TO: Randy Smith, Vice Provost for Academic Programs

FROM: Graduate School Curriculum Services

DATE: November 24, 2025

RE: Proposal to **establish a Master of Sustainable Energy in the Sustainability Institute**

The **Sustainability Institute with collaboration from the College of Arts and Sciences, College of Engineering and College of Food, Agriculture and Environmental Science, is proposing a new Master of Sustainable Energy degree program.**

The proposal was received by the Graduate School on November 14, 2025. The combined GS/CAA subcommittee reviewed the proposal on November 24, 2025, and supports its review by the Council on Academic Affairs.

THE OHIO STATE UNIVERSITY
SUSTAINABILITY INSTITUTE

Sustainability Institute
The Ohio State University
3018 Smith Lab
174 W. 18th Ave.
Columbus, OH 43210

614-247-4762 Phone

si.osu.edu

November 13, 2025

W. Randy Smith, PhD
Vice Provost for Academic Programs
Office of Academic Affairs
The Ohio State University
Columbus, Ohio 43210

Dear Randy:

Attached you will find a proposal for the *Master of Sustainable Energy*, facilitated by the Sustainability Institute, with the degree conferred by the Graduate School. The College of Arts and Sciences, College of Engineering, and College of Food, Agricultural, and Environmental Sciences are collaborating and sponsoring academic units.

The overarching goal is to launch a new interdisciplinary graduate-level professional *Master of Sustainable Energy* (MSE) degree using a framework to initially offer an MSE degree *Generalist Pathway* curriculum and eventually add various curricula for MSE degree *Specialist Pathways.* All pathways to earn the MSE degree will align with 10 *Foundational Competencies* and the associated 19 semester credits of *Foundational Courses*. **The plan is to launch the proposed 34 semester credit *Generalist Pathway* curriculum by academic year 2026-2027.** Graduates from the program will demonstrate knowledge, skills, and attitudes to prepare them for careers across the spectrum of energy resource and technology sectors.

Letters of support from the College of Arts and Sciences, College of Engineering, and College of Food, Agricultural, and Environmental Sciences are included in the proposal.

Thank you for considering our proposal, and the associated Autumn 2026 launch.

Best,
Elena

Elena Irwin
Director, Sustainability Institute
Distinguished University Professor, College of Food, Agricultural, and Environmental Sciences
The Ohio State University

Proposal for an Interdisciplinary Graduate-Level Professional Degree: *Master of Sustainable Energy* (MSE) (34 semester credits)

Submission Date of Original Final Proposal: January 30, 2025
(Submission Date of Second Revised Final Proposal: November 12, 2025)

Goal

The overarching goal is to launch a new interdisciplinary graduate-level professional *Master of Sustainable Energy* (MSE) degree using a framework to initially offer an MSE degree *Generalist Pathway* curriculum and eventually add various curricula for MSE degree *Specialist Pathways.* All pathways to earn the MSE degree will align with 10 *Foundational Competencies* and the associated 19 semester credits of *Foundational Courses*. The plan is to launch the proposed 34 semester credit *Generalist Pathway* curriculum by academic year 2026-2027. Graduates from the program will demonstrate knowledge, skills, and attitudes to prepare them for careers across the spectrum of energy resource and technology sectors.

Facilitating Units

- **Ohio State University Sustainability Institute**
  - **Sustainability Education and Learning Committee** (represented by Co-Chairs Elena Irwin and Michael Bisesi and its **Graduate and Professional Education Subcommittee**)
- **Graduate School** (represented by Maria Miriti)

Collaborating and Sponsoring Academic Units (represented by their respective Graduate and Professional Education Subcommittee members/proposal co-authors)

- **College of Arts and Sciences** (represented by David Cole and Max Woodworth)
  - Department of Geography
  - School of Earth Sciences
- **College of Engineering** (represented by Daniel Gingerich and Rajiv Ramnath)
  - Department of Civil, Environmental, and Geodetic Engineering
  - Department of Computer Science and Engineering
  - Department of Mechanical and Aerospace Engineering
- **College of Food, Agricultural, and Environmental Sciences** (represented by Jeremy Brooks, Jonathan Fresnedo Ramirez, and Brent Sohngen)
  - School of Environment and Natural Resources
  - Department of Agricultural, Environmental, and Development Economics
  - Department of Horticulture and Crop Sciences

Executive Summary

This proposal to develop and implement the new *Master of Sustainable Energy* (MSE) degree represents one of several actions and outcomes from the coordinated and collaborative efforts at The Ohio State University, via its Sustainability Institute (SI), to enhance and expand sustainability-related education, research, and community engagement. The focused visioning initiative, led by SI Faculty Director Elena Irwin, was officially launched during January 2023 and involved applicable groups of faculty and administrators. The first product from the initiative is the document *Advancing Education at Ohio State: Education and Workforce Development* that was completed and released during June 2023. The document, found here https://oaa.osu.edu/sustainability, shares a vision to *promote the health, justice and well-being of people, biodiversity, and the environment of Ohio, the nation, and the world by educating and empowering sustainability leaders, practitioners, and change agents across the lifespan of learning at The Ohio State University.* In relation to this, the document summarizes plans for actions and outcomes specifically focused on sustainability-related education and workforce development at Ohio State.

A Graduate and Professional Education Subcommittee (GPES), under the SI Sustainability Education and Learning Committee (SELC) established in 2018, was organized and launched during January 2024 as one of four subcommittees to implement the plan and applicable education initiatives. This specific proposal was developed by the GPES members with the goal to launch an interdisciplinary graduate-level professional *Master of Sustainable Energy* (MSE) degree at Ohio State during the 2026-2027 academic year. This effort aligns well with the United Nation Sustainable Development Goal #7 *Ensure access to affordable, reliable, and sustainable and modern energy for all*.[1] The conceptual framework and model for this program is shown in Figure 1 and summarized in more detail throughout the proposal.

The proposed MSE degree program is interdisciplinary involving three Colleges and will leverage the Ohio State *EmPOWERment* program, which started in 2019 as a National Science Foundation funded National Research Traineeship. The overarching aspiration is to contribute to meeting the societal challenge of fostering a sustainable energy future. To date, the Ohio State *EmPOWERment* program has 46 affiliated faculty members, a 14-member internal advisory council, plus a 7-member external advisory council.

Rationale for Developing and Implementing the New MSE Degree

The world is experiencing an energy revolution focused on the dual challenges of meeting a growing global demand for energy and reducing the impact of energy generation and utilization. Presently, the spectrum of technologies is vast and ranges from conventional fossil fuel-based technologies to alternatives that do not use fossil fuel as an energy resource. *Sustainable energy* includes a foundational provision of energy to meet the needs of the present without compromising the ability of future generations to meet their needs. However, inherent to sustainable energy requires going beyond energy technologies and energy generation. It requires building a more holistic sustainable energy system that includes the additional focus areas of energy resources plus energy transmission, distribution, demand, and use.

[1] United Nations (2015). *Transforming Our World: The 20230 Agenda for Sustainable Development*. https://sdgs.un.org/publications/transforming-our-world-2030-agenda-sustainable-development-17981

