

DRAFT Implementation Plan: Interdisciplinary *Master of Energy Sustainability* (MES) Degree Ohio State University

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1. Introduction

a. Overview

The proposed *Master of Energy Sustainability* (MES) graduate-level professional degree is an interdisciplinary, cross-college program at Ohio State University involving three large colleges—Arts and Sciences, Engineering, and Food, Agricultural, and Environmental Sciences—and facilitated by the Sustainability Institute under the administrative authority of the Office of Academic Affairs (OAA) and in collaboration with the Graduate School.

The goal is to launch the MES degree using a framework to initially offer an MES degree *Generalist Pathway* curriculum and eventually add various curricula for MES degree *Specialist Pathways* (Figure 1). All pathways to earn the MES degree align with 10 *Foundational Competencies* and the associated 19 semester credits of *Foundational Courses*. The goal 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.

This document augments the MES curricular proposal by providing additional details of the draft implementation plan, including proposed program administration, budget model, enrollment/budget scenarios, and assessment plan. Appendices (provided separately) provide program-level and college-specific details of projected revenues and costs of implementing the MES under baseline and multiple alternative scenarios, which were developed with input from academic partners. These scenarios are also used to establish minimum enrollment targets as part of the program assessment plan.

b. Background

Following a university-wide visioning process in 2023-24, a graduate and professional subcommittee was launched as part of the Sustainability Education and Learning Committee (SELC) to develop sustainability education initiatives at the graduate and professional levels. This subcommittee is comprised of faculty from the colleges of Arts and Sciences, Engineering, and Food, Agricultural and Environmental Sciences. In response to growing demand for a trained workforce in the energy sector and building on the existing EmPOWERment NSF-funded research traineeship program, the first proposal developed by this subcommittee is for an interdisciplinary graduate-level professional *Master of Energy Sustainability* (MES) degree. The proposal, which is currently under review, outlines a plan for an MES degree *Generalist Pathway* curriculum and provides a framework for adding various specialization curricula to create MSE degree *Specialist Pathways*. The proposal is to offer the MSE initially as an in-person program using largely existing courses with a goal of becoming fully online within 3-5 years.

c. Rationale

The world is experiencing an energy revolution driven by the dual challenges of meeting growing global energy demand while reducing the environmental and social impacts of energy generation and use. The current energy landscape spans a wide range of technologies, from conventional fossil fuel-based systems to alternatives that do not rely on fossil fuels as an energy resource. Across public and private sectors, employers are engaged in activities ranging from the exploration of novel energy sources to the development and deployment of energy-efficient generation, distribution, and conservation technologies, underscoring the need for both the emerging and current workforce to be adequately educated in energy-related natural and social sciences and professions, including engineering, economics, and business.

Energy sustainability refers to meeting present energy needs without compromising the ability of future generations to meet their own, while reducing adverse effects on natural and social systems, and requires moving beyond energy technologies and generation to a holistic sustainable energy system that includes energy

resources, transmission, distribution, demand, and use. Achieving this transition requires understanding and evaluating both technical and non-technical interventions across the entire energy system, from generation to distribution to end use, grounded in applied energy sciences and complemented by knowledge from multiple disciplines.

Drawing on the depth and breadth of expertise of its faculty across multiple colleges and disciplines and its extensive private and public sector and alumni networks, The Ohio State University is well-positioned to attract students and provide them with this essential professional education and training.

