The Department of Agricultural and Biological Engineering

Strategic Plan

2014-18

Executive Summary

The Department of Agricultural and Biological Engineering has identified eight strategic goals to guide its progress over the next five years. In addition to the specific goals, the university’s themes of sustainability, diversity, and ethics are an integral part of guiding the implementation and outcomes of these goals. The ABE department has been engaged in sustainable practices in all functions: the courses we teach, the research we perform, our outreach to industry and the public, and our operations within the department. With the eight strategic goals, we aim to build on our successes, and strengthen areas where we believe there are significant opportunities to improve.
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Department of Agricultural and Biological Engineering
Strategic Plan, 2014-2018

Our Vision
To be a global leader in building a more sustainable world

Our Mission
To advance the engineering sciences, business, and technical management of biological and agricultural systems by promoting scholarship and engaging our students and stakeholders

Our Core Values
• Excellence and creativity in scholarship of education, research, and outreach as our highest priority.
• The highest standards of integrity, honesty, responsibility, and accountability.
• Commitment to sustainable systems approaches in all department functions: teaching, research, extension, and operations.
• Commitment to a workplace environment that nurtures personal and professional growth and development.
• Lifelong learning and access to information and knowledge for all Pennsylvania residents.
• Functional collaborations to solve complex problems for the common good.
• Dedication to diversity, multi-cultural understanding, and cross-cultural competence.
• Involvement, support, and encouragement of our partners in the planning and implementation of Departmental programs.
• Commitment to our parent Colleges (COAS and COE) and the University and to their respective missions.
• Respect in debate, flexibility to change, and responsiveness to emerging issues.

Our Strategic Goals
Goal 1: Recruit and retain a diverse student body that is motivated and engaged by increasing academic rigor, practicing ethics and integrity, and fostering a culture of achievement for our undergraduate and graduate programs

Goal 2: Broaden and strengthen stakeholder engagement

Goal 3: Pursue financial resources for achieving excellence and engagement

Goal 4: Increase the department’s involvement in on-line education for resident instruction, extension, and continuing professional development

Goal 5: Develop facilities, including technology and communications infrastructure, utilizing sustainable practices

Goal 6: Enhance extension capacity

Goal 7: Increase appropriate faculty, instructor, and staff capacity and diversity

Goal 8: Improve and promote national and international recognition of ABE departmental programs and people
Section 2. Implementation Plan

Section 2A. This is a summary of the strategies for each goal. Details of tactics and metrics can be found in section 2B.

Goal 1: Recruit and retain a diverse student body that is motivated and engaged by increasing academic rigor, practicing ethics and integrity, and fostering a culture of achievement for our undergraduate and graduate programs

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<td>Develop new and revised marketing materials to support recruitment efforts</td>
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<td>2</td>
<td>Strengthen recruitment of current and prospective undergraduate Penn State students, with a focus on both student numbers and quality</td>
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<td>3</td>
<td>Support undergraduate students in department programs through orientation, advising, and academics</td>
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<td>4</td>
<td>Enhance recruitment and quality of graduate students</td>
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Goal 2: Broaden and strengthen stakeholder engagement

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<td>Identify key stakeholders for specific targeting (from strategy #1) with consideration given to those who can best assist in promoting long-term, sustainable programs</td>
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<td>3</td>
<td>Develop plan for contacting and engaging the key stakeholders</td>
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<td>4</td>
<td>Conduct actual engagement activities</td>
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<td>5</td>
<td>Perform follow-up monitoring and adjust engagement programs as appropriate</td>
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Goal 3: Pursue financial resources for achieving excellence and engagement

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<tr>
<td>1</td>
<td>Provide educational programs beyond traditional courses that generate financial resources and focus of renewable energy and sustainable practices (see goal #4)</td>
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<td>2</td>
<td>Increase support for research programs and graduate students</td>
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<td>3</td>
<td>Enhance funding resources from alumni and corporate supporters whose sustainability goals align with those of the department, college and university</td>
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Goal 4: Increase the department’s involvement in on-line education, for resident instruction, extension, and continuing professional development