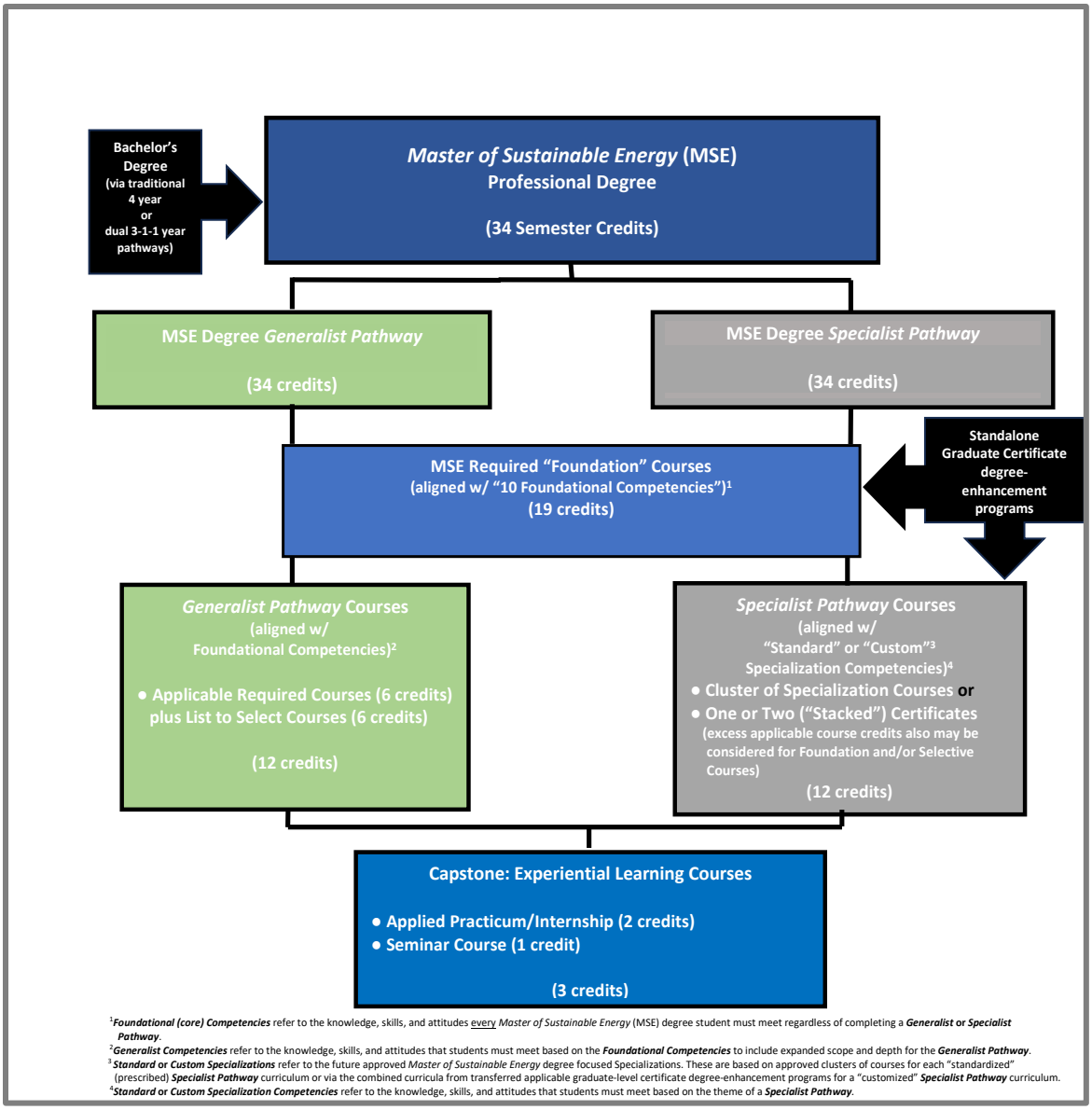

Figure 1. Model for the MSE Degree *Generalist* and *Specialist Pathways*

The transition to a more sustainable energy system will require understanding and evaluating technical and non-technical interventions throughout the entire system, from generation-to-distribution-to-use. Evaluating and implementing these technologies, with the overarching goal of ensuring that society's energy needs are met without adversely affecting the natural or social environment, requires a foundation in applied energy sciences while also leveraging and integrating skills and techniques developed in a variety of complementary disciplines. Likewise, maximizing the impact of technological developments will require a deeper understanding of the complex socio-economic, cultural, and political factors that adequately foster or hinder widespread distribution of sustainable energy production and transmission facilities as well as consumer needs and demand for sustainable energy and products that are dependent on it.

The MSE Degree and Workforce Development

An Ohio State University Workforce Development Committee led by Vice Provost Randy Smith and co-led by former Vice Dean Michael Bisesi created and adopted a framework for workforce development summarized in the document *The Conceptual Elements for Framing and Defining Workforce Development at The Ohio State University*. Within the framework document that was completed and released during May 2020 two major workforce categories are defined as follows:

1) The *emerging workforce* category are those focusing exclusively on full-time pursuit of a degree program that upon completion will lead to applicable employment and a career. The education and training required is exclusively academic credit-based.
2) The *present workforce* category refers to those who are focused primarily on working full-time as well as those who are interested in working full-time but are underemployed or unemployed. This group may have an interest in pursuing academic part-time education and training to earn a credential in the form of an academic credit-based degree or certificate program to enhance their knowledge and skills to meet present and/or future needs or wants. This same group may be interested in pursuing other shorter education and training in the form of non-credit modules, short courses, and workshops.

As an extension of this effort plus to prepare the *Advancing Education at Ohio State: Education and Workforce* document, a Sustainability Education Visioning Committee (SEVC) collected applicable employer stakeholder data by 1) conducting a survey distributed to 100 external recipients, 2) hosting 3-hour listening sessions to allow for more comprehensive details about and understanding of survey responses, and 3) facilitating individual interviews for those unable to participate in the scheduled listening sessions. These coordinated integrated efforts resulted in a collection of 1,100 data points, from which nine primary areas of emphasis emerged:

1) Employers are thinking about sustainability and are concerned about related issues such as the political climate, the circular economy and waste reduction, environmental justice, climate change, net zero emissions, population growth, the regulatory environment, and technology.
2) Sustainability touches all jobs, and employers expect their employees to have a base level of sustainability knowledge that is supplemented with in-house job training.
3) Employers need knowledge and expertise regarding policy/regulatory processes, waste, and materials management, ESG knowledge, and expertise in areas such as climate change, energy purchasing, and information systems.
4) Employees need to be able to work in interdisciplinary environments and with teams.
5) Employees need to possess both hard and soft skills, including subject matter expertise, a sustainability mindset, training in basic STEM, project management, communication, policy, regulation, and engineering/manufacturing processes.
6) Job candidates ideally come with real-world experiences, and these can be gained through capstones, internships and other interactions with practitioners and alumni inside and outside the classroom.
7) There is a need for training to keep up with technological change and changes in jobs.
8) Employers believe that Ohio State has an opportunity to better prepare its students by providing experiential learning, teaching interdisciplinary and systems thinking, promoting diversity and social sustainability, and integrating sustainability throughout the curriculum.
9) Employers believe Ohio State can help better prepare existing employees by creating alternative credentials such as certificates, training programs, and modular videos, fostering real world experiences, creating partnerships, and teaching critical thinking and communication.

The nine areas of emphasis align with a need and demand for the proposed sustainability-related MSE degree and are further emphasized, as examples, by the following employer stakeholder responses to applicable questions: 1) 90% of respondents said "yes" when asked, *Is there a basic level of knowledge about sustainability that you would like all your employees to possess?* 2) 80% answered "yes" to *Do any positions in your organization require more specialization related to sustainability?* and 3) 80% responded "yes" to *Looking ahead, are there any sustainability-related knowledge and/or skills you expect your organization to need in the future?*

Indeed, there are both need and demand for degree programs focused on sustainability and energy related to continued technology expansion and workforce development. These are global needs, as reported for examples, in the International Energy Agency (IEA). *World Energy Outlook*[2] and the International Renewable Energy Agency (IRENA) *Renewable Energy and Jobs – Annual Review*[3].

The applicable public and private employment sectors are engaged in energy-related activities ranging from exploring novel sources of energy to developing and deploying generation, distribution, and conservation of energy efficient technologies. Understanding their impact on the environment and society requires that both the *emerging workforce* and *present workforce* are appropriately and adequately educated in the energy-related natural and social sciences and professions (e.g., engineering, business). Although the employment of graduates from The Ohio State University is not limited geographically to only Ohio, representatives from various energy sectors located in Ohio have stated that there is a demand for an appropriately and adequately educated workforce.

Phases for the Proposed Master of Sustainable Energy (MSE) Degree Program

The framework of the MSE degree model (Figure 1) reflects pathways for developing and implementing *generalist* and *specialist* curricula that align with identified societal and workforce needs and wants applicable to all aspects of sustainable energy. The first phase is to launch the 34-semester credit Master of Sustainable Energy (MSE) degree *Generalist Pathway* to provide an opportunity for both the emerging workforce and the present workforce to expand and enhance their knowledge, skills, and attitudes through completion of a sustainability-themed curriculum. The curriculum will emphasize and focus primarily, but not exclusively, on a variety of applicable energy topics. The Generalist Pathway curriculum was developed by first establishing ten *Foundational Competencies* (listed later in Table 2) and then aligning courses and course content with these competencies (shown later in Table 3).

While this initial phase focuses on the MSE degree *Generalist Pathway*, the second phase will involve the SI SELC Graduate and Professional Education Subcommittee working with academic units to catalyze and facilitate planning for and developing "standardized" and "customized" *Specialist Pathways*. Curriculum development for all MSE degree pathways will embed the more general ten *Foundational Competencies* and the aligned required *Foundational Courses* (18-credits). The *Specialist Pathways*, however, will also

[2] International Energy Agency (2024). *World Energy Outlook*. https://www.iea.org/reports/world-energy-outlook-2024
[3] International Renewable Energy Agency (2024). *Renewable Energy and Jobs – Annual Review*. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2024/Oct/IRENA_Renewable_energy_and_jobs_2024.pdf

include developing three to five *Specialization Competencies* and aligning them with *Specialization Courses* for each of the respective specialist curricula. For example, the MSE degree specializations can be developed and offered across a spectrum of focus areas including business and economics, policy, environmental and geological (e.g., subsurface), energy engineering technology, among other areas.

The second phase will also include concurrently developing applicable graduate-level certificate programs. The vision is to provide all students with sufficient foundational content, but also choices for "standardized" (prescriptive) energy-focused specializations as well as options for others to apply individual or combined ("stacked") energy-related certificates for competency-based "customized" specializations. For example, some may initially pursue and complete a certificate program. The framework of the MSE degree model will allow those students to apply one or even stack two applicable certificate programs and count some or all the completed courses toward the *Generalist Pathway*, a "standardized" *Specialist Pathway*, or a "customized" *Specialist Pathway*.

Options for the MSE degree *Generalist Pathway* and *Specialist Pathways* align with responses from employer stakeholders collected during the SEVC visioning process when participants were asked, *What types of positions within your organization require more specialized sustainability-related knowledge and skills?* For one example, 10 of 39 (26%) respondents indicated that "energy planning management" required more specialization. Indeed, in Ohio, and beyond, there has been and continues to be emphasis on expanding and enhancing sources of and technologies for generating energy that is sustainable from natural resource, economic, and environmental perspectives. The proposed options for MSE degree pathways will create opportunities for offering curricula with applicable scope and depth to meet the needs and wants of the emerging workforce and present workforce while simultaneously aligning employers' interests as well.

