share with the programme is the interface between qualitative and quantitative approaches. According to the panel, the natural sciences offer important boundaries on possible solutions regarding for instance water use and air pollution. While the panel understands that the programme is in its core a social sciences programme, literacy on such quantitative approaches is important for working towards sustainable solutions. The panel invites the programme to reflect to what extent these approaches could be incorporated into the programme.

Intended learning outcomes
MEEM's mission and profile provide the foundation for the intended learning outcomes (ILOs, see appendix 1). The ILOs highlight the academic orientation of the programme, including the knowledge base, critical reflection, social science research skills and problem-solving skills. In line with the programme's aims, the ILOs include competencies in interdisciplinary work and intercultural skills, as well as a strong emphasis on a role as responsible socio-technical change agent. The programme used the domain-specific framework for environmental sciences to benchmark itself against similar programmes focusing on environment and sustainability. This alignment was provided to the panel in an overview matching the programme's ILOs with the requirements of the domain-specific framework.

The panel studied the ILOs and concludes that these reflect the master's level as described in the Dutch qualification framework NLQF, and clearly show an academic orientation. The benchmark with the environmental sciences framework shows that, while having a unique profile, the programme is aligned in terms of content with other environmental and sustainability oriented master's programmes. The panel noted with appreciation that the programme has updated the ILOs after the previous accreditation. This was done in order to improve synergy with the programme's profile and curriculum content, as recommended by the previous accreditation panel.

Alignment with professional field
MEEM has an extensive network of regional higher education institutions, governments, NGOs, and private sector companies and initiatives that contribute directly to the curriculum and engage students by providing real-world challenges in diverse local and global contexts. In 2022, the programme initiated a Professional Advisory Board to formalize its external connections. This board represents a diverse group of stakeholders and alumni working in local government, academia, business, and networking organizations. PAB members advise the programme on the alignment of its goals and content with the professional field and are often directly involved in the programme, for example through guest lecturers, site visits, case projects and career advice. In 2024, MEEM also became a member of Circular Friesland, an association that aims to accelerate the transition to a circular economy in the province. The panel praises MEEM's strong alignment with the professional field, and feels that these stakeholder connections, as well as the advice provided by the Professional Advisory Board, keep the programme firmly aligned with the requirements of that field.

Considerations

The master's programme MEEM at the University of Twente has a unique profile, equipping students with a holistic understanding of sustainability challenges, with a strong focus on organizing and managing stakeholder engagement regarding regulation of commons. The three areas of specialization, Environmental Management, Energy Management and Water Management, are well chosen and reflect the key areas where such challenges arise. The intended learning outcomes are formulated at the required academic master's level and reflect the profile and curricular content of the programme. MEEM is well aligned with the professional field through stakeholder connections and a Professional Advisory Board. For future improvement, the panel advises the programme to consider the role of student literacy in quantitative approaches to sustainability challenges.

Conclusion

The panel concludes that the programme meets standard 1.

Standard 2. Teaching-learning environment

The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.

Findings

Curriculum

The MEEM curriculum (see appendix 2) consists of 60 EC divided into four quartiles (Q1-Q4). The curriculum content consists of three main components, each progressively aligned with the student's individual interests: mandatory core courses (Q1 and Q2), Personal Development Electives (Q2 and Q3) and the specialization component (Q3 and Q4).

- The *mandatory core* (28 EC) consists of seven courses that cover the main knowledge, skills and attitudes relevant for socio-technical change for sustainable development. They introduce the three main domains (environmental, water and energy management) through an interdisciplinary perspective, as well through the global-local and rural-urban perspectives. The core also contains an academic skills course that prepares students for their master's thesis.
- In Q2 and Q3, students pursue *Personal Development Electives* (4 EC). Students choose two out of four 2 EC programme-specific electives based on their personal interests.
- The *specialization component* (28 EC) consists of Case Project, Research Proposal and Master Thesis courses, in which students can choose to focus either on environmental, water or energy management. The Case Project (10 EC) is a course that applies challenge-based learning, where students work in teams on a real-life case, often inspired or provided by one of the programme's external partners. The Research Proposal (3 EC) and Master Thesis (15 EC) together form the individual master's thesis trajectory. In Q3, students select a research project based on their research interest. Students write their research proposal supported by additional workshops on e.g. literature review and data management and ethics. Q4 is fully devoted to conducting the research project, writing the master's thesis and defending it during a colloquium.