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<td>1</td>
<td>Investigate and pursue world campus opportunities</td>
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<td>2</td>
<td>Continue to develop existing workshops and webinars, fact sheets, and idea plans that contribute to the department’s mission and vision statements and consider high, medium, and low demand offering and adjust as necessary</td>
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<td>3</td>
<td>Investigate development of additional new workshops, seminars, and short courses that contribute to the department’s mission and vision statements. Evaluate feasibility of developing professional certification programs regarding specific topics.</td>
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<td>Consider mechanisms for adding online content to existing ABE (BE and BRS) courses to enhance classroom discussion and problem solving opportunities</td>
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<td>Investigate opportunities to develop a new professional MPS/MS degree by combining existing BE and BRS graduate course content with additional content outside of ABE, or industry-based MS degrees.</td>
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### Goal 5: Develop facilities, including technology and communications infrastructure, utilizing sustainable practices

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<td>Establish priorities and needs for the department’s facilities including the needs of wood products faculty and new faculty hires</td>
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<td>Work with OPP, architects and construction personnel to develop a design for the renovated ABE building meeting all teaching, research, outreach and extension needs</td>
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<td>Develop a plan for relocation of ABE faculty, staff, students and visiting scholars to maintain productivity in all program areas during the construction period (May 2016 to May 2018)</td>
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<td>Enhance funding resources from alumni and corporate supporters</td>
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<td>5</td>
<td>Maintain an active ABE ‘Green Team’ or equivalent committee to help ensure continual improvement in sustainable practices and infrastructure</td>
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### Goal 6: Enhance extension capacity

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<td>1</td>
<td>Develop a leadership position for each of the 5 ABE extension specialty areas to assure continuity of major program areas</td>
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<td>Establish a new model for Extension Associate and Educator positions</td>
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<td>3</td>
<td>Increase support for ABE Extension programs</td>
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<td>4</td>
<td>Improve communication of Extension outcomes to stakeholders and the public</td>
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<td>5</td>
<td>Improve strategic planning and development activities by developing a business plan for major extension program areas</td>
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<td>6</td>
<td>Integrate department Resident Education and Extension functions more closely</td>
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### Goal 7: Increase appropriate faculty, instructor, and staff capacity and diversity

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<td>1</td>
<td>Document the need for additional faculty, instructors and staff—and for greater diversity among our personnel. Pursue revenue streams or opportunities that facilitate growth</td>
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<td>2</td>
<td>Increase the number of faculty capacity relevant to the new BioRenewable Systems (BRS) program</td>
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<td>3</td>
<td>Promote and support professional development opportunities not only in skill-specific areas, but also in a broader sense, including international activities, leadership, team-building, ethics &amp; integrity, and diversity</td>
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<td>Consider reallocating personnel for various tasks, such that our best resource—our personnel—have the opportunity to use their strengths</td>
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<td>5</td>
<td>Broaden the capacity of the Department with respect to international and interdisciplinary opportunities, particularly in fields relating to sustainability</td>
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### Goal 8: Improve and promote national and international recognition of ABE department programs and people

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<td>1</td>
<td>Increase university press releases related to ABE programs and people</td>
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<td>2</td>
<td>Maintain up-to-date content on department webpages, especially those related to department programs and faculty research activities</td>
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<td>Pursue recognition by professional societies for new BRS programs</td>
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<tr>
<td>4</td>
<td>Increase student participation in regional, national, and international conferences and competitions</td>
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Section 2B. Details of Goals, Strategies, and Tactics

Goal 1: Recruit and retain a diverse student body that is motivated and engaged by increasing academic rigor, practicing ethics and integrity, and fostering a culture of achievement for our undergraduate and graduate programs

Strategy #1: Develop new and revised marketing materials to support recruitment efforts

Tactics:
1. Create BRS promotional materials and strategies highlighting diversity of program, people, and experiences and the theme of sustainability
2. Work with CAS and COE marketing to review and develop our recruitment materials
   o Print and digital

Strategy #2: Strengthen recruitment of current and prospective undergraduate Penn State students, with a focus on both student numbers and quality

Tactics:
1. Work with DUS advisors to be sure they know our majors
2. Work with commonwealth campus advisors to promote majors to a diverse group of prospective students
   o Go out into the world to meet with advisors
3. Consider working with or visiting with high schools to promote majors through 4-H programs, summer camps, Engineering Ambassadors, etc.
4. Use a Data Pull to dig into background of current and past students to learn more about where they come from; this may allow targeted marketing to new students
5. Review qualifications and diversity of incoming students.