Examples of Other Applicable Graduate-Level Degree Programs in the Big Ten plus Ohio

Given the global (i.e., regional, national, and international) needs and demands regarding resources for, sources of, and technology for sustainable energy, it is encouraging to know that there are several universities within Ohio and the Big Ten that presently offer master-level degree programs that align with sustainability and emphasize energy resources, technologies, and their impact (Table 1). Most of the universities listed that have already developed and implemented applicable graduate-level degree programs have focused on the engineering aspects. The Master of Sustainable Energy (MSE) degree proposed here is similar but not the same as those degree programs listed in Table 1. As described earlier in this proposal, the framework of the Ohio State MSE degree model initially allows for a more general sustainable energy pathway/curriculum plus eventually varieties of specialized sustainable energy-related pathways/curricular offerings.

Although Ohio State is behind in having a specific master-level degree in this space, the University presently has several units with faculty engaged in conducting high-level basic and applied energy-related research and directing/teaching energy-related courses. In addition, representative faculty from these units are contributing to the EmPOWERment project funded by the National Science Foundation. Indeed,

there is a need for expansion with an emphasis on education and research beyond this, with sustainable energy focus, which allows for more interdisciplinary collaboration and cooperation. Leveraging faculty knowledge and skills plus other resources across academic units, as proposed here, will lead to more efficient and effective education and training of students. Indeed, given its size, scope, and depth, Ohio State alone and in collaboration and cooperation with other applicable agencies, organizations, companies, and universities, is well-positioned to be among the leaders in sustainability, including energy-focused education and research.

Table 1. Examples of Similar Degree Programs at Big Ten and Ohio Universities.

University	Degree Offered	Number of Semester Credits	Examples of Curricular Requirements
Big 10 Universities			
University of Illinois	Master of Engineering in Energy Systems	32	Professional development requirement (practicum, project, or coursework)
Indiana University	Master of Science in Environmental Science - Energy and Climate Change	42	Capstone or Thesis. Internship required over the summer.
University of Maryland	Master of Engineering in Energy Systems Engineering	30	Coursework-only
Penn State University	Master of Professional Studies in Renewable Energy and Sustainability Studies	33	3-credit capstone or unique topics research
Purdue University	MSChE – Energy Systems and Fundamentals	30	Capstone
Rutgers University	Master of Engineering in Energy Systems Engineering	30	3 credit credits in industry internship or a hands-on project
University of Michigan	MSE in Energy Systems and Sustainability Engineering	30	Thesis (6 credits) or additional coursework
University of Wisconsin	Engineering MS: Energy Engineering Concentration	30 (thesis) or 31 (non-thesis)	Thesis or non-thesis. Non-thesis requires capstone or comprehensive exam
Ohio Universities			
University of Cincinnati	Master of Engineering in Sustainable Energy	30	Capstone
Ohio University	Master's degree Engineering - Sustainable Energy	30	Thesis or non-thesis.
University of Dayton	MS - Renewable and Clean Energy Engineering	30	Thesis (24 credits of coursework, 6 credits research) or non-thesis.
University of Toledo	Master of Energy Engineering	30	Coursework or project option (fewer courses with a work-related project w/ employer/advisor)
Cleveland State	MS Mechanical Engineering – Sustainable Energy Systems	33	Project
Wright State	MSE Renewable and Clean Energy	30	Thesis or non-thesis

Accordingly, the Ohio State MSE degree model proposed here will provide a sustainable energy-focused and versatile framework for graduate students to complete contemporary education and training that will lead to opportunities for applicable employment and/or more advanced studies. In addition, as mentioned, the proposed MSE degree program at Ohio State will be collaboratively and cooperatively interdisciplinary. This approach will provide students with a broader scope of perspectives from the faculty engaged in sustainable energy research sustainable energy as well as related technologies, economics, issues, challenges, and solutions. Given the global needs and demands, there is room for this new degree program from Ohio State plus the other similar (but not the same) energy-focused master's degree programs offered by the other universities listed above in Table 1.

Ten *Foundational Competencies* for the MSE Degree *Generalist Pathway* and *Specialist Pathways*

The proposed curriculum aligns with the nationally-established sustainability competencies that have been adopted by the Ohio State Sustainability Institute's (SI's) Sustainability Education and Learning Committee (SELC). In turn, the curriculum aligns with one or more of SI's *Six-Dimensions of Sustainability*. Accordingly, the proposed MSE degree program is categorized as a sustainability-related degree program based on national and local categorizations. However, central to this proposed MSE degree, ten sustainable energy-focused competencies were established to develop the curriculum required to earn the MSE degree (Table 2). These ten competencies and the aligned curriculum are the basis for the required energy-focused knowledge, skills, and attitudes that the students will acquire while pursuing and upon successful completion of the MSE degree program.

Table 2. MSE Degree *Foundational Competencies* Based on Identified Needs for Applicable Sustainable Energy Knowledge, Skills, and Attitudes

Foundational Competencies for MSE Degree
1 - Compare the types and characteristics of major conventional and emerging technologies used or proposed to generate electricity in a low-impact future.
2 - Articulate the social and behavioral features of energy use and transitions and the factors that may influence technical and non-technical solutions to energy conservation and the move to lower-impact energy systems.
3 - Summarize the mechanisms by which conventional and emerging technologies for energy extraction and generation create environmental and ecological impacts.
4 - Determine the impact of local, national, and international governmental and non-governmental institutions and global governance in promoting sustainable energy and mitigating climate change.
5 - Summarize and apply theories and principles of economics, business, finance, policy, ethics and law as each relates to sustainable energy systems.
6 - Communicate a definition of sustainable energy systems that draw upon elements from different disciplinary perspectives and definitions of sustainability.
7 - Describe the ways that society currently and may in the future transport, store, and use energy.

Foundational Competencies for MSE Degree
8- Describe trends in demand for energy over time and explore how the relationship between changes in energy demand and energy production can aid in identifying pathways to sustainable energy through social, behavioral, and other mechanisms that generate overall energy demand.
9 - Acquire software, analysis, modelling, and computation skills to address sustainable-energy problems.
10 - Assess the opportunities and uncertainties in the sustainable energy landscape to develop solutions plus determine market needs and growth to develop potential technical and business strategies.

The Curricular Framework for the Master of Sustainable Energy (MSE) Degree *Generalist Pathway*

The curriculum required to complete and earn the proposed Master of Sustainable Energy (MSE) degree program *Generalist Pathway* consists of a set of foundational courses (19 semester credits), applicable general courses (12 semester credits), and an experiential learning capstone and seminar (3 semester credits). A total of 34 semester credits are required for the degree curriculum (Table 3.1). A general Plan of Study for completing the MSE Degree Generalist Pathway within 12-months is shown in Table 3.2. Course descriptions for the Foundational Courses plus selections for the General Pathway courses are shown in Appendix A. The only course that needs to be developed is the Practicum in Sustainable Energy, which will be developed by the three Program Co-Directors (once named), or they may identify an applicable practicum course from their respective units. The first offering of the Practicum in Sustainable Energy course will be Summer 2027.

The non-thesis experiential learning capstone requires students to complete an applied practicum placement or rotations at applicable public or private agencies or organizations. Students with their faculty advisor will identify three major Foundational Competencies that align with the experiential learning capstone. Students will be responsible for documenting major activities completed, alignment with the identified competencies, and summarizing the experience in a narrative document that is due upon completion of the practicum. While most students will pursue the required non-thesis experiential learning capstone as a practicum, some students who may already have one-year or more applicable work experience may be eligible for substituting a research thesis/project or waving the 3-credit practicum/internship requirement. This will be determined by the MSE degree Program Co-Directors and Admission Committee faculty members on a case-by-case basis.

Table 3.1 Curriculum for the MSE Degree *Generalist Pathway*: Courses and Aligned General *Foundational Competencies*

Courses	Credits	Colleges (Units)	Aligned Foundational Competencies
Foundational Courses (19 credits)			
AEDE 6320 Energy Economics	3	CFAES (AEDE)	3,5
AEDECON 6500/ ENVENG 6020/ FABENG 6020/ISE 6020 /PUBAFRS 6020/ GEOG 6020 Foundations of Data-Driven Sustainable Energy Systems	3	CFAES/COE/ GCPA/ASC	1,2,4,5,6
PUBAFRS 8620 Innovating for Sustainable Energy Systems	4	GCPA	2,7,10
GRADTDA 5621 Big Data Computing Foundations 1	3	TDAI/COE(CSE)	9
Select 6 Credits: **ENR 7150** Environmental Risk and Decision-Making **ENR 7430** Sustainability Psychology **MECHENG 5194** Comparative Energy	6	 CFAES (SENR) CFAES (SENR) COE (MECH)	 2,8 8 1,7,8
Sub-Total Foundational Course Credits	**19**		
General Pathway Courses (12 credits)			
ENVENG 5170 Sustainability and Circular Economy	3	COE (CEGE)	3,5
GEOG 5802 Globalization and Environment	3	ASC (GEO)	4
Select 6 Credits: **MECHENG 6526** Combustion **MECHENG 5194** Comparative Energy **MATSCEN 5572** Materials for Energy Technology **AEDECON 6300** Environmental Resource Economics **GEOG 5900** Weather, Climate, and Global Warming **GRADTDA 5620** Practical Learning and Mining for Big Data **CIVILEN 6211** Simulation of Building Energy Performance **ISE 5043** Power Systems-Analysis and Operation **CRPLAN 5550** Financing Sustainability **ENR 7400** Communicating Environmental Risk **GEOG 5301** Sustainable Transportation	6	 COE (MAE) COE (MAE) COE (MSE) CFAES (AEDE) ASC (GEOG) TDAI/COE (CSE) COE (CEGE) COE (ISE) COE (CRPPLAN) CFAES (SENR) ASC (GEO)	 1,3 1,7,8 1,3 5 3 9 9 3,5,9 5 2,6,8 4,9
Sub-Total General Pathway Course Credits	**12**		
Capstone Courses (3 credits): Experiential Learning + Selectives + Seminar			
<insert alpha code> Practicum in Sustainable Energy	2	Interdisciplinary	identify 3 competencies
EARTHSC 8860 Seminar in Energy Resources	1	ASC (SES)	Identify 3 competencies
Sub-Total Capstone Course Credits	**3**		
TOTAL MSE Degree Curriculum Credits	**34**		

Table 3.2 General Plan of Study Completing the MSE Degree within 12-months.