MEEM employs various teaching methods, which often rely on the small-scale and interactive nature of the classes. These range from in-class instruction to role-playing exercises, site visits and guest lectures from external organizations within MEEM's network. Several courses use challenge-based learning, where students study complex, open-ended challenges and work with fellow students, teachers and external

stakeholders to explore and tackle these challenges. This approach is mainly highlighted in the Case Project in Q3, but is also used on a smaller scale in the core courses.

The panel found that MEEM has a well-developed and strong curriculum that is well aligned with the intended learning outcomes. It has a well-designed balance between domain-specific and interdisciplinary knowledge, with courses covering key areas essential for professional engagement in the water, energy and environment sectors. Students expressed that they appreciate the engaging, interdisciplinary courses with timely and relevant topics that reflect the current global trends in environmental, water and energy management. The curriculum provides sufficient training in research skills, both in the dedicated course and throughout the other courses and the master's thesis. It also enables the development of professional skills in working on practical cases and with external partners, most notably in the Case Project. Teaching methods are varied and tailored to the content of the courses. The challenge-based learning approach actively engages students in real-world, relevant challenges that are closely tied to their environment, fostering critical thinking and hands-on learning.

Interdisciplinarity is highly visible throughout the curriculum, with several courses and projects requiring students to integrate insights from different disciplines to understand complex challenges. Given this interdisciplinary focus, the programme could make the teaching of interdisciplinary skills more explicit. This includes teaching students how to work across disciplines and how to deal with the challenges involved. The programme has a very diverse student body in terms of disciplinary backgrounds, which could be deliberately used to teach interdisciplinary work. This should be accompanied by explicit assessment of these skills, meaning that students should be assessed on the extent to which they are able to integrate different disciplines when working on specific challenges.

The programme is considering changing the current curriculum structure of courses with different sizes to a structure with more evenly sized courses of 5 ECs. The panel agrees with this proposed change and believes that it would make the curriculum more streamlined and provide students with a greater range of 5 EC electives. The panel found that while students welcome the offer of electives, the current 2 EC courses don't provide the in-depth content that some students would like. A 5 EC elective could make room for a larger course, possibly from another MSc programme. Redesigning courses to fit the 5 EC structure could also be an opportunity to address student feedback expressed in the student chapter that some of the core courses are too broad. The panel advises to make clear choices about the content of core courses: it believes that it would be most beneficial for courses to go into depth on a number of selected topics, even at the expense of covering the full breadth of a topic.

Language and internationalization
The inherently global and intercultural nature of MEEM is reflected in its choice of language of instruction. The programme, as well as its name, is in English, with the aim of creating an intercultural learning community in which students can practice their language skills and international competencies. The challenges and perspectives that students study are inherently cross-border and international. To promote the quality of English-language education, prospective students as well as new teaching staff members are required to demonstrate sufficient command of English during their application.

The international classroom and exposure to an intercultural community of staff and students are essential to students achieving the programme's ILOs and prepare students for international teamwork in their careers. Students come from a wide variety of cultural backgrounds; more than half of the students come from outside the EU, including Asia, Africa and Latin America. MEEM started as a postgraduate internationally focused master's programme and became a regular, funded master's programme in 2017. Its origins are still

visible in the international student population, resulting in a diverse, international classroom where issues can be discussed from a variety of cultural perspectives.

The panel agrees with MEEM's rationale for using English as the language of instruction and in the programme name, and believes that this is consistent with the distinctly international nature of the challenges studied. The internationally diverse classroom is an asset of the programme and is instrumental in the development of students' intercultural competencies. The panel believes that the programme could further emphasize this aspect as a strength and that it could make more conscious use of the cultural diversity of the student population. It learnt that some courses already deliberately combine students from different backgrounds in project groups, and believes that mixing students from different cultural (as well as disciplinary, see above) backgrounds could be done more systematically to promote intercultural learning.

Admission
To be admitted to the MEEM programme, prospective students must have a bachelor's degree from an internationally recognized university in a field relevant to the programme (natural sciences, engineering, environmental sciences, or social sciences), and English language proficiency. The programme may require students to complete a pre-master's course prior to enrolment, which may include academic skills and/or sustainability content, depending on the student's background. This pre-master is usually followed by students with a Dutch *hbo* bachelor's degree and bachelor graduates with a disciplinary background with insufficient sustainability content. The panel approves of the programme's admission criteria. The broad requirements allow students from different academic and professional backgrounds to enrol, fostering interdisciplinary learning and collaboration. The language requirements promote the quality of the international learning environment, and the pre-master offers bachelor's graduates the opportunity to remedy larger deficiencies before entering the programme.