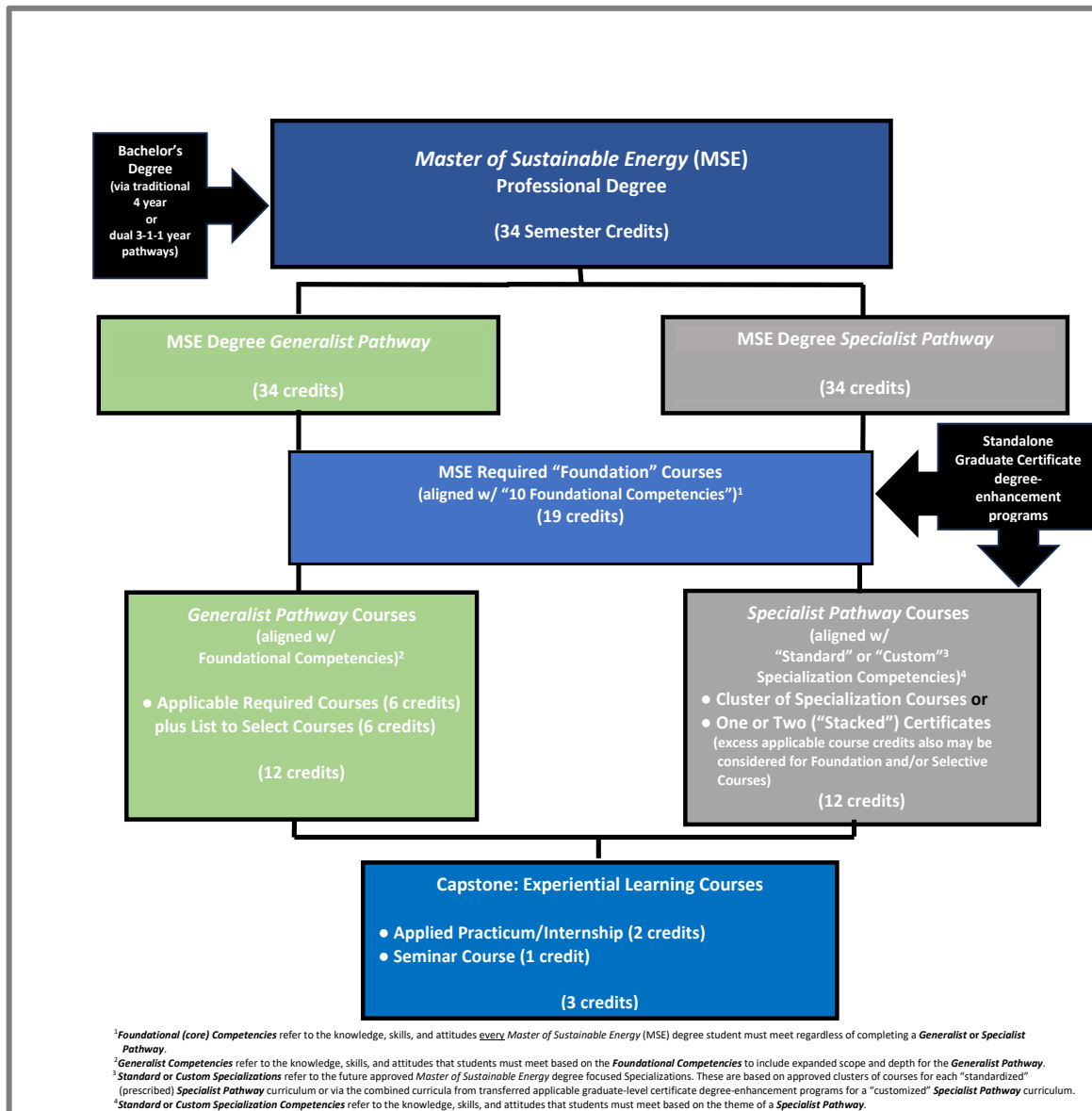


Figure 1. Model for the MES Degree Generalist and Specialist Pathways

2. Program Administration

a. Administrative Structure

The administrative oversight for marketing, admissions, curriculum, advisement, retention, and assessment for the interdisciplinary MES degree will be provided by the program Executive Committee. The committee members will include one faculty representative from each of the three sponsoring colleges (College of Arts and Sciences; College of Engineering; and College of Food, Agriculture, and Environmental Sciences) plus two staff members. The administrative structure involves one of the three faculty members serving as the primary Program Director and the other two serving as Program Co-Directors. (Note that additional Program Co-Directors will be added to the Executive Committee as new Specialist Pathway curricula are developed.) One staff member will serve as Program Manager and the other staff member will be the Sustainability Institute's Director of Education and Learning (*ex officio*). Terms for the Program Director and Program Co-Directors will be three years with the opportunity for position renewal. The Program Manager is a Sustainability Institute (SI) staff position and is ongoing.

The MES degree program will be managed under the aegis of the Vice Provost for Academic Programs in the Office of Academic Affairs. Refer to the organization chart below (Figure 2). Program operations will be facilitated centrally by SI in cooperation with the Graduate School and in alignment with its applicable policies and procedures. The SI Director, who reports to the Vice Provost for Academic Programs, will provide administrative oversight of the program, including the Program Director and Program Co-Directors. An Administrative Advisory Committee consisting of applicable administrators (i.e., chairs, directors) from the collaborating colleges, the SI Director, and the Graduate School Associate Dean will be formed to advise on administrative and operational aspects of the program and serve as a conduit for communication and awareness of the program among faculty, staff, and students. Meeting cadence will be one meeting Summer, two meetings Fall, and two meetings Spring.