Courses	Credits	Delivery Mode
Autumn Semester		
AEDE 6320 Energy Economics	3	Online
AEDECON 6500/ENVENG 6020/FABENG 6020/ISE 6020 /PUBAFRS 6020/ GEOG 6020 Foundations of Data-Driven Sustainable Energy Systems	3	In-Person
GRADTDA 5621 Big Data Computing Foundations 1	3	Online
Select a 3-credit course from the three listed courses that follow: **ENR 7150** Environmental Risk and Decision-Making or **ENR 7430** Sustainability Psychology or **MECHENG 5194** Comparative Energy (see prerequisites)	3	In-Person
GEOG 5802 Globalization and Environment (**or during Spring**)	3	In-Person
Selective Course (**or during Spring or Summer**)		

Spring Semester		
PUBAFRS 8620 Innovating for Sustainable Energy Systems	4	In-Person
Select a 3-credit course from the three listed courses that follow: **ENR 7150** Environmental Risk and Decision-Making or **ENR 7430** Sustainability Psychology or **MECHENG 5194** Comparative Energy (see prerequisites)	3	In-Person
ENVENG 5170 Sustainability and Circular Economy	3	In-Person
GEOG 5802 Globalization and Environment (**or during Autumn**)	3	In-Person
EARTHSC 8860 Seminar in Energy Resources	1	In-Person
Selective Course (**or during Autumn or Summer**)		
Summer Term		
Practicum in Sustainable Energy	2	Off-Site
Selective Course (**or during Autumn or Spring**)	3	

Administrative Oversight

The administrative oversight, admissions, curriculum, assessment, and advisement for the MSE degree *Generalist Pathway* will be provided and conducted by representatives from each of the three sponsoring colleges (College of Arts and Sciences; College of Engineering; and College of Food, Agriculture, and Environmental Sciences). Each of the three collaborating and cooperating colleges will have a designated faculty member serving as the interdisciplinary degree Program Co-Director. In turn, these individuals will coordinate with applicable faculty members from their respective units to engage in collaborative intercollege activities including application and admissions reviews, MSE Generalist Pathway curriculum, program and student assessment, course scheduling, and student advisement. Application for admission, tracking for student retention, and graduation will be centralized administratively via the Graduate School. General program operations will be facilitated and centralized via the Sustainability Institute and a central Program Coordinator working with the respective Program Co-Directors.

Admissions and Graduation

The MSE degree *Generalist Pathway* Admissions Committee, consisting of applicable faculty representation from each of the three collaborating colleges, will use the criteria specified in the Ohio State *Graduate School Handbook* Section 2.2 Admission Criteria (https://gradsch.osu.edu/graduate-school-handbook-gsh/gsh-section-2-admissions#section2.2). In addition to the Graduate School Admission criteria listed below, MSE degree admission will require completion of a college-level foundational course in calculus with grade C or higher.

Admission Criteria for All Applicants:

- The equivalent of a four-year bachelor's or advanced degree from a regionally accredited college or university, earned by the expected date of entry into the graduate program.
- Calculus with grade C or higher.
- A minimum 3.0 cumulative GPA (on a 4.0 scale or equivalent) for the last bachelor's or advanced degree earned.
- Transcripts or other credentials documenting that prerequisite academic work has been completed.

Note: A standardized GRE test score is required only if:

- Applicant's degree is from an unaccredited college or university *and* your program requires the score.

- Applicant's cumulative GPA is below 3.0 for the last bachelor's or advanced degree earned *and* the program requires the score.

Additional Admission Criteria for International Applicants:

Success at Ohio State depends upon your ability to converse in, write and understand English. The university requires official TOEFL, Duolingo or IELTS Academic test scores from all international applicants, except:

- Applicants who are citizens of, or who have received a bachelor's degree or higher by the time of matriculation from, one of the countries or territories exempt from the English proficiency requirement (see exemptions below).
- Applicants who have held U.S. permanent resident, asylee or refugee status for more than one year by the start date of the first term of enrollment.

Note: If applicants' courses were taught in English but they do not meet either of the above exceptions, they are still required to submit proof of English proficiency. Refer to https://gpadmissions.osu.edu/intl/additional-requirements-to-apply.html for additional details and minimum test score criteria.

In relation to admission, the criteria for retention and graduation will follow those specified in Sections 4, 5, and 6 of the *Graduate School Handbook* (https://gradsch.osu.edu/graduate-school-handbook-gsh).

Anticipated Enrollment for the MSE Degree *Generalist Pathway*

It is estimated that initially there will be ten students enrolled during year one for the MSE degree Generalist Pathway. Estimated future enrollment is 30 or more students per year (Table 4). The anticipated enrollment numbers are estimates based on the increased public awareness of plus need and demand for professionals in the sustainable energy related sector. It is projected and expected that enrollments will increase during subsequent years with expanded program awareness plus general and targeted program marketing and student recruitment. In addition, the overall MSE degree enrollments will increase too when curricula options are added for students to pursue one of several choices for MSE degree Specialist Pathways. Detailed information on how students will be informed of the MSE degree program is summarized in Appendix B: Program Implementation.

Table 4. Five-Year Estimated Annual MSE Degree *Generalist Pathway* Student Enrollments.

Academic Year	Estimated Number New Students
2026-27	10
2027-28	15
2028-29	20
2029-30	25
2030-31	30

Assessment

The overall assessment plan will use specific evaluation tools to collect both direct and indirect measures of several components. The overall process will collect, organize, interpret, summarize, and report quantitative and qualitative outcome measurement data as program, including student, performance

indicators, and, for continuous quality improvement. The MSE degree Program Co-Directors plus the Program Coordinator will oversee the Assessment Plan including the annual data collection, review, and reporting.

The program assessment plan consists of two parts. Part 1 is focused on overall program evaluations and measures related to admissions through program completion and alumni job placements (Table 5.1.). Part 2 involves conducting specific evaluations to assess whether students meet each of the ten MSE degree *Foundational Competencies* aligned with the specific topic modules within the required *Foundational Courses* (Tables 5.2 and 6).

Table 5.1. Part 1 - Admission through Graduation

Indirect Measures for MSE Degree Program Evaluation and Assessment
• Number of Applications • Quality of Applicant Pool • Admissions (Rubric/Summary) • Survey Students (Satisfaction w/ Program and Program Support for Continuous Quality Improvement) • Student Evaluation of Instruction (Satisfaction w/ Course and Instruction for Continuous Quality Improvement) • Retention (% Retained) and Graduation Rates (Cumulative GPA ≥3.0/4.0, % Graduated, Time-to-Degree) • Survey Graduating Students (Satisfaction w/ Program and Program Support for Continuous Quality Improvement) • Survey Alumni (Applicable Employment/Use of Degree)

Table 5.2. Part 2 - Alignment of Competencies with Required Foundational Courses and Student Evaluation Modes.

Direct Measures for Student Evaluation and Assessment
• Case Studies/Applied Case-Based Scenarios) • Problem Sets • Presentations (oral and poster) • Papers • Quizzes • Exams • Facilitated Discussions (e.g., Seminar) • Cumulative Course Performance

One or more of the required *Foundational Courses* is/are aligned with each of the ten MSE degree program *Foundational Competencies*. See page 8 for the list of competencies and Table 3 on page 9 showing the required *Foundational Courses* and for each course the aligned *Foundational Competencies*. The MSE degree graduate students are expected to score ≥80% for each evaluation mode that corresponds with the courses and the specific course module topic(s) within that align with each respective competency.

Table 6. Alignment of Competencies with Required Foundational Courses and Student Evaluation Modes.