Guidance and feasibility
The main point of contact for students within MEEM are the programme coordinators and the study advisor, who are located in Leeuwarden. Prior to arriving in Leeuwarden at the start of the programme, students receive information to help them prepare. Further information on the facilities, social events, curriculum and contact with the programme is provided during the introduction week. The study advisor offers individual meetings to discuss study-related issues or personal circumstances. Early in the programme, each student has a mandatory personal meeting to discuss their individual situation. Further meetings are scheduled upon request. The study advisor is also the first point of contact for students who encounter issues related to functional impairments. They can help the student arrange further support, such as specialized software or other adjustments. In the master's thesis phase, students are guided by a UT supervisor. As most teaching staff is located in Enschede, students typically interact with their supervisor online through weekly or biweekly meetings, depending on the student's need. The track coordinators assign the first and second supervisor based on the expertise relevant to the research topic chosen by the student. Students can also opt for an external project, in which case the organization and topic need to be approved by the student's UT supervisor.

Students consider the MEEM curriculum to be intensive, yet feasible. The programme puts a high emphasis on studying nominally, expecting students to follow the curriculum as an integrated one-year programme with their own cohort. Students mention the close-knit community of students and the tailored feedback and support as important strengths of the programme. Students commend the commitment of teaching staff, administrative staff and study advisor to keep all students on track. This includes helping students select a specialization, courses and thesis project in a timely manner. This attention to study progress translates into a high success rate, with 89% of students graduating nominally within one year.

The panel commends the very well organized structure and implementation of student guidance and support in the MEEM programme. The information provided during the onboarding in Leeuwarden helps students to settle into their new study environment. The programme is in close contact with students through the programme coordinator and study advisor based in Leeuwarden, which allows for quick and personal communication between students and staff. Students appreciate the support and guidance they receive throughout the programme, including thesis supervision in deciding on their specialization. The panel also found the support for students with an impairment to be in order. The curriculum is feasible, with the small-scale setting and support mechanisms encouraging students to study nominally. Feasibility is reflected in very favourable pass rates, demonstrating the success of this approach.

Teaching staff

The teaching staff predominantly comes from the Section of Governance and Technology for Sustainability (CSTM) of BMS. CSTM focuses on interdisciplinary research structured around the themes of the energy transition, water and climate, sustainable production and consumption, and regional sustainable development. These themes are studied using the lenses of policy studies & transition, law & regulation and geographic economics. Each of these themes and lenses are reflected in the MEEM curriculum, with the interdisciplinary teaching team drawing upon theories, methods and projects form their respective backgrounds. All (core) teachers, as well as the supervisors for the master's theses, are required to have a PhD as well as a University Teaching Qualification (UTQ). In addition, two MEEM teaching staff members have a Senior University Examination Qualification (SUEQ). Most teaching staff members are located on the UT Campus in Enschede, and travel to Leeuwarden for courses.

The panel considers the teaching staff to be one of the strengths of MEEM. The staff members are all well qualified researchers with international recognition, whose expertise is well aligned with the curriculum content. The panel learned from discussions during the site visit that faculty members often make connections between research and teaching, thereby enriching the academic content of the curriculum. In line with the diverse international character of the programme, the teaching team has a good complementarity of local and international experts and a balanced composition in terms of gender and nationality. The mandatory teacher professionalization ensures that teaching staff members are didactically qualified. Students mention that they find their teachers professional and competent, as well as approachable. They can easily contact staff members whenever they are present in Leeuwarden or online.

Location and facilities

The programme is organized on the campus of the VHL University of Applied Sciences in Leeuwarden, where the programme has its own classroom, study facilities and a kitchen, as well as office space for the staff members located in Leeuwarden. Staff and students can also use the general VHL facilities, such as a library, laboratories and the café, and have access to VHL sports and social events. Throughout the academic year, the programme offers students a variety of extracurricular workshops and activities to complement their studies, such as guest lectures and career workshops. These initiatives aim to enhance academic performance, support personal development such as intercultural skills and effective group work, and prepare students for their professional careers. The programme also offers students the opportunity to participate in extracurricular events on the Enschede campus, and in some cases, such as the Twente Business Days, arranges transport for students. Throughout the year, programme coordinators organize multiple social events for students in Leeuwarden to promote the sense of community.