b. General Responsibilities

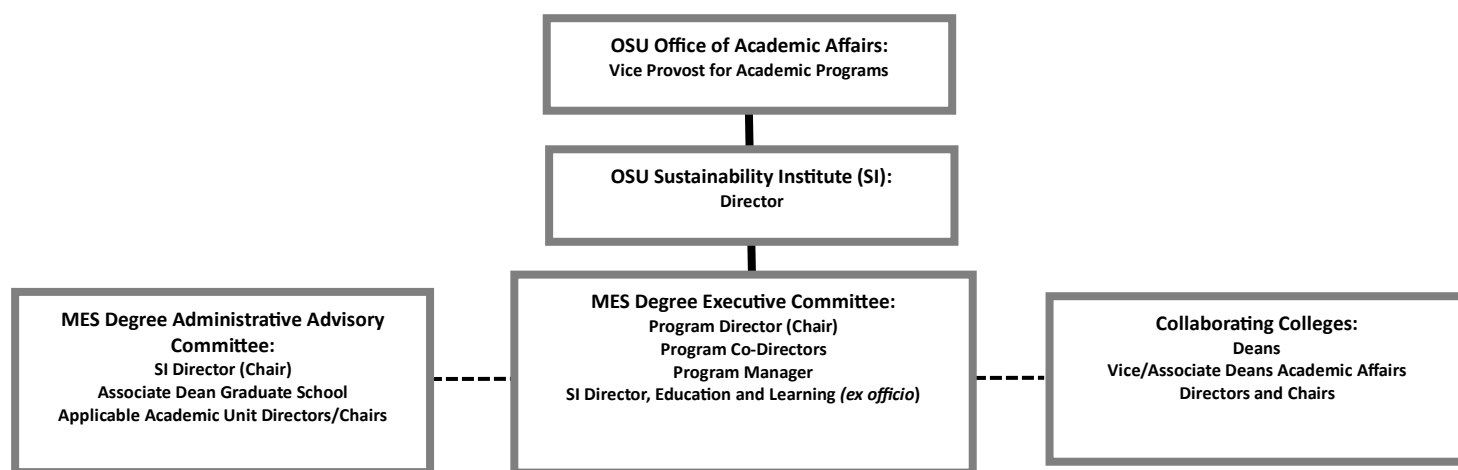


Figure 2. Administrative Structure for the Master of Energy Sustainability (MES) Degree Program

The MES Program Director and Program Co-Directors --hereafter collectively referred to as Directors--will coordinate with applicable faculty members from their respective units to engage in collaborative intercollege activities including application reviews, admission decisions, MES curricula, student advisement, student retention, program and student assessment, and course scheduling. Application for admission, tracking for student retention, and graduation will be centralized administratively via the Graduate School. The Administrative Advisory Committee will be the primary means by which the administrative leaders of the

participating units are engaged with program administration and operations, providing a two-way platform for communicating the goals, needs, and constraints of participating units and consulting on program assessment, risk management, and all major administrative decisions.

c. Specific Responsibilities

Program Director:

- Ensure that the Executive Committee (Program Director/Program Co-Director/Program Manager) meetings are held routinely, to meet the administrative and communication needs for effective and efficient program operations. Meeting cadence will be approximately: one meeting Summer, two meetings Fall, and two meetings Spring. Meeting cadence will be at least biweekly during the early stages of the MES degree planning and implementation.
- Lead the Executive Committee and its meetings.
- Engage in and delegate applicable activities to the Program Co-Directors and Program Manager.

Directors (Program Director and Program Co-Directors):

- Serve as the administrative liaison between each of the three collaborating colleges.
- Serve as the MES degree Admissions and Retention Committee with at least one faculty representative from each of the collaborating colleges.
- Identify applicable faculty members from their colleges to serve as MES degree program academic and/or capstone student advisors.
- Work with the Program Manager and delegate applicable MES degree operational tasks.

Program Manager:

- Develop and manage MES degree marketing and student recruiting in coordination and cooperation with representatives from each of the three collaborating colleges.
- Advise students enrolled in the program.
- Identify sites for applicable paid (preferred) and unpaid experiential learning practicum sites.
- Develop and maintain annual summary of marketing and recruitment efforts plus lists applicants, admissions offered, admissions accepted, matriculants pursuing the MES degree, and program graduates/alumni.
- Serve as the primary MES degree administrative point-of-contact for communications involving SI, the Graduate School, and Office of Academic Affairs.
- Establish an annual request for Operations Budget for review and approval by the Director of SI and in consultation with the Administrative Advisory Committee.

Administrative Advisory Committee

- Advise on program administration, including policies, procedures, timelines, and alignment with college- and Graduate School-level requirements and expectations for a cross-college Master degree program.
- Serve as a conduit for communication and coordination between the MES degree and collaborating colleges and other administrative units, ensuring two-way awareness of the MES degree and coordination of key program components including marketing, recruitment, and professional development opportunities for students.
- Support coordination of instructional staffing, course scheduling, and other instructional needs across participating academic units.
- Provide input on management of program enrollment and operations, including admissions processes, degree progress tracking, program costs, and other components of the assessment plan.

- Identify and address administrative or operational challenges, including low enrollments or instructional capacity constraints, and recommend risk management strategies that enhance program efficiency and effectiveness while minimizing downside risk to participating units.
- Enhance institutional visibility and awareness of the program within participating colleges by sharing information about program activities and outcomes with college leadership and administrative units.
- Advise on long-term administrative sustainability, including scalability, coordination mechanisms, growth opportunities, and alignment with participating units.

3. Budget Model

a. Overview

The budget model is a revenue sharing model between OAA and colleges. Program revenues from tuition and subsidy payments are used to cover program costs. Any deficit in the initial ramping up period (first four years FY26-29) is covered by a loan from the OAA Enrollment Reserve Fund. This fund is an established and successful mechanism within OAA used to grant interest free loans for the purpose of developing and launching new academic programs. Starting in FY30, all program costs are assumed to be fully covered by program revenues and the OAA loan is paid back from program revenues over a flexible 5-10 year period. Net revenues are apportioned to colleges based on annual credit hour production.