Ten Foundational Competencies (see pp. 7-8 and Table 2)	Applicable Required Foundation Courses (credits)	Applicable Student Evaluation Modes per Course (i.e., Quizzes; Exams; Problem Sets; Applied Case Studies; etc.)	Measurement to Demonstrate Acquired Competency
Foundational Competency 1	**AEDECON 6500/ ENVENG 6020/ FABENG 6020/ISE 6020 /PUBAFRS 6020 (3 cr.)** Foundations of Data-Driven Sustainable Energy Systems	Case Study Paper	Score ≥80% per Evaluation Mode
Foundational Competency 2	**PUBAFRS 8620 (3 cr.)** Innovating Sustainable Energy Systems	Paper; Presentation	Score ≥80% per Evaluation Mode
Foundational Competency 3	**AEDE 6320 (3 cr.)** Energy Economics	Quiz; Exam	Score ≥80% per Evaluation Mode
Foundational Competency 4	**AEDECON 6500/ ENVENG 6020/ FABENG 6020/ISE 6020 /PUBAFRS 6020 (3 cr.)** Foundations of Data-Driven Sustainable Energy Systems	Case Study Paper	Score ≥80% per Evaluation Mode
Foundational Competency 5	**AEDE 6320 (3 cr.)** Energy Economics	Quiz; Exam	Score ≥80% per Evaluation Mode
Foundational Competency 6	**AEDECON 6500/ ENVENG 6020/ FABENG 6020/ISE 6020 /PUBAFRS 6020 (3 cr.)** Foundations of Data-Driven Sustainable Energy Systems	Case Study Paper	Score ≥80% per Evaluation Mode
Foundational Competency 7	**PUBAFRS 8620 (3 cr.)** Innovating Sustainable Energy Systems	Paper; Presentation	Score ≥80% per Evaluation Mode
Foundational Competency 8	**ENR 7150 (3 cr.)** Environmental Risk and Decision-Making or **ENR 7430 (3 cr.):** Sustainability Psychology	Paper; Presentation Paper; Project	Score ≥80% per Evaluation Mode
Foundational Competency 9	**GRADTDA 5621 (3 cr.)** Big Data Computing Foundations 1	Case Studies; Project	Score ≥80% per Evaluation Mode
Foundational Competency 10	**PUBAFRS 8620 (3 cr.)** Innovation for Sustainable Energy Systems	Paper; Presentation	Score ≥80% per Evaluation Mode

Appendix A

Descriptions, Prerequisites, Modes of Delivery, and Terms Offered for the MSE Degree Foundational and General Pathway Courses

Courses	Credits	Colleges (Units)	Course Descriptions	Course Prerequisites	Modes of Delivery / Semester
Foundational Courses (19 credits)					
AEDECON 6320 Energy Economics	3	CFAES (AEDE)	This course will deliver content through asynchronous online, web-based instruction through Ohio State's Carmen system (https://carmen.osu.edu/). Students should be familiar with Carmen as the course outline, lecture slides, videos, quizzes (graded and practice), homework, exams, and other assignments will be delivered through Carmen. Please read the rest of the syllabus and then review the "student resources" module on Carmen.	None	Online Autumn
AEDECON 6500/ ENVENG 6020/ FABENG 6020/GEOG 6020 / ISE 6020 /PUBAFRS 6020 Foundations of Data-Driven Sustainable Energy Systems	3	CFAES/COE/ ASC/GCPA	Introduction to issues impacting sustainable energy systems across technology, law and policy, business models, resilience, data, geospatial, and decision sciences.	Not open to students with credit for AEDECON 6500, ENVENG 6020, FABENG 6020, GEOG 6020, or PUBAFRS 6020. (Cross-listed in AEDECON 6500, ENVENG 6020, FABENG 6020, GEOG 6020, or PUBAFRS 6020.)	In-Person Autumn
PUBAFRS 8620 Innovating for Sustainable Energy Systems	4	GCPA	Provides students with the design tools and a framework to understand complex problems and develop within weeks minimal viable products or solutions that address energy-sector needs. Through an intense process of stakeholder interviews and continuous feedback, students acquire experience in systematic innovation, refining problem-statements, and navigating public and private sector organizations.	None	In-Person Spring
GRADTDA 5621 Big Data Computing Foundations 1	3	TDAI/COE(CSE)	Professionals must be able to locate, scrape, ingest and clean data sources to	None	Online

Courses	Credits	Colleges (Units)	Course Descriptions	Course Prerequisites	Modes of Delivery / Semester
			produce useful information for exploration and visualization to address work-related challenges. The course is on programming in JavaScript and Python and tools like Hadoop and Scala. This two-semester sequence is to be taken in parallel with a two-semester sequence on fundamental statistical data analytic methods.		Autumn
Select 6 Credits: **ENR 7150** Environmental Risk and Decision-Making **ENR 7430** Sustainability Psychology **MECHENG 5194** Comparative Energy	3	CFAES (SENR) COE	ENR 7150: Theory of individual and participatory decision-making processes under risk and uncertainty and applications to improve decision making in environmental risk management contexts. ENR 7430: This course helps students expand their understanding of the psychological bases of environmental problems. It focuses on leveraging psychological tools to address such problems. Students learn about theories and methods relevant to behavior change, explore the applicability of these approaches to changing environmental behaviors, and gain practical experience doing this with real-world problems. Understand the principle and energy efficiency of renewable energy technologies and prepare engineering students for evaluating and developing those technologies. The course will be a combination of technological examples, fundamental principles, and project-based deep dive into renewable energy technologies. Technologies covered include wind electricity, hydroelectricity, geothermal, solar thermal, hydrogen, CO2 capture, battery, capacitors, fuel cell, solar photovoltaic, magnetocaloric cycle, electrocaloric cycle, and thermoelectric cycle. Target audience: junior/senior	ENR 7150: Not open to students with credit for 8150. ENR 7430: Graduate standing plus any ONE of the following: • Any undergraduate- or graduate-level psychology course • ENR 3400 • ENR 5400 • **Instructor permission** 3500, 3501, AEROENG 2405, MATSCEN 2251, CBE 3508, CHEM 4310, FABE 3120, Grad Standing in Engineering, or Grad Standing in Chemistry.	7150: In-Person Autumn 7430: In-Person Spring 5194: In-Person Spring

Courses	Credits	Colleges (Units)	Course Descriptions	Course Prerequisites	Modes of Delivery / Semester
			undergraduates and graduate students. Recommended preparation: introductory energy technology or introductory thermodynamics knowledge.		
Sub-Total Foundational Credits	**19**				
General Pathway Courses (12 credits)					
ENVENG/ENVSCI 5170 Sustainability and Circular Economy	3	COE (CEGE) CFAES (SENR)	An introduction to life-cycle thinking and the circular economy with emphasis on quantitative sustainability assessment and decision-making.	3200, or Grad standing in Engineering, or permission of instructor. Not open to students with credit for ENVSCI 5170. Cross-listed in EnvSci.	In-Person Spring
GEOG 5802 Globalization and Environment	3	ASC (GEO)	Transnational dimensions of changes to the natural environment; ways that global economic activity, international institutions, and global environmentalism contribute to environmental problems and solutions.	Not open to students with credit for 635.	In-Person Autumn and Spring
Select 6 Credits: **MECHENG 6526** Combustion **MATSCEN 5572** Materials for Energy Technology **AEDECON 6300** Environmental Resource Economics **GEOG 5900** Weather, Climate, and Global Warming **GRADTDA 5620** Practical Learning and Mining for Big Data **CIVILEN 6211** Simulation of Building Energy Performance **ISE / ECE 5043** Power Systems-Analysis and Operation **CRPLAN 5550** Financing Sustainability **ENR 7400** Communicating Environmental Risk **GEOG 5301** Sustainable Transportation	 3 3 2 3 3 3 3 3 3 3	 COE (MAE) COE (MSE) CFAES (AEDE) ASC (GEOG) TDAI/COE (CSE) COE (CEGE) COE (ISE / ECE) COE (CRPPLAN) CFAES (SENR) ASC (GEO)	MECHENG 6526: Fundamentals of energy conversion through combustion, thermodynamics and chemical kinetics of combustion, premixed flames, deflagration vs. detonation waves, diffusion flames, droplet combustion, and thermal ignition. MATSCEN 5572: Structure property relationships of materials in energy applications. Photovoltaic materials, solid state photonic materials, electrochemical devices such as batteries, fuel cells and chemical sensors, superconductors, memory and nuclear materials. AEDECON 6300: Application of economic theory and methods to current problems in environmental and resource economics. GEOG 5900:	MECHENG 6526: 3503, 3504 (504), or 4510 (510), or permission of instructor. Not open to students with credit for 726. MATSCEN 5572: 2241, and 3271 or ECE 2300; and enrollment as MATSCEN-BS major; or Grad standing; or permission of instructor. AEDECON 6300: 4001 (500) or Econ 4001 (501). Not open to students with credit for 831.	MECHENG 6526: In-Person Spring MATSCEN 5572: In-Person Autumn AEDECON 6300: In-Person Spring

Courses	Credits	Colleges (Units)	Course Descriptions	Course Prerequisites	Modes of Delivery / Semester
			An introduction to the fundamental physical and mathematical principles governing both day-to-day weather and the average of weather, or climate. Objectives are to understand the physical processes of the earth-atmosphere system, describe its weather features and climate characteristics today, and outline how they might change in the future because of global warming.	GEOG 5900: Not open to students with credit for 520 or AtmosSc 2940 (230).	GEOG 5900: Online Autumn
			GRADTDA 5620: Building computational and interpretative skills in data analytics and computing foundations, students will explore practical ways to create data mining and machine learning workflows. Students will learn to mine associations and patterns, to classify, and build predictive models and recommendation systems for data and questions in the context of enterprises.	GRADTDA 5620: Enrolled in TDAI or MSE degree program.	GRADTDA 5620: Online Summer
			CIVILEN 6211: Simulation of building energy consumption under various design or retrofit scenarios. Prediction of the impact of design decisions and energy conservation measures on building energy consumption. Employment of EnergyPlus and OpenStudio, free but sophisticated and open-source building energy modeling tools, to develop and simulate a model of a real building.	CIVILEN 6211: Grad standing in the College of Engineering, or permission of instructor.	CIVILEN 6211: In-Person Spring
			ISE / ECE 5043: Power systems analysis and operations, including steady-state analysis, state estimation, and economic operation.	ISE 5043: 3040, and ECE major; or Sr standing and ISE major; and MATH 2568; or Grad standing in engineering or biological sciences or math and physical sciences.	ISE 5043: In-Person Spring
			CRPLAN 5550: This course examines sustainability through the lens of financing. The primary foci are two	CRPLAN 5550: CRPLAN 3400, Grad standing, or permission of instructor.	CRPLAN 5550: Uncertain; has