The panel got an overview of the programme facilities in Leeuwarden through a description, images, a video also used for promotion to prospective students, and discussions with staff and students. It concludes that the facilities offered in Leeuwarden are up to standard. Students appreciate their own homebase in the

building as well as the strong sense of community. They also welcome the extracurricular activities and the effort the programme makes to include them in Enschede-based university activities. Staff members have not raised concerns about travelling to Leeuwarden to teach and generally find the atmosphere at the location positive. There are multiple stakeholder connections with companies and governmental organizations in Friesland that engage in Case Projects, thesis projects and sometimes courses.

At the same time, discussions with programme management, staff and students revealed several disadvantages of the Leeuwarden location. First, MEEM is relatively academically isolated: interaction with other educational programmes is limited, both in terms of exchanging electives and in terms of student life. The VHL student population is often younger and Dutch-speaking, which means that MEEM students tend to stay in their own social circle. There is some interaction with the MSc Water Technology, another UT programme based in Leeuwarden, but the natural science focus of this programme limits opportunities for elective courses. Second, due to the travel time of the teaching staff, the courses are often concentrated on single days, with lectures and tutorials of up to five hours. And third, the programme management is concerned that the location might have a negative impact on student numbers, especially for Dutch BSc graduates from Twente, who are often unwilling to move to Leeuwarden for their master's. Based on these and other considerations, the faculty BMS is currently weighing whether or not to move the programme from Leeuwarden to Enschede. The panel considers that a move to Enschede would be beneficial for MEEM, as it would provide opportunities to embed the programme in a wider academic context, including interaction with other MSc programmes, more flexibility in organizing the education, and a possible increase in the intake of Enschede-based BSc graduates. It recommends the faculty to reflect on this and to take a decision taking into account the above considerations.

Considerations

The panel found that the MEEM programme has a well-developed curriculum that is closely aligned with the intended learning outcomes and strikes a good balance between domain-specific and interdisciplinary knowledge. Students are well trained in research and professional skills. Interdisciplinarity and intercultural skills are clear strengths of the MEEM, although the panel recommends more explicit teaching and assessment of these interdisciplinary skills, as well as more deliberate use of intercultural learning in teaching. The diverse academic and cultural backgrounds of the students provide a strong foundation for this. The use of English as the language of instruction is appropriate given the international scope of the programme and the field of study. The programme's broad admissions criteria promote interdisciplinary learning and are supported by clear language requirements and a well-designed pre-master's track for students who need additional preparation.

Student guidance, support and information provision are well implemented in MEEM, with approachable teaching and support staff guiding students throughout their studies. The curriculum is feasible, supported by a small-scale teaching and learning environment and strong student guidance, resulting in high success rates. The panel considers the teaching staff to be a major asset. The staff members are experienced researchers with international recognition and expertise relevant to the programme content. The facilities in Leeuwarden are up to standard and contribute to a strong sense of community. However, the location also presents challenges related to MEEM's relatively isolated position with respect to the rest of the university. The panel believes that a move to Enschede, which is currently under consideration, could be beneficial for the programme and recommends that the faculty BMS reflect on this and make a decision that takes these challenges into account.

Conclusion

The panel concludes that the programme meets standard 2.

Standard 3. Student assessment

The programme has an adequate system of student assessment in place.

Findings

System of assessment
The assessment plan and policy of MEEM are drafted by the programme management, and established after reviewing feedback from MEEM teachers, the Examination Board and an assessment expert from the UT. The assessment plan provides an overview of all courses in the programme, the associated course goals and assessment methods, and to what extent these courses and their assessment contribute to the realization of the ILOs by students.

The assessment policy describes the programme's vision on assessment, assessment regulations and quality assurance mechanisms. MEEM's assessment vision is aimed at enhancing students' development and self-learning through diverse and appropriate assessment methods. The associated policies include alignment between learning outcomes and assessment, a balanced mix between formative and summative assessment, as well as varied assessment methods. Test types in the programme include written exams, individual and group assignments (such as reports and papers) and presentations. The Case Project is assessed through a group report and presentation. Upon advice of the previous accreditation panel, the programme uses self-reflections and peer-to-peer evaluations halfway and at the end of the project to monitor individual contributions and provide students with feedback on their performance.