The following assumptions are used to estimate program revenues and costs:

Program revenues:

- Net effective rate of \$650/grad credit hour.
 - Note: This is a realistic, but somewhat conservative estimate based on \$872/hour less taxes. For comparison we also provide a scenario with a somewhat higher rate of \$775.

Program costs:

- Annual operations (marketing, recruitment, career services, etc. – includes 25% FTE and funds for contracting with external services as needed): \$50k in FY26, \$80k FY27 onward
- 50% program manager (program admin, student advising, support for faculty directors): 50% of \$80k salary (+ benefits) in FY26, 3% annual increases
- \$4500 (+ benefits) per faculty director
 - 3 directors for MES degree (one each from ASC, COE, CFAES)
 - Note: One director will serve as the primary MES degree Program Director and the others as Program Co-Directors
 - 1 director for each specialization (from lead college)

Timeline:

- Years 1-4 (FY26-29):
 - OAA loan will cover 100% of program costs in FY26. Following launch in Autumn 2026 (FY27), OAA loan will be adjusted to cover deficit and to ensure positive net revenues for colleges.
 - Remaining (net) revenues are distributed to colleges based on their share of credit hour production; used by colleges to address additional instructional costs as needed
- Years 5 (FY30) until end of loan payback (e.g., FY35 for 6-year loan payback period; FY39 for 10-year loan payback period)
 - Program revenues cover 100% program costs + OAA loan repayment
 - OAA loan repayment period is flexible (over 5-10 years)

- Net revenues are distributed to colleges based on their share of credit hour production; colleges use these to address additional instructional costs as needed
- Post-loan payback period
 - Gross revenues cover 100% program costs
 - Net revenues are distributed to colleges based on their share of credit hour production; colleges use these to address additional instructional costs as needed

b. Distribution of Credit Hour Production

MES DEGREE: GENERALIST PATHWAY (34 CREDITS)

This is the proposal that is currently under review with a proposed start date of Autumn 2026 (FY27). The distribution of credits is provided in Table 1. See the MES degree proposal for more details.

Table 1: MES Degree Generalist Pathway: Distribution of Annual Credit Hours across Colleges

| | Foundational + General Pathway credits | Selective (6) + Experiential learning (2) credits* | Estimated credits (average) |
|--------------|--|--|-----------------------------|
| ASC | 4 | 1.67 | 5.7 |
| COE | 7.5 | 4.17 | 11.7 |
| CFAES | 7.5 | 1.67 | 9.2 |
| GCPA | 4 | 0 | 4.0 |
| FCOB | 0 | 0 | 0 |
| TDAI | 3 | 0.5 | 3.5 |
| TOTAL | 26 | 8 | 34 |

*Note: Distribution of credits by college are calculated assuming equal enrollments across all elective courses

SPECIALIZATIONS (12 CREDITS)

The MES proposal includes both generalist and specialist pathways (Figure 1). Each specialization is 12-credits and can be used to replace 12-credits of the generalist MSE pathway to create a specialized MSE pathway. These will also be offered as stand-alone graduate minors and certificates. The specialist pathways are planned to start in FY28 and FY29 and have not yet been fully developed. The scenarios below reflect an initial list of 4 specializations based on discussions of the SELC grad/professional subcommittee and ideas that surfaced from the sustainability education visioning process. **We expect that this list will evolve and be modified as units engage and programs are developed – therefore the distribution of credit hours across colleges is TBD. The distributions provided below (Table 2a-d) are approximations.** See the MES degree proposal for more details.

EARTH & ENVIRONMENTAL ENERGY RESOURCES (EEER) SPECIALIZATION

Anticipated start: FY28 - led by ASC

Table 2a: Distribution of Annual Credit Hours for EEER Specialization

| College | Average credits |
|--------------|-----------------|
| ASC | 9 |
| COE | 0 |
| CFAES | 3 |
| GCPA | 0 |
| FCOB | 0 |
| TOTAL | 12 |

Approximation of courses

- ASC: 3 courses in energy and environmental resources, climate change (SES, CBC, Geog)
- CFAES (FABE, SENR): 1 course in biobased energy resources or environmental systems

POLICY, PLANNING, AND REGULATION (PPR) SPECIALIZATION

Anticipated start: FY29 - led by Glenn or CFAES

Table 2b: Distribution of Annual Credit Hours for PPR Specialization

| College | Average credits |
|--------------|-----------------|
| ASC | 0 |
| COE | 3 |
| CFAES | 6 |
| GCPA | 3 |
| FCOB | 0 |
| TOTAL | 12 |

Approximation of courses

- GCPA: 1 course in energy policy and regulation
- COE (CRP): 1 course in energy planning
- CFAES (AEDE, SENR): 1 course in cost-benefit analysis, 1 course on climate policy,