Courses	Credits	Colleges (Units)	Course Descriptions	Course Prerequisites	Modes of Delivery / Semester
			essential elements of green infrastructure - food systems and clean energy. Students will explore the systems and industry behind food and energy and develop comprehensive road maps that communities can use to build robust and financially supported sustainability systems for food and energy. ENR 7400: Introduction to the design and implementation of public-focused risk communication as it relates to environmental, agricultural and public health contexts. GEOG 5301: Sustainable transportation generates accessibility while minimizing harm to people and the natural environment. This course examines the problems associated with transportation, including climate change, air quality, non-renewable resources, safety, congestion and social equity. We will also examine solutions to these problems, including pricing, planning, policy and technology.	ENR 7400: Graduate standing or permission of instructor GEOG 5301: None listed	not been offered recently but could be offered with demand (per Dr. Conroy) ENR 7400: In-Person Spring GEOG 5301: In-Person Spring
Sub-Total General Pathway Credits	**12**				
Capstone Courses (3 credits): Practicum + Seminar					
<insert alpha code> Practicum in Sustainable Energy	2	Interdisciplinary	Experiential learning opportunity with a public or private organization of agency.	Completion of a minimum of 12 credits of the curriculum	
EARTHSC 8860 Seminar in Energy Resources	1	ASC (SES)	Study of selected deposits of subsurface energy resources.	Permission of instructor. Repeatable to a max 12 cr.	Spring In-Person
Sub-Total Capstone Credits	**3**				
TOTAL MSE Degree Curriculum Credits	**34**				

Appendix B

Program Implementation

1. **How will students be informed of the program?**

   There are multiple ways students will be informed of the program. We plan to:

   - Inform academic and faculty advisors of the opportunity to share with their undergraduate students in the three associated colleges, College of Food, Agricultural, and Environmental Sciences (Schol of Environment and Natural Resources), College of Arts and Sciences (School of Earth Sciences), and College of Engineering. Advisors in adjacent colleges (College of Public Health, Fisher College of Business, and the Glenn College of Public Affairs.
   - Create an accessible, dynamic webpage as part of the Sustainability Institute's website
   - Utilize internal Ohio State marketing –
     - Ohio State today
     - Advisor Beat (academic advising newsletter)
     - Sustainability Institute newsletters (faculty and external)
     - Sustainability Institute's Student Advisory Board
     - Sustainability Education and Learning Committee (SELC)
     - Honors and Scholars
     - Information for energy-related faculty to share in classes
     - CABS advertisement
   - Host student engagement activities focused on building the sustainable energy community
     - Sustainable Energy Accelerator (week-long competition where students work on a real-world challenge facing industry)
     - Sustainable Energy Networking Events (partnership with the Battelle Center for Science, Engineering, and Public Policy)
     - Battelle Center Student Community of Practice and Engagement events (hosted by Battelle Center)
   - Leverage external channels to communicate with prospective students
     - Sustainability Institute's external advisory board (when established)
     - Handshake events for internal and external audiences
     - Otterbein, Denison, Capital, Ohio Wesleyan, etc.

2. **How will students be advised regarding the opportunities and challenges associated with the option?**

   Prospective students will have access to information from the Sustainability Institute Website and will also be directed to the Program Coordinator and MSE Program Co-Directors. Matriculated students will be provided with general advisement via Program Coordinator and posted Webpage information, plus designated faculty members, including but not limited to Program Co-Directors involved with the MSE degree program.

3. **Describe how the success of the program will be assessed?**

   Refer to "Assessment" section of the proposal pages 12-14.

4. Specific actions and any corollary issues (positive and negative) that will arise from implementation. Frequently addressed issues include but are not limited to the following:

a) How will the proposal affect specific groups/constituencies (faculty, graduate/undergraduate students, staff, alumni, accrediting organizations, etc.)?

The Master of Sustainable Energy (MSE) degree program will enhance opportunities to address employment needs and demands for the current and emerging energy workforce. In addition to pursuing the MSE degree as a standalone degree program, undergraduate students will have the opportunity to take courses to prepare for the MSE with the possibility of a 3+2 (AKA 4+1+1) combined BS-MSE degree program. One of the goals of the MSE degree program is to offer available and accessible pathways to energy careers for people from varied academic backgrounds. Faculty conducting applicable energy research projects at Ohio State will have a place to direct interested students. Additionally, since only one new course is being developed for the Generalist Pathway, associated faculty will not see a significant shift in their teaching obligations.

b) What programmatic changes will take place internally?

Three MSE degree Program Co-Directors, one from each of the collaborating colleges, will be named to administer the program in partnership with the MSE degree Program Coordinator housed in the Sustainability Institute.

c) How will the program affect students, faculty, and staff outside the proposing unit?

Since the MSE degree program is interdisciplinary, there will be initial and eventual opportunities to expand the collaborative and cooperative partnerships with other academic units. This will occur naturally as new Specialization Pathways are developed and implemented as part of the MSE degree program model as shown in Figure 1.

d) Does the content of the proposal overlap in scope or substance with the interests of other units?

The focus and content of the MSE degree program does not conflict with or encroach on programs offered by other academic units. The degree program model, beginning with this initial MSE degree Generalist Pathway, is designed to enhance expand opportunities for students as well as faculty members at Ohio State. In addition, as summarized on pages 6 and 7, the new MSE degree program will be complementary to, not the same as, other graduate-level energy-related programs in the State.

e) A summary of the adequacy and availability of resources including but not limited to fiscal impact statements, commitments of funding from any sources, and memoranda of understanding between collaborating units.

An MOU will be developed with each collaborating unit to leverage and optimize the efficient use of essential resources in the form of people (e.g., faculty; staff), places (e.g., classrooms; labs), and things (e.g., funding; marketing/recruitment).

Appendix C

Applicable Letters of Support

- College of Arts and Sciences
  - Letter of Support from Andrew Martin, Associate Dean of Undergraduate Education
  - Email Letter of Support from Kim Kinsel, Chief Administrative Officer
- College of Engineering
  - Letter of Support from Rosie Quinzon-Bonello, Assistant Dean for Curriculum and Assessment
  - Email Letter of Support from Bobby Srivastava, Chief Administrative Officer
- College of Food, Agricultural, and Environmental Sciences
  - Conditional Letter of Support from Cathann Kress, Vice President for Agricultural Administration and Dean
  - Email Letter of Support from Terry Snoddy, Senior Fiscal Officer
- Sustainability Institute
  - Letter of Support from Elena Irwin, Director, Sustainability Institute, Distinguished University Professor, College of Food, Agricultural, and Environmental Sciences

College of Arts and Sciences –

Letter of Support from Andrew Martin,

Associate Dean of Undergraduate Education

Fiscal Letter of Support from Kim Kinsel,

Chief Administrative Officer

09/29/25

W. Randy Smith, PhD
Vice Provost for Academic Programs
Office of Academic Affairs
The Ohio State University
Columbus, OH

RE: Letter of Support for the Proposed Master of Sustainable Energy (MSE) Degree
Dear Randy,

On behalf of the College of Arts and Sciences please accept this letter of enthusiastic support for the approval of the proposed 34-credit *Master of Sustainable Energy* degree. This new graduate professional degree program is a timely and vital initiative that demonstrates The Ohio State University's collaborative leadership and efforts in expanding sustainability-related education and research.

The MSE program represents a significant and cooperative milestone, co-led by the College of Arts and Sciences, the College of Engineering, and the College of Food, Agriculture, and Environmental Science, with facilitation by the Sustainability Institute (SI). This interdisciplinary structure is particularly compelling as it provides a comprehensive, multi-faceted approach to sustainable energy challenges, drawing on diverse expertise from across the university.

This proposal is a direct outcome of the coordinated and collaborative efforts at Ohio State, spearheaded by the Sustainability Institute, to advance sustainability education, research, and community engagement. Furthermore, the development and implementation of the MSE degree is directly aligned with the goals of the recently completed interdisciplinary NSF-funded EmPowerment grant, building upon and expanding its valuable work in sustainable energy education and training.

We are committed to the success of this program and look forward to contributing to this cooperative and collaborative interdisciplinary framework. Our unit is prepared to assist with marketing the program, attracting and admitting qualified applicants, advising students, offering courses, and educating and training students for the interdisciplinary MSE curriculum. We are confident that this degree will produce highly capable and sought-after graduates equipped to address the complex challenges of our energy future.

Thank you for your consideration. We strongly endorse the approval of the Master of Sustainable Energy degree program and believe it will be one of the highlights of Ohio State's sustainability efforts.

Sincerely,

Andrew W. Martin

Associate Dean of Undergraduate Education

College of Arts and Sciences

From: Zimmerman, Katie
To: Zimmerman, Katie
Subject: FW: ASC letter of support for master of sustainable energy proposal
Date: Thursday, November 13, 2025 11:37:51 AM
Attachments: image007.png
image008.png
image002.png
image006.png

From: Kinsel, Kimberly <kinsel.21@osu.edu>
Sent: Thursday, November 13, 2025 11:22 AM
To: Irwin, Elena <irwin.78@osu.edu>
Subject: Re: ASC letter of support for master of sustainable energy proposal

Thank you, Elena. I used your summary information in an email to Dean Horn and he is supportive of our participation. How does the documentation work on your end? Will you be sending him a letter to sign electronically? If so, please cc me so I can share the signed document with my finance team.