Quality assurance mechanisms include clear procedures on communicating on assessment criteria to staff and students, the involvement of at least two examiners in the design and grading of each test, and screening of each course by assessment experts at least once every six years. The programme's Examination Board, which it shares with the other Governance Sciences programmes in the BMS Faculty, is responsible for safeguarding the quality of assessment in the programme as well as the exit level of students. It advises the programme management upon request and unrequested concerning assessment policies. The Board meets with the programme management twice a year to discuss issues and resulting actions regarding assessment quality. It also meets with staff members to discuss issues such as fraud, plagiarism and guidelines for the use of generative AI.

The programme management and Examination Board monitor the programme's exit level through the thesis carrousel. This is a peer review of a representative sample of theses by examiners not involved in the original assessment, which the programme organizes once every three years. The programme management analyses the results from this peer review, focusing for instance on deviations from the original assessment in overall or criterion grades, and shares the findings with the Examination Board and the original supervisors. The most recent thesis carrousel in 2022-2023 showed a good level of consistency, and resulted in adaptations to the thesis assessment form clarifying the criteria and the role of the two examiners.

The panel examined the programme's assessment system and interviewed staff, students, and the Examination Board. It commends the clear assessment policies, including the measures in place to ensure the quality of assessment. It also appreciates the varied and balanced assessment methods used throughout the curriculum. Most courses use a combination of group and individual assessment, as well as peer feedback in projects, to ensure that students can always demonstrate sufficient individual mastery of course objectives. The panel considers this to be an appropriate response to the previous panel's recommendations. The Examination Board fulfils its duties and has sufficient checks and balances in place to

keep track of the assessment quality in the programme. According to the panel, the thesis carrousel is a good mechanism to keep track of the exit level of the programme. It was also happy to learn that the Examination Board used the results of this exercise to advise the programme on possible improvements, which were followed up by the programme management.

Based on student remarks, the panel felt that further attention to alignment between examiners might be useful for some assessment procedures. This includes the role of the second examiner in thesis assessment (see below) and the role of feedback in course assessment. Students told the panel that the amount and type of feedback they received on assignments can vary between examiners, and mentioned that in some cases formative feedback did not meet their expectations. The panel thinks that better communication should help about what kind of feedback students can expect, as well as alignment between examiners about expectations regarding feedback.

According to the panel, one area requiring attention in the current assessment setup is the frequent use of essays and reports, since the programme runs the risk of students using generative AI to assist them in such tests. Currently, it is up to individual staff members to signal the potential use of AI and to work with the Examination Board to address suspicions. The panel appreciates that the programme already has measures in place, such as requiring students to mention any use of generative AI and repercussions for the improper use of AI depending on the nature of the offence. At the same time, it recommends a more thorough, programme-wide reflection on AI-proofing the assessment system. In the process, the panel believes that the Examination Board should take a proactive role in ensuring that the current assessment system is prepared for the major changes expected in the coming years with respect to generative AI. This goes not only for the assessment of writing skills, but also for skills such as solution creativity. Furthermore, AI literacy for staff and students will be of importance. As a programme focused on sustainability, the panel believes that sustainable use of AI, with attention paid to the large energy consumption associated with it, should also be part of this AI literacy.

Thesis assessment
Each master's thesis is assessed by two examiners. The first examiner is the student's supervisor, who is responsible for overseeing the content and process of the thesis. The second examiner ensures quality control by providing formative feedback and assessment during key stages of the thesis, such as the green-light moment and the final assessment. In the case of complementary expertise to the supervisor in terms of topic and methods, the second examiner can also contribute to supervision of the student. A standard thesis assessment form, including a rubric with multiple criteria, is used to grade the thesis. The form includes four criteria related to the research project and thesis report (75% in total), one criterion on the process, independence and project management of the student (15%), and one concerning the defense during the thesis colloquium (10%). Each examiner grades the thesis independently and fills out the assessment form separately. The grade on each criterion is the average of the two examiners' grades, and the student's final grade is the weighted average of the different assessment criteria. Compensation between sub-grades is not allowed; each grade needs to be 5,5 minimum for the student to be eligible for graduation. The two examiners jointly complete the final assessment form, and provide qualitative substantiation of the grades as well as written feedback to the student.