SUSTAINABLE ENGINEERING (SE) SPECIALIZATION

Anticipated start: FY29 - led by COE or CFAES

Table 2c: Distribution of Annual Credit Hours for SE Specialization

| College | Average credits |
|--------------|-----------------|
| ASC | 1.5 |
| COE | 6 |
| CFAES | 3 |
| GCPA | 0 |
| FCOB | 1.5 |
| TOTAL | 12 |

Approximation of courses

- COE (CEGE, other): 2 course sequence
- CFAES (FABE): 1 course in ecological engineering
- Pick 1 from: ASC (Geog or SES) course in climate change or FCOB course (sustainable business or finance)

SUSTAINABLE FINANCE (SF) SPECIALIZATION

Anticipated start: FY28 - led by FCOB

Table 2d: Distribution of Annual Credit Hours for SF Specialization

| College | Average credits |
|--------------|-----------------|
| ASC | 3 |
| COE | 1 |
| CFAES | 1 |
| GCPA | 1 |
| FCOB | 6 |
| TOTAL | 12 |

Approximation of courses

- FCOB: 2 course sequence in finance
- ASC: 1 course in climate change
- Pick 1 from: CFAES (AEDE cost-benefit course); COE (CRP financing sustainability course); GCPA (public finance)

Table 3: Total Distribution of Annual Credits Hours (Tables 2a-d) for the Four Modeled Specializations*

| College | Total Average Credits |
|--------------|-----------------------|
| ASC | 15 |
| COE | 10 |
| CFAES | 13 |
| GCPA | 4 |
| FCOB | 6 |
| TOTAL | 48 |

*Note: Each specialization comprises a Specialist Pathway as part of the MES degree as well as a stand-alone graduate certificate or minor

c. Scenario Assumptions

Scenarios (Table 4) are provided to illustrate program revenues, costs, and net returns across a range of assumptions:

- Different enrollment trajectories: baseline is 20 students enrolled annually by FY35; alternative scenarios assume more conservative projections.
- Two different MES program offerings: (i) both Generalist and Specialist Pathways with stand-alone certificates/minors offered for each of the four specializations or (ii) the Generalist Pathway only.
- Net effective revenue rates per credit hour: \$650 is the assumed rate; the last two scenarios provide a plausibly higher rate of \$775 (based on \$872/hour less taxes) for comparison.

The OAA loan covers 100% of program costs in FY26 and a declining proportion of program costs in subsequent years of the loan (FY27-29) as enrollments rise and program revenues are generated. For the purpose of the scenarios, program revenues are assumed to cover an increasing share of the costs (25% in FY27, 50% in FY28, and 75-100% in FY29 depending on the scenario) and the OAA loan covers remaining program costs.

Starting in FY30, program revenues cover all costs and the loan payback begins. For the purpose of the scenarios, we illustrate the maximum (10 year) payback time for all scenarios and a 6-year payback time for Scenario A (baseline) for comparison. The annual loan payback amount is adjusted for each scenario to ensure non-negative annual net revenues.

These scenarios are also used to approximate a break-even level of enrollment, defined as the minimum level of enrollment needed to maintain positive net returns for each college. As Table 5 shows, these break-even points differ depending on the scenario and whether the time period is during the loan repayment period or not. These are approximations and the actual break-even enrollments will be determined the actual net effective rate.

Table 4: Scenario Descriptions and Highlighted Program-Level Results

| Scenario Name | Scenario Assumptions* | | Scenario Results | | |
|---|--|--|--|---|---|
| | Revenue per Credit Hour (net effective rate) | Annual Enrollment Projection: Gradual increase from FY27 to FY35; steady state FY35 onward | OAA Loan Amount (total amount FY26-29) | Cumulative Net Revenues** Returned to Colleges (starting in FY27 through end of loan payback period) [†] | Average Annual Net Revenues** Returned to Colleges (starting in FY27 through end of loan payback period) [†] |
| A: Baseline | \$650 | 20 MES students by FY35 or earlier; 15 students enrolled in stand-alone cert./minors | \$320,935 | 6-yr payback: \$2,271,252 10-yr payback: \$3,403,111 | 6-yr payback: \$252,361 10-yr payback: \$261,778 |
| B: Alternative 1 | \$650 | 15 MES students by FY35 or earlier; 15 students enrolled in stand-alone cert./minors | \$331,985 | \$2,386,511 | \$183,578 |
| C: Alternative 2 | \$650 | 10 MES students by FY35 or earlier; 15 students enrolled in stand-alone cert./minors | \$337,510 | \$1,281,511 | \$98,578 |
| D: Alternative 3 | \$650 | 10 MES students by FY35 or earlier; 5 students enrolled in stand-alone cert./minors | \$348,812 | \$541,811 | \$41,678 |
| E: Baseline with MES Generalist Pathway Only | \$650 | 20 MES students by FY35 or earlier; 0 students enrolled in stand-alone cert./minors | \$298,506 | \$2,552,513 | \$196,347 |
| F: Alternative 1 with MES Generalist Pathway Only | \$650 | 15 MES students by FY35 or earlier; 0 students enrolled in stand-alone cert./minors | \$332,225 | \$2,241,397 | \$106,385 |
| G: Alternative 2 with MES Generalist Pathway Only | \$650 | 10 MES students by FY35 or earlier; 0 students enrolled in stand-alone cert./minors | \$393,000 | \$233,803 | \$17,985 |
| H: Alternative 3 with \$775 net effective rate | \$775 | 10 MES students by FY35 or earlier; 5 students enrolled in stand-alone cert./minors | \$331,125 | \$982,011 | \$75,539 |
| I: Alternative 4 with MES Generalist Pathway Only and \$775 net effective rate | \$775 | 8 MES students by FY35 or earlier; 0 students enrolled in stand-alone cert./minors | \$356,875 | \$235,503 | \$18,116 |