Best regards,

Kim

THE OHIO STATE UNIVERSITY

Kim Kinsel

Chief Administrative Officer

College of Arts and Sciences
186 University Hall, 230 North Oval Mall, Columbus, OH 43210
(614) 292-6186 Office
kinsel.21@osu.edu

From: Irwin, Elena <irwin.78@osu.edu>
Sent: Wednesday, November 12, 2025 10:23 PM
To: Kinsel, Kimberly <kinsel.21@osu.edu>
Subject: RE: ASC letter of support for master of sustainable energy proposal

Absolutely. Attached is the key info and ASC-specific tables for both a baseline and conservative enrollment scenario. The two tables that have the revenue and cost projections are on page 3 (baseline) and page 6 (conservative).

I'm also copying and pasting these two tables below. In both cases projected net revenues are in righthand column – you can see that there are some initial net costs for start up in year 1 and basically break even in year 2 before positive net revenues thereafter. This includes covering ASC's share of central costs, which starts when the loan payback starting in FY30 (baseline) and starting in FY31 (conservative). All central costs including the loan are apportioned based on ASC's share of expected credit hour production. The basic difference between the two scenarios is that it takes longer to pay back the loan in the conservative scenario.

Please let me know if you have questions or need any further clarifications. Thanks so much, Elena

BASELINE: PROJECTED COLLEGE NET REVENUES – loan payback is FY30-35.

ASC Projected Net Revenues										
	Projected Program Revenues					Projected Program Expenses			Net	
Fiscal Year	MSE credit hour production	MCRR credit hour production	Stand alone minor/ certificates credit hour production	Total credit hour production	Projected annual total revenues	Central costs (Operations + Program manager + Loan payback)	Faculty & Instructional time	Projected annual expenses	Projected surplus	
FY26	0	0	0	0	$0	$0	$4,335	$4,335	-$4,335	
FY27	**28**	**0**	**0**	**28**	**$11,333**	**$0**	**$11,890**	**$11,890**	**-$557**	
FY28	42	0	36	78	$31,333	$0	$23,296	$23,296	$8,037	
FY29	**66**	**0**	**96**	**162**	**$64,667**	**$0**	**$31,019**	**$31,019**	**$33,647**	
FY30	120	219	81	420	$168,133	$61,952	$82,882	$144,834	$23,300	
FY31	**120**	**219**	**81**	**420**	**$168,133**	**$75,368**	**$72,478**	**$147,846**	**$20,287**	
FY32	160	303	96	559	$223,733	$126,387	$80,798	$207,185	$16,548	
FY33	**160**	**363**	**96**	**619**	**$247,733**	**$157,612**	**$79,756**	**$237,368**	**$10,365**	
FY34	166	363	96	625	$250,000	$151,108	$92,586	$243,694	$6,306	
FY35	**166**	**375**	**114**	**655**	**$262,000**	**$165,582**	**$92,586**	**$258,168**	**$3,832**	
									$117,431	***Cumulative FY26-35***
Post Loan (FY36 onward)	166	375	114	655	$262,000	$74,167	$92,586	$166,753	***$95,247***	***Annual FY36 onward***

CONSERVATIVE: PROJECTED COLLEGE NET REVENUES – loan payback is FY31-39

ASC Projected Net Revenues										
	Projected Program Revenues					Projected Program Expenses			Net	
Fiscal Year	MSE credit hour production	MCRR credit hour production	Stand alone minor/ certificates credit hour production	Total credit hour production	Projected annual total revenues	Central costs (Operations + Program manager + Loan payback)	Faculty & Instructional time	Projected annual expenses	Projected surplus	
FY26	0	0	0	0	$0	$0	$4,335	$4,335	-$4,335	
FY27	**28**	**0**	**0**	**28**	**$11,333**	**$0**	**$11,890**	**$11,890**	**-$557**	
FY28	42	0	36	78	$31,333	$0	$23,296	$23,296	$8,037	
FY29	**66**	**0**	**66**	**132**	**$52,667**	**$0**	**$31,019**	**$31,019**	**$21,647**	
FY30	90	210	72	372	$148,933	$65,002	$82,882	$147,884	$1,049	
FY31	**92**	**219**	**81**	**392**	**$156,800**	**$78,191**	**$72,478**	**$150,669**	**$6,131**	
FY32	101	243	81	425	$170,133	$98,175	$55,138	$153,313	$16,820	
FY33	**101**	**243**	**81**	**425**	**$170,133**	**$105,637**	**$41,266**	**$146,903**	**$23,230**	
FY34	101	243	81	425	$170,133	$105,906	$41,266	$147,172	$22,962	
FY35	**101**	**243**	**81**	**425**	**$170,133**	**$106,969**	**$41,266**	**$148,235**	**$21,898**	
FY36	101	243	81	425	$170,133	$108,064	$41,266	$149,330	$20,803	
FY37	**101**	**243**	**81**	**425**	**$170,133**	**$109,192**	**$41,266**	**$150,458**	**$19,675**	
FY38	101	243	81	425	$170,133	$110,354	$41,266	$151,620	$18,513	
FY39	**101**	**243**	**81**	**425**	**$170,133**	**$110,615**	**$41,266**	**$151,881**	**$18,252**	
									$194,127	***Cumulative FY26-39***
Post Loan (FY40 onward)	**101**	**243**	**81**	**425**	**$170,133**	**$69,631**	**$41,266**	**$110,897**	***$59,237***	***Annual FY40 onward***

From: Kinsel, Kimberly <kinsel.21@osu.edu>
Sent: Wednesday, November 12, 2025 4:08 PM
To: Irwin, Elena <irwin.78@osu.edu>
Subject: Re: ASC letter of support for master of sustainable energy proposal

Hi Elena,

Can you give me a quick summary of ASC's estimated costs for this new Master's? I am swamped and it would be helpful to have a quick overview to share with David to secure his approval.

Thanks,

Kim

THE OHIO STATE UNIVERSITY

Kim Kinsel

Chief Administrative Officer

College of Arts and Sciences
186 University Hall, 230 North Oval Mall, Columbus, OH 43210
(614) 292-6186 Office
kinsel.21@osu.edu

From: Irwin, Elena <irwin.78@osu.edu>
Sent: Wednesday, November 12, 2025 12:37 PM
To: Kinsel, Kimberly <kinsel.21@osu.edu>
Cc: Schmidt, Kerry <schmidt.1248@osu.edu>
Subject: FW: ASC letter of support for master of sustainable energy proposal

Kim: Thanks much for your support of the plan for the Master of Sustainable Energy proposal. Before we submit this formally to the Grad School, I want to doublecheck that we have your endorsement of the plan and that Dean Horm is also onboard? FYI attached is the expression of support that we received from ASC, which was shared by Andrew Martin, ASC Associate Dean for Undergraduate Education.

We are rushing to make deadlines, so if you could confirm as soon as possible I would be very grateful.

Thanks so much
Elena

From: Martin, Andrew <martin.1026@osu.edu>
Sent: Monday, September 29, 2025 11:06 AM
To: Irwin, Elena <irwin.78@osu.edu>
Cc: Jaquet, Gina <jaquet.6@osu.edu>
Subject: RE: ASC letter of support for master of sustainable energy proposal

Hi Elena
Sorry for the delay, attached please find the letter in support of this program on behalf of ASC.
Best
Andrew

THE OHIO STATE UNIVERSITY

Andrew W. Martin
Associate Dean for Undergraduate Education
Professor of Sociology
114 University Hall, 230 North Oval Mall
Columbus, OH 43210
614-247-6641 Office
martin.1026@osu.edu

From: Irwin, Elena <irwin.78@osu.edu>
Sent: Thursday, September 25, 2025 8:10 AM
To: Martin, Andrew <martin.1026@osu.edu>
Cc: Jaquet, Gina <jaquet.6@osu.edu>
Subject: ASC letter of support for master of sustainable energy proposal

Andrew: Can you let me know where ASC stands with their review of this proposal (attached)? We'd like to get letters of

support by Oct 1 to meet our timeline for launching next fall.

A suggested template attached.

Thanks much
Elena

THE OHIO STATE UNIVERSITY

Elena Irwin
Faculty Director, Sustainability Institute
Distinguished University Professor
CFAES Department of Agricultural, Environmental, and Development Economics
irwin.78@osu.edu si.osu.edu/ aede.osu.edu/
Pronouns: she/her

College of Engineering –

Letter of Support from Rosie Quinzon- Bonello,

Assistant Dean for Curriculum and Assessment

Fiscal Letter of Support from Bobby Srivastava,

Chief Administrative Officer

THE OHIO STATE UNIVERSITY

College of Engineering

Undergraduate Education & Student Services

122 Hitchcock Hall
2070 Neil Avenue
Columbus, OH 43210-1278

614-292-2651 Phone
614-292-9379 Fax

engineering.osu.edu

Memo

To: Elena Irwin, Faculty Director, Sustainability Institute
From: Rosie Quinzon-Bonello, Assistant Dean for Curriculum and Assessment
Date: October 7, 2025

Re: Master of Sustainable Energy Degree Proposal

On October 7, 2025, The College of Engineering Committee on Academic Affairs unanimously supported the proposal to establish the interdisciplinary graduate-level professional degree: Master of Sustainable Energy (MSE). The committee found the proposal well developed and complete with the only minor concern for the "MSE" acronym that students may confuse with the Department of Materials Science and Engineering and its relevant programs, which are also known by the "MSE" acronym.