The panel commends the programme for its clear procedures for evaluating theses. Based on its own evaluation of theses and the associated evaluation forms, the panel concludes that theses are usually graded appropriately. The grading criteria, subgrades, and rubrics promote reliability and validity in grading. Regarding the role of the second examiner, the panel thinks that the supervision and assessment could be more strictly separated. At the moment, second examiners can take a double role as second supervisor if

their expertise is relevant to the project. The panel feels that each thesis should have one examiner fully independent from the process, and recommends separating the role of second supervisor and second examiner. In addition, the panel found that assessment practices, which generally followed procedures well, in some cases deviated from the general rules. For example, the panel found that the alignment between the two examiners and the rationale for the final grade was not always apparent from the assessment form. The panel found one borderline thesis (see Standard 4) where the two examiners gave a 5 and a 6 respectively on the written report, with no further explanation as to why a passing grade was agreed upon. In addition, the presentation appeared to have played a decisive role in the awarding of the degree, but these considerations were not made explicit either on the evaluation form. The panel recommends that all examiners follow the procedures for evaluating theses closely, and that additional guidance be provided to examiners where necessary.

Considerations

The assessment system of the programme is well designed, with varied assessment methods and clear checks and balances to promote assessment quality. The Examination Board fulfils its legal duties and has sufficient mechanisms in place to safeguard assessment quality and the exit level, of which the thesis carrousel is considered a best practice by the panel. Thesis assessment procedures promote reliable and valid assessment, with well-designed criteria and rubrics. A point of attention is ensuring that all examiners implement these procedures and tools as intended. This encompasses expectations for feedback on course assignments and substantiation of the considerations used for giving specific grades on the assessment form. Furthermore, the panel recommends a stricter separation of supervision and assessment: it feels that the second examiner of the thesis should be independent from the process and not fulfil a double role as supervisor and examiner. Finally, the panel recommends a programme-wide reflection on AI-proofing assessment. This includes a broad reflection on skills assessment, as well as promoting AI literacy for staff and students.

Conclusion

The panel concludes that the programme meets standard 3.

Standard 4. Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Findings

Theses

As part of the preparation for the site visit, the panel studied a selection of 15 recent master's theses of the programme. It found the theses generally be of the required master's level. Students demonstrate solid research competencies on interesting topics related to sustainability and stakeholder engagement. One out of the 15 theses the panel read concerned a borderline case that the panel would not have given a pass. The panel understood from the assessment form that the presentation gave the final push towards a sufficient grade, but would have welcomed more substantiation in the assessment form regarding this decision. This is further discussed under standard 3. The quality of the other 14 theses convinced the panel that this particular case was an outlier that did not undermine the overall quality of the theses, showing that students meet the intended learning outcomes of the programme.

Alumni

After graduation, alumni find a diversity of positions in the public or private sector, from commercial companies to NGOs, and from local authorities to environmental consultancies, in roles such as manager, consultant, policy advisor or researcher. In a recent alumni survey, 57% of graduates mentioned that their employment is in a field directly relevant to MEEM. Two-thirds of the graduates remain in the Netherlands, with one-third finding a job abroad. MEEM is in close contacts with its alumni, primarily via the UT Alumni community and the MEEM Alumni LinkedIn group. Based on these results, the panel is confident that most graduates find a relevant job, demonstrating that the programme has equipped them with the necessary knowledge and skills.

Considerations

The quality of the master's theses as well as the job market position of graduates demonstrate that students achieve the intended learning outcomes of the programme. The theses are generally good with solid research competencies. Graduates find relevant jobs after graduation, using the knowledge and skills obtained in the programme.

Conclusion

The panel concludes that the programme meets standard 4.

General conclusion

The panel's assessment of the master's programme Environmental and Energy Management is positive.

Recommendations

1. Use interdisciplinarity and intercultural skills more explicitly in teaching. This includes teaching and assessment of interdisciplinary skills, as well as more deliberate use of intercultural learning, using the diverse academic and cultural backgrounds of the students as starting point.

2. Consider a move of MEEM from Leeuwarden to Enschede, which the panel believes would be beneficial to the programme.

3. Engage in a programme-wide reflection on AI-proofing assessment. This includes a broad reflection on skills assessment, as well as promoting AI literacy for staff and students.

4. Ensure that all examiners use the assessment procedures and tools as intended, including ensuring that all examiners provide the necessary justification for grades on the assessment form.

5. Create a stricter separation between assessment and supervision in thesis assessment, requiring the second examiner to be independent from the process and not fulfil a double role as second supervisor.