*All scenarios assume a 10-year loan payback; Scenario A is also illustrated with a 6-year payback for comparison.

** Net revenues are estimated at the program level. See appendix for estimated allocations to colleges (ASC, COE, CFAES) based on share of credit hour production.

[†] Loan payback period is FY30-35 for 6-year window and FY30-39 for 10-year window.

Table 5: Break-Even Enrollment Estimates Across Scenarios

| Break-even enrollment = minimum number of full-time students enrolled annually needed to maintain positive net returns for each college. This varies depending on the scenario assumptions of program revenues and costs. | | | Break-even Enrollment Estimates | |
|--|--|---|--|--------------------------|
| Scenarios | Program Assumptions | Net effective revenue rate per credit hour | During loan payback | Post-loan payback |
| Scenarios A-D | MES degree has both Generalist and Specialist Pathways; steady state of 15 students enrolled in stand-alone specialization certificates/minors by FY35 | \$650 | 7 | 5 |
| Scenarios E-G | MES degree Generalist Pathway only (no stand-alone specialization certificates/minors) | \$650 | 10 | 9 |
| Scenario H | MES degree has both Generalist and Specialist Pathways; steady state of 5 students enrolled in stand-alone specialization certificates/minors by FY35 | \$775 | 9 | 7 |
| Scenario I | MES degree Generalist Pathway only (no stand-alone specialization certificates/minors) | \$775 | 8 | 7 |

d. Scenario Result Highlights

- Colleges receive positive net returns during the first four years across all scenarios (ensured by the OAA loan) and during the loan repayment period for all but the lowest enrollment scenarios (D, G, I).
- OAA loan projection varies from ~\$300-400k depending on scenario. Slower enrollment growth in the first four years of the program translates into a larger loan size.
- Break-even enrollment (Table 5) varies by scenario and time period (during or post loan payback).
 - During loan payback period: Varies from 7-10 students
 - After loan payback period: Varies from 5-9 students
- Colleges' share of total credit hour production varies depending on the scenario. The long-run averages for two baseline scenarios are:
 - Scenario A (baseline): 19% ASC, 29% CFAES, 25% COE, 7% FCOB, 13% GCPA, 7% Other (TDAI)
 - Scenario E (baseline with MES Generalist pathway only): 17% ASC, 27% CFAES, 34% COE, 0% FCOB, 12% GCPA, 10% Other (TDAI)
- Scenario-specific highlights:
 - Scenario A is the baseline case with 20 students enrolled annually by FY35. Projections illustrate the difference in a 6 vs. 10-year loan payback with higher annual loan payments and lower annual net revenues under a 6-year versus 10-year payback period.
 - Scenarios A-D: These scenarios illustrate positive net revenues for a range of enrollment trajectories with a net effective revenue rate of \$650 per credit hour.
 - Scenarios E, F, G: These scenarios assume that the MES degree Generalist Pathway is the only program offered with a net effective revenue rate of \$650 per credit hour. Scenario E represents baseline enrollment of 20 students enrolled annually by FY35. Scenario G illustrates break-even enrollment levels.
 - Scenario H: This is the same low enrollment projection as Scenario D, but with a slightly higher, plausible rate of \$775 per credit hour. The results show somewhat higher net revenues. With this higher rate, the break-even levels are estimated to be slightly lower.
 - Scenario I: This illustrates the break-even point with \$775 per credit hour and assuming that only the MES Generalist Pathway is offered.

4. Assessment Plan

a. Program Metrics

The assessment plan for the Master of Energy Sustainability (MES) degree program will measure factors that are directly and indirectly associated with continuous quality improvement and financial stability. The overall process will collect, summarize, and report quantitative and qualitative outcome measurement data as program indicators of success (Table 6). The overarching goal is to (1) meet the needs, wants, and expectations of the (i) MES degree program students, (ii) employers of the graduates, and (iii) applicable Ohio State administrators, faculty, and staff; and (2) ensure that the overall MES degree program revenues exceed program costs for each of the applicable participating academic and administrative units.