Strategy #3: Support undergraduate students in department programs through orientation, advising, and academics

Tactics:
1. Create “expectations seminar” for all incoming students to increase awareness of ABE culture, and make them aware of the importance of ethics and integrity
2. Instructors and advisors communicate better about struggling students
   o Counsel them out of major when necessary or appropriate
   o Or, help them turn their lives around to complete our degree
3. Consider how to review course content plus instruction/instructors to determine places to improve our quality of offerings
4. Take advantage of opportunities to increase diversity in our undergraduate student population working with the College of Agricultural Sciences and College of Engineering multicultural offices.
Strategy #4: Enhance recruitment and quality of graduate students

*Tactics:*
1. Develop and offer annual expectations seminar, to make them aware of the ABE culture, and the importance of ethics and integrity
2. Use ABE/BRS 500 or other intro course to supplement broad ABE themes of excellence, ethics and integrity, and diversity  
   - Could also use the seminar to have joint faculty presentations
3. Continue to recruit highly qualified minority students through connections with 1890 institutions, Colleges of Ag Sciences and Engineering events, and other opportunities that support diversity.
4. Review qualifications and diversity of incoming students.
5. Develop funding for graduate assistantships.

*General Metrics:*
- Number of visits to commonwealth campuses and high schools
- Creation of marketing materials, emphasizing sustainability, diversity
- Number of contacts with DUS advisors (both AG and ENGR)  
  - Number of students referred to ABE by DUS, AG, and ENGR
- Number of students entering & graduating from ABE and BRS programs  
  - Track both grad and undergrad
- Offering of annual expectations seminar(s)

Goal 2: Broaden and strengthen stakeholder engagement

Strategy #1: Establish purpose and rationale for stakeholder engagement

*Tactics:*
1. List potential stakeholders and programs to be considered
2. Develop targeting matrix for engagement (is the target to broaden a program and/or strengthen a program) for each of the programs being considered. Within the matrix development consider those who exemplify sustainability, diversity, and integrity in their professional activities and programs
3. Prioritize within matrix which program(s) to address first
4. Schedule actions in association with priorities established

Strategy #2: Identify key stakeholders for specific targeting (from strategy #1) with consideration given to those who can best assist in promoting long-term, sustainable programs

*Tactics:*
1. Consider past and existing stakeholders initially (who have we worked with successfully and what level of success)
2. Form department “teams” to focus on targeted programs (BRS undergrad, BRS grad, BE undergrad, ABE grad, facilities, etc.)
3. “Teams” identify and recommend key stakeholders for specific program(s)
4. Current stakeholders assist in identifying new contacts
Strategy #3: Develop plan for contacting and engaging the key stakeholders

Tactics:
1. Consider how best to contact and engage each stakeholder
2. Use existing mechanisms and venues for contact (where possible leverage existing mechanisms and venues)
3. Develop new mechanism and venues for contact as appropriate (newsletters, web-based materials, Facebook, face-to-face meetings, association meetings, targeted mailings, etc.)
4. Consider priorities and timeframe of needs and mechanisms
5. Identify “who” from the department to lead specific contact and engagement (i.e. department head, committee, individual faculty and staff, consultant, etc.)