Appendix 1. Intended learning outcomes

1. Expertise within and across MEEM domains Graduates have interdisciplinary knowledge about the topics and trends in sustainability science, particularly in the domains of environmental, energy and water management and governance, and can further develop this knowledge.
1.1 Graduates have knowledge of theories, methods, techniques and topical questions regarding the political, managerial, legal and regulatory aspects of resource use and governance in the MEEM domains.
1.2 Graduates are able to integrate knowledge from disciplines that relate to the MEEM domains; understand interrelationships in social-ecological and socio-technological systems, including, if relevant, spatial and digital dimensions.
1.3 Graduates are able to apply combinations of concepts, theories and tools from relevant disciplines to reason, evaluate, and design in real-life cases and specific contexts; to identify the barriers and enablers of change; and to assess the usefulness and feasibility of these concepts, theories and tools in real-life cases and various contexts.
1.4 Graduates are able to spot gaps in their own knowledge independently, and to revise and extend their knowledge through study.

2. Competence in doing research Graduates can acquire new scientific knowledge through research. For this purpose, research means the development of new knowledge and insights in a purposeful and methodical way, aimed at socio-technical changes towards improved environmental, energy and water management and governance.
2.1 Graduates are able to formulate research problems, taking the system boundaries into account, and to defend the formulation against involved parties.
2.2 Graduates are able to compose and execute a research plan by performing a literature review, collecting and analysing data, and making recommendations and designs towards fundamental understanding and/or case-related problem solving.
2.3 Graduates are able to independently assess research within the disciplines relevant to the MEEM domains on scientific value, and draw conclusions upon research as performed, and argue about their assessment and conclusions.
2.4 Graduates are able to deal with the changeability of the research process through (unforeseen) external circumstances or advancing insight, and are able to steer the process on the basis of this.

3. Competence in designing solutions Graduates can design solutions, such as by challenge- and case-based recommendations or guidelines for the use of instruments or tools. Designing for this purpose means a synthetic activity aimed to solve problems or improve processes in socio-technical systems.
3.1 Graduates are able to describe wicked problems that a solution is desired for, while taking account of the system boundaries, and to defend this description against the parties involved.
3.2 Graduates are divergent and flexible thinkers and have synthetic skills with respect to original and innovative design solutions to (case-related) problems, also in a challenge-based manner, involving a (SMART) design of action upon having engaged with and researched the challenge.
3.3 Graduates are able to formulate a design for action, programme, policy, project or recommendations for environmental, energy or water management and/or governance issues in their context, based on integrated knowledge.

4. Demonstration of a scientific approach Graduates can apply a systematic approach, characterised by the development and use of scientific theories, models and coherent interpretations, demonstrate a critical attitude, and have insight into the social science and its relationship with technology and natural resources.

4.1 Graduates are able to give a balanced answer that points out strengths and weaknesses also by comparison of existing theories, models or interpretations in the area of their graduation subject.
4.2 Graduates are skilled in understanding and modelling complex adaptive social-ecological and socio-technical systems, to critically choose between relevant analytical techniques, and to adapt such techniques for their own use.
4.3 Graduates have insight into the relationships between natural resources and socio-technical processes and have knowledge about current debates on these relationships.
4.4 Graduates have insight into (the current debates about) the scientific practice (research system, relation with clients, publication systems, the importance of integrity, providing proper credits and references, etc.) and are able to apply this in their own work.

5. Demonstration of basic intellectual skills Graduates are competent in reasoning, reflecting, and forming a judgment. These are skills which are learned or sharpened in the context of disciplines relevant to the MEEM domains, and which are generically applicable from then on.
5.1 Graduates are able to critically reflect based on experience and academic content to give meaning to their own thinking, decision making and acting and are able to adjust these on the basis of this reflection.
5.2 Graduates are able to recognise modes of reasoning (induction, deduction, analogy etc.) within the field and are able to apply these modes of reasoning.
5.3 Graduates are able to form a well-considered and reasoned opinion in the case of incomplete or irrelevant data, taking account of the way in which that data is collected or created.

6. Competence in cooperation and communication Graduates can work with and for others as a change-agent in the endeavour of fostering sustainable development. This requires not only interaction, responsibility, and leadership, but also communication with academic and societal stakeholders.
6.1 Graduates are able to communicate about their research and solutions to problems with academic and societal stakeholders. If and when relevant, they can do so by taking the role of change agent, actively contributing to communicating and cooperating towards fostering sustainable development in the MEEM domains.
6.2 Graduates demonstrate transversal skills such as self-discipline, enthusiasm, perseverance, self-motivation, as well as drive, reliability, commitment, accuracy, and independence.
6.3 Graduates are able to cooperate constructively as a member of a multi-disciplinary and international team to analyse and solve challenging, complex and wicked problems (be it local or global) in the MEEM domains.