Yours sincerely,

Rosario Quinzon-Bonello

Rosie Quinzon-Bonello

From:	Zimmerman, Katie
To:	Zimmerman, Katie
Subject:	FW: COE Support of the MSE proposal
Date:	Thursday, November 13, 2025 9:56:32 AM
Attachments:	image001.png image002.png

From: Srivastava, Bobby <srivastava.85@osu.edu>
Sent: Wednesday, November 12, 2025 12:31 PM
To: Irwin, Elena <irwin.78@osu.edu>; Tomasko, David <tomasko.1@osu.edu>
Cc: Schmidt, Kerry <schmidt.1248@osu.edu>
Subject: RE: COE Support of the MSE proposal

Hi Elena,

I can't speak for the Dean on this, but from a financial perspective, my questions have been answered and I'm supportive, which is fine on behalf of the dean only for that element of the proposal. I'll let David respond to the other programmatic and academic components.

Best,

Bobby

THE OHIO STATE UNIVERSITY

Bobby Srivastava, MBA, MPA
Chief Administrative Officer
College of Engineering
Knowlton School of Architecture
University Airport

142 Hitchcock Hall
614-292-8312 Office
Pronouns: he/him/his

Executive Assistant: Kate Saup (saup.3@osu.edu)

From: Irwin, Elena <irwin.78@osu.edu>
Sent: Wednesday, November 12, 2025 12:28 PM
To: Tomasko, David <tomasko.1@osu.edu>; Srivastava, Bobby <srivastava.85@osu.edu>
Cc: Schmidt, Kerry <schmidt.1248@osu.edu>
Subject: FW: COE Support of the MSE proposal

Bobby, David: Thanks much for your support of the plan for the Master of Sustainable Energy proposal. Before we submit this formally to the Grad School, I want to doublecheck that we have your endorsement of the plan and that Dean Howard is also onboard? FYI attached is the

expression of support that we received from COE, which was shared by Rosario Qunzon-Bonello on behalf of the College of Engineering Committee on Academic Affairs.

We are rushing to make deadlines, so if you could confirm as soon as possible I would be very grateful.

Thanks so much
Elena

From: Quinzon-Bonello, Rosario <quinzon-bonello.1@osu.edu>
Sent: Tuesday, October 7, 2025 11:13 AM
To: Irwin, Elena <irwin.78@osu.edu>
Cc: Matyas, Cory <matyas.3@osu.edu>
Subject: COE Support of the MSE proposal

Hello Elena,

Attached is a memo of support for the proposal to establish a Master of Sustainable Energy proposal.
Please let me know if you need anything else.

Thanks,

Rosie

THE OHIO STATE UNIVERSITY

Rosario (Rosie) Quinzon-Bonello, M.Ed.
Assistant Dean for Curriculum and Assessment
College of Engineering
122 Hitchcock Hall, 2070 Neil Ave.
Columbus, OH 43210
quinzon-bonello.1@osu.edu
engineering.osu.edu

College of Food, Agricultural, and Environmental Sciences –

Conditional Letter of Support from Cathann Kress,

Vice President for Agricultural Administration and Dean

Email Letter of Support from Terry Snoddy,

Senior Fiscal Officer

THE OHIO STATE UNIVERSITY

College of Food, Agricultural, and Environmental Sciences

Cathann A. Kress
Vice President for Agricultural Administration and Dean

140 Agricultural Administration Building
2120 Fyffe Road
Columbus, OH 43210

614-292-4703

cfaes.osu.edu

October 10, 2025

W. Randy Smith, PhD
Vice Provost for Academic Programs
The Ohio State University
Office of Academic Affairs
University Square South
15 E. 15th Ave.
Columbus, OH 43201

RE: Letter of Conditional Support for the Proposed Master of Sustainable Energy (MSE) Degree

Dear Vice Provost Smith,

On behalf of the College of Food, Agricultural, and Environmental Sciences (CFAES), I am writing to offer conditional support for the proposed 34-credit Master of Sustainable Energy (MSE) degree pending review of the budget details. This new graduate professional degree program is timely and reflects The Ohio State University's collaboration to expand interdisciplinary, sustainability-related education and research.

The MSE program represents a significant model of collaboration – jointly developed by the College of Arts and Sciences, the College of Engineering, and the College of Food, Agricultural, and Environmental Sciences, with facilitation by the Sustainability Institute (SI). This interdisciplinary structure provides a comprehensive, multi-faceted approach to sustainable energy challenges and is an example of Ohio State's ability to unite expertise across the university.

This proposal is an outcome of the university's coordinated efforts, led by the Sustainability Institute, to advance sustainability education, research, and community engagement. The MSE degree is directly aligned with the goals of the recently completed interdisciplinary NSF-funded EmPowerment grant, building upon and expanding its valuable work in sustainable energy education and training, while preparing graduates who can apply interdisciplinary approaches to real-world problems.

CFAES is conditionally committed to supporting the MSE program, pending review of the budget details. Our college will assist with marketing the program, recruiting and admitting qualified applicants, student advising, and collaborative instruction of coursework aligned with the interdisciplinary *MSE–Generalist Pathway* curriculum. We see this as an opportunity to strengthen our university-wide engagement in sustainable energy education and to develop leaders who will address the complex challenges of our energy future.

THE OHIO STATE UNIVERSITY

Thank you for your consideration of this proposal. We conditionally support the Master of Sustainable Energy degree program and believe it will highlight Ohio State's interdisciplinary strength and its commitment to creating a more sustainable future.

Sincerely,

Cathann A. Kress
Vice President for Agricultural Administration and Dean
College of Food, Agricultural, and Environmental Sciences

From: Snoddy, Terry
To: Schmidt, Kerry
Subject: RE: College/OAA SFO Touchbase
Date: Friday, November 7, 2025 9:06:41 AM

I believe I can from a financial perspective.

Thanks
Terry

From: Schmidt, Kerry <schmidt.1248@osu.edu>
Sent: Wednesday, November 5, 2025 9:55 AM
To: Snoddy, Terry <snoddy.10@osu.edu>
Subject: RE: College/OAA SFO Touchbase

Hi Terry,

Thanks for letting me know. Elena wanted me to reach out to see if you have any questions about the Master's of Sustainability program and whether you can now endorse with your Dean.

Thanks,

Kerry

From: Snoddy, Terry <snoddy.10@osu.edu>
Sent: Wednesday, November 5, 2025 9:12 AM
To: Schmidt, Kerry <schmidt.1248@osu.edu>
Subject: RE: College/OAA SFO Touchbase

Kerry,

I have a conflict for this timeslot tomorrow and wont be able to attend.

Terry

-----Original Appointment-----
From: Schmidt, Kerry <schmidt.1248@osu.edu>
Sent: Friday, August 15, 2025 4:01 PM
To: Schmidt, Kerry; Gombos, Gretchen; Betts, Nikki; Srivastava, Bobby; Kinsel, Kimberly; Snoddy, Terry
Subject: College/OAA SFO Touchbase

When: Thursday, November 6, 2025 11:00 AM-11:45 AM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting

Microsoft Teams Need help?

Join the meeting now

Meeting ID: 228 615 517 202

Passcode: VA3RH3Wv

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For organizers: Meeting options | Reset dial-in PIN
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Sustainability Institute –

Letter of Support from Elena Irwin,

Director, Sustainability Institute

Distinguished University Professor, College of Food, Agricultural, and Environmental Sciences

THE OHIO STATE UNIVERSITY
SUSTAINABILITY INSTITUTE

Sustainability Institute
The Ohio State University
3018 Smith Lab
174 W. 18th Ave.
Columbus, OH 43210

614-247-4762 Phone

si.osu.edu

September 25, 2025

W. Randy Smith, PhD
Vice Provost for Academic Programs
Office of Academic Affairs
The Ohio State University
Columbus, OH

RE: Letter of Support for the Proposed Master of Sustainable Energy (MSE) Degree

Dear Randy,

On behalf of the Sustainability Institute please accept this letter of enthusiastic support for the approval of the proposed 34-credit *Master of Sustainable Energy* degree. This new graduate professional degree program is a timely and vital initiative that demonstrates The Ohio State University's collaborative leadership and efforts in expanding sustainability-related education and research.

The MSE program represents a significant and cooperative milestone, co-led by the College of Arts and Sciences, the College of Engineering, and the College of Food, Agriculture, and Environmental Science, with facilitation by the Sustainability Institute (SI). This interdisciplinary structure is particularly compelling as it provides a comprehensive, multi-faceted approach to sustainable energy challenges, drawing on diverse expertise from across the university.

This proposal is a direct outcome of the coordinated and collaborative efforts at Ohio State, spearheaded by the Sustainability Institute, to advance sustainability education, research, and community engagement. Furthermore, the development and implementation of the MSE degree is directly aligned with the goals of the recently completed interdisciplinary NSF-funded EmPOWERment grant, building upon and expanding its valuable work in sustainable energy education and training.

We are deeply committed to the success of this program and are excited to contribute to its collaborative, interdisciplinary foundation. The Sustainability Institute is fully prepared to partner with the Graduate School and affiliated colleges to support the administration of the program. As the administrative home of the MSE, the Sustainability Institute will work laterally across the College of Engineering, College of Arts and Sciences, and College of Food, Agricultural, and Environmental Sciences to ensure that students—whether prospective, current, or alumni—have a positive and enriching experience throughout their involvement with the program. The Sustainability Institute will assist in promoting the program, recruiting and admitting qualified applicants, advising students, and supporting the education and training of students within the interdisciplinary MSE curriculum.

We are confident that this degree will produce well-prepared, in-demand graduates ready to address the complex challenges of our evolving energy landscape, and the Sustainability Institute is proud to help lead that effort.

Thank you for your consideration. We strongly endorse the approval of the Master of Sustainable Energy degree program and believe it will be one of the highlights of Ohio State's sustainability efforts.

Sincerely,

Elena Irwin
Faculty Director Sustainability Institute
Distinguished University Professor
The Ohio State University