Table 6. Program Metrics for MES Degree Program Assessment

| No. | Metric | Frequency |
|-----|--|-----------|
| 1 | Inventory of MES degree program <u>marketing</u> activities (and locations) | Annual |
| 2 | Inventory of MES degree program <u>recruiting</u> activities (and locations) | Annual |
| 3 | Number of MES degree program applicants/applications received | Annual |
| 4 | Number (and percentage) of applicants accepted and offered admission to the MES degree program | Annual |
| 5 | Number (and percentage) of applicants who accept the offer and matriculate into the MES degree program | Annual |
| 6 | Number (and percentage) of <u>new</u> MES degree program full-time and part-time enrolled students | Annual |
| 7 | Number (and percentage) of <u>total</u> MES degree program full-time and part-time enrolled students | Annual |
| 8 | Number of total MES degree program paid course credits generated and related tuition/subsidy | Annual |
| 9 | Number of total MES degree program paid course credits and related tuition/subsidy per course by academic unit | Annual |
| 10 | Total MES degree program revenue versus program costs | Annual |
| 11 | Current student satisfaction w/ program and program support (survey) | Semester |
| 12 | Student evaluation of instruction (satisfaction w/ course and instruction) | Semester |
| 13 | Retention (% retained) and graduation rates (cumulative GPA $\geq 3.0/4.0$, % graduated, time-to-degree) | Annual |
| 14 | Graduating student satisfaction w/ program and program support (survey) | Annual |
| 15 | Alumni job placement and other applicable employment/use of degree info (survey) | Annual |

The program assessment data are either directly or indirectly related to financial stability that is essential for program implementation, year-to-year operations, and ongoing program quality improvements. The goal is to collect data for all factors and make ongoing adjustments to determine if and ensure that program revenues (i.e., total tuition and subsidy) exceeds program costs (i.e., total operational and personnel expenses) and that each of the participating academic units involved receives sufficient revenues to cover any instructional, faculty director stipends, or other expenses associated with the program. In the first four years of the program, a loan from OAA's Enrollment Reserve Fund will be used to cover any shortfall in program expenses; the loan will be paid back from program revenues over a 5-10 year period thereafter.

b. Enrollment Targets

In addition to the metrics listed in Table 6, this assessment plan establishes desired enrollment targets and minimum enrollment targets to be met over the first five years of the MES (Table 7). The goal is to matriculate 10 full-time enrolled students by year 3 (FY28) and to increase annual enrollments to a steady state of 20 by year 5. This accounts for a ramping up period in the first few years, which will be necessary to market and grow the program. Following this ramping up period, break-even enrollment levels (in which total program revenues are sufficient to cover all program costs) are estimated to be between 7-10 new MES degree program students per year, depending on differing assumptions of projected program revenues and costs (Table 5). The enrollment targets identified in Table 7 reflect these considerations as well as the following:

- During FY 2026, the efforts needed to actively market and recruit MES degree program applicants for Autumn 2026 matriculation is compromised since the formal proposal review and approval process began during Spring 2025 and will continue through end of Spring 2026. Active marketing and recruitment are not permitted during this period of review and approval. Accordingly, enrollment expectations are modest for Autumn 2026 and projected program revenues for FY27 will likely be less than total costs.
- Full approval of the MES degree program is anticipated to be received by May 2026. Once received, a well-organized general and targeted marketing and recruitment plan will launch and continue through year one with projected higher enrollments beginning year 2 (Autumn 2027).
- We expect that dedicated program-specific courses and/or sections will not be necessary during the early stages of the MES degree program, and therefore no additional instructional costs. The required 34 credits for the MES degree program Generalist Pathway curriculum, the only initial option, are associated with courses that will be delivered regardless since the courses (and their faculty) already support other existing degree programs. The courses required to earn the MES degree Generalist Pathway will contribute to increased enrollments of existing courses.
- We anticipate that new MES degree program Specialist Pathway curricula will be developed during the next several years and will launch in years 3 and 4 (FY28 and FY29). The core of foundation courses for the MES degree program is 19 credits which must be completed by all students regardless of their degree pathway (Generalist or Specialist). Eventually these foundation courses will have the highest enrollments and contribute to foundational tuition and subsidy revenue.
- We anticipate that the specializations developed for the Specialist Pathway will also be offered as standalone graduate minors or certificates, generating additional program revenues and lowering the minimum enrollment in the MES needed for breaking even. The minimum targets in Table 7 are based on a very conservative estimate of these enrollments (5 students annually) and could be adjusted downward if enrollments are larger.

c. Responsibilities

The MES Executive Committee will oversee this Assessment Plan, including annual data collection, review, and reporting. Annual assessment data will be used for the annual reviews of the MES degree program revenue versus expense and inform the associated decision-making, including recruitment, marketing, and career service strategies. Continuous feedback will be sought, including from employers and prospective students, to guide marketing and recruitment strategies.

The MES Executive Committee will update projected enrollment and net revenues each semester based on metrics and broader trends. These projections will be used to update break-even enrollment estimates and minimum targets (Table 7) as needed, to ensure these are meeting the goal of positive net returns to colleges. It

is important to note that the numbers listed in Table 7 are approximations based on current budget projections; these will be updated based on actual revenues and costs as the program evolves.