7. Awareness of the temporal and social context Graduates are aware of the social and temporal context of science and technology, and can demonstrate this awareness in their work, such as by considering their role as a change agent fostering sustainable development.
7.1 Graduates are able to analyse and to discuss the social consequences of the new developments in MEEM domains with academic and societal stakeholders, and integrate these consequences in their scientific work.
7.2 Graduates can critically analyse and discuss the ethical and normative aspects in MEEM domains, as well as the consequences and assumptions of scientific thinking, and integrate these aspects in a well-considered and responsible way in their scientific work.
7.3 Graduates pay attention to and reflect on the different roles of professionals in society, such as being a change-agent for sustainable development, with a view on global citizenship and with an attitude of tolerance, openness, respect for diversity, and with intercultural understanding.

Appendix 2. Programme curriculum

MSc MEEM structure	EC
Mandatory courses	28
Mandatory Specialisation	28
Personal Development Electives	4
Total EC's	60

Qrt	Code	Name	EC	Coordinator
1-2	Mandatory Courses		28	
1	201700114	Environmental Management	4	Franco Garcia
1	201700116	Energy Management	4	Aukes
1	202300113	Water Management	4	Casiano Flores
1	201900112	Sustainability & Law	3	Heldeweg
2	202300122	Policy and Sustainability	3	Sanderink
2	202300112	Rurban Commons	6	Özerol
2	202300121	Academic Research Skills	4	Casiano Flores
3-4	Mandatory Specialisation		28	
3	202001451	Research Proposal	3	Özerol
3	201900129/30/31	Case Project (Energy/ Environment/ Water)	10	Franco Garcia, Sanderink, Lulofs
4	202001452/53/54	Master Thesis (Energy/ Environment/ Water)	15	Franco Garcia, Aukes, Lulofs
2-3	Personal Development Electives (one per quartile)		4	
2	202100152	Sustainability & Justice	2	Ibrahim
2	202100153	Digitalisation & Sustainability	2	Chiappini
3	202200311	Critical Sustainable Futures	2	McGreevy
3	202001456	Stakeholder & Social Network Analysis	2	Metz
	Total EC		60	

Appendix 3. Programme of the site visit

Tuesday 8 April 2025

08.45 - 09.15	Welcome and panel preparation
09.15 - 10.00	**Interview with programme management**
10.00 - 10.15	Break
10.15 - 11.00	**Interview with teaching staff**
11.00 - 11.30	Break
11.30 - 12.15	**Interview with students and alumni**
12.15 - 13.00	Lunch
13.00 - 13.30	**Interview with Examination Board**
13.30 - 15.00	**Thematic sessions**
15.00 - 15.45	Internal panel session
15.45 - 16.15	**Concluding session with programme management**
16.15 - 17.00	Internal panel session
17.00 - 17.15	**Oral feedback from panel and closing**

Appendix 4. Materials

Prior to the site visit, the panel studied 15 theses of the master's programme Environmental and Energy Management. Information on the theses is available from Academion upon request.

The panel also studied other materials, which included:

- Intended Learning Outcomes
- Domain specific reference framework Environmental Sciences
- Report previous accreditation and reflection on recommendations
- Programme description
- Curriculum overview
- Annual report Examination Board
- Assessment Policy
- Rules and Regulations Examination Board
- Video of Leeuwarden facilities
- Student information website
- MEEM Study Guide
- Memo MEEM Professional Advisory Board
- Admission Requirements and pre-master programme
- MEEM Extracurricular Workshops and Activities
- Course Descriptions of all courses (incl. Case Project and master thesis)
- Teaching Qualifications
- Research Expertise of MEEM Teachers
- Teacher's Guide
- Link to Student Guidance and Well-being
- Overview of Support Available to Students
- Annual Improvement Plan 2024-2025
- Example Course Evaluation
- MEEM Assessment Policy and Assessment Plan
- Examples exam questions and model answers
- Example Exam Energy Management
- Thesis Assessment Form 2023-2024
- Screening Report assessment evaluations
- Examination Boards BMS Annual Reports
- Master Education & Examination Regulations (EER) BMS 2024-2025
- MEEM Programme Specific Part of EER 2024-2025
- Guidelines for MEEM Master Thesis 2024-2025
- Thesis Carousel Report
- MEEM Alumni Testimonials and Exit Survey