The Executive Committee will provide an annual report to all participating academic and administrative units. In addition, they will discuss the findings with the MES Administrative Advisory Committee and work with them to determine and implement any changes to marketing, recruitment, or operational strategy, as needed and without compromising the program or related program process.

Table 7. Annual Enrollment Targets for MES Degree Program Assessment in First Five Years

| Year | Desired Target | Minimum Target* |
|---------------|----------------|-----------------|
| Year 0 (FY26) | 0 | 0 |
| Year 1 (FY27) | 5 | 5 |
| Year 2 (FY28) | 10 | 7 |
| Year 3 (FY29) | 15 | 8 |
| Year 4 (FY30) | 18 | 9 |
| Year 5 (FY31) | 20 | 10 |

* Note: Minimum targets are based on a net effective rate of \$650/grad credit hour and low enrollment in stand-alone specialization certificates or minors (5 students annually). If the actual net effective rate is higher or if enrollments in stand-alone degree enhancement programs are higher than these targets also could be adjusted downward.

d. Risk Management Strategies

Based on past experiences, new graduate degree programs often need three to five years to meet robust enrollment goals and the associated income for financial stability. With this in mind, the following risk management strategies will guide decision making:

- Beginning in the pre-launch period, the Program Manager working with the Executive Committee will develop and implement ongoing enrollment strategies, including:
 - Targeted outreach to prospective undergraduate students from Ohio State and other Ohio colleges and universities, including via academic programs, student organizations, social media, and other networks; host info sessions and professional development activities, e.g., hack-a-thons, employer networking events.
 - Targeted outreach to academic advisors and energy-related faculty and academic units across Ohio State and at other Ohio colleges and universities.
 - Assess online market and develop transition plan for a fully online offering of the program by FY31 if not sooner.
- Other strategies that may be considered include:
 - Work with an external marketing firm to improve messaging and outreach channels.
 - Engage with OSU Advancement to secure funding for partial scholarships.
- The Executive Committee will regularly assess enrollment trends and projections, based on the actual net effective revenue rate and actual distribution of credit hour production. They will seek continuous feedback to ensure their effectiveness and adjusting strategies as needed to meet the desired targets.
- If the minimum enrollment targets are not reached by end of year 3 (FY28), two additional years of probationary operation may be required to reach financial sustainability. In this case, the Vice Provost for Academic Programs will assess program solvency and stability and determine the best course of action in consultation with the leadership of the participating academic and administrative units. Strategies may include one or more of the following:

- Modify the MES Generalist and/or Specialist Pathways to ensure they are as well-aligned with workforce development needs and employment opportunities as possible.
 - Accelerate conversion of the MES degree to an online offering.
 - Reduce program costs and loan taken out in FY28-29 to minimize the overall loan payback amount.
- With enrollment growth over time, strategies are needed to manage the additional instructional costs associated with new sections. In general, the rule of thumb will be to minimize risks to academic units by using program revenues to cover the costs of a new section. This implies waiting until enrollments are sufficient to generate the revenues needed to pay for the additional costs. This will be based on the minimum viable number of additional students needed to support a new section, calculated as instructor costs divided by the net revenues per 3 credit hours received by the unit. For example, if instructor costs are \$9,000 and the net revenues per 3 credit hours received by the unit are \$360, then the minimum number of students necessary to justify a new section = $\$9,000/\$360 = 25$.
 - During the OAA loan payback period (starting in FY30): If there are insufficient program revenues to cover program costs and ensure non-negative net returns to colleges, strategies to reduce this downside risk will be pursued. In addition to implementing strategies to increase enrollment and reduce program costs, this may include the following:
 - Lengthen the OAA loan payback time period to reduce the annual loan payback amount.
 - Redistribute program revenues to ensure non-negative annual net returns for each college. This would reduce net returns for colleges who are in the black while also ensuring that no college is in the red. However, participating colleges would have to agree to this plan ahead of time.
 - Additional strategies, including the possibility of a partial loan forgiveness, will be considered and will be determined by the Vice Provost for Academic Programs and the Associate Vice President of Resource and Budget Management.
 - If the MES degree program does not meet, or under realistic scenarios is not projected to meet, break-even minimum targets by the end of five years (i.e., by the end of FY31), then it will be sunsetted.
 - In the case that the loan is not fully repaid and the program is sunsetted or revenues are insufficient to cover the remaining loan amount, then the Office of Academic Affairs will work with respective colleges to cover the amount of loan default with OAA covering 50% of the balance and the participating colleges covering the other 50% at a rate based on share of revenue distribution over the life of the program from FY27 through the time the program is sunsetted.

5. Appendix: Detailed Scenario Results

Program-level and college-specific tables with full details of projections for Scenarios A-I are provided separately and available upon request. For each scenario, this includes:

- Program-Level Tables: Projected credit hour production, gross revenues, program costs, net revenues
- College-Share Tables: Share of credit hour production and net revenues for all participating units providing instruction:
 - Colleges: ASC, COE, CFAES, FCOB, GCPA
 - Other units: TDAI