Strategy #4: Conduct actual engagement activities

Tactics:
1. Use current avenues, venues, and mechanisms as much as possible, such as:
   - Opportunities at workshops to promote ABE programs to industry stakeholders
   - Form BRS advisory group
   - Increase interactions with industry in classes (BRS 393, BRS 490, B E 391/392, BE 467)
2. Determine resources available and time frame and schedule for activity
3. Attend functions, meetings, conferences, etc. of targeted associations, stakeholders, groups, etc.
4. Invite stakeholders to campus for department functions (seminars, meetings, IPAC, etc.)
5. Target award recipients who have demonstrated high ethical standards

General Metrics:
- Number of visits to and from industry stakeholders
- Number of contacts with alumni

Strategy #5: Perform follow-up monitoring and adjust engagement programs as appropriate

Tactics:
1. Record-keeping of contacts, engagement activities, schedules, results
2. Assess success (yes, no, uncertain) and degrees of success
3. Identify logical adjustments and follow-up to engagement
4. Adapt approaches based on feedback from monitoring activities

Goal 3: Pursue financial resources for achieving excellence and engagement

Strategy #1: Provide educational programs beyond traditional courses that generate financial resources and focus of renewable energy and sustainable practices (see goal #4)

Tactics:
1. Offer educational activities that satisfy PE licensing continuing professional competency requirement
2. Improve marketing of fermentation engineering, stormwater management, bioenergy short courses, and similar workshops
General Metric:
• Financial resources beyond program costs returned to department and participating faculty

Strategy #2: Increase support for research programs and graduate students

Tactics:
1. Increase faculty engagement as co-investigators on proposals submitted through PSU centers and institutes
2. Explore foundation funding for research activities and the new BRS program
3. Pursue USDA national needs fellowship
4. Have ABE/BRS 500 students develop applications for NSF graduate fellowship program
5. Explore center for advanced fermentation and similar programs
6. Explore filling equipment needs through corporate donation of used equipment

General Metrics:
• Number of graduate students supported by fellowships. Proposal developed for center for advanced fermentation. Number of proposals submitted to foundations

Strategy #3: Enhance funding resources from alumni and corporate supporters whose sustainability goals align with those of the department, college and university

Tactics:
1. Team with College and University development officers in contacting potential donors
2. Explore possibility of engaging corporate donors to support fermentation workshop

General Metrics:
• Number of contacts with alumni and industry partners eliciting support for programs

Goal 4: Increase the department’s involvement in on-line education, for resident instruction, extension, and continuing professional development

Strategy #1: Investigate and pursue world campus opportunities

Tactics:
1. Consider BE and BRS undergraduate, and ABE and BRS graduate course content, collaborators and synergy – ABE faculty, other national and international colleagues – and identify high priority “need” areas for collaboration
2. Investigate the “fit” of ABE and BRS graduate courses (and undergraduate content) with RESS (Renewable Energy and Sustainable Systems)
3. Develop graduate certificate programs on timely hot topics such as bioenergy
4. Further develop options within online Professional Master Program in Renewable Energy and Sustainability Systems (RESS)
**General Metrics:**
- Develop 3-6 courses that contribute to the department’s mission and vision statements and are compatible and synergistic with BRS, RESS, or other
- Develop 2 to 4 graduate certificate programs

**Strategy #2:** Continue to develop existing workshops and webinars, fact sheets, and idea plans that contribute to the department’s mission and vision statements and consider high, medium, and low demand offering and adjust as necessary

**Tactics:**
1. Clearly communicate with ABE stakeholders regarding all existing ABE workshops, seminars, and short courses through the departmental website
2. Expand high demand offerings and eliminate low demand offerings

**General Metrics:**
- # of idea plans for animal systems
  -- Identify and seek staff resources necessary to implement and expand idea plans
- # of fact sheets for water quality resources and safety
  -- Simplify access to fact sheets

**Strategy #3:** Investigate development of additional new workshops, seminars, and short courses that contribute to the department’s mission and vision statements. Evaluate feasibility of developing professional certification programs regarding specific topics.

**Tactics:**
1. Identify high demand (optimal) content and develop mechanisms for delivery

**General Metrics:**
- # of new workshops, seminars, and short courses that contribute to the department’s mission and vision statements and are compatible and synergistic with existing ABE faculty and their collaborations

**Strategy #4:** Consider mechanisms for adding online content to existing ABE (BE and BRS) courses to enhance classroom discussion and problem solving opportunities

**Tactics:**
1. Identify 1-2 courses for initial experimentation
2. Identify mechanisms to provide university, college, and/or departmental incentives (resources) to these courses to better understand the optimal structure, partners and mechanisms for delivery for this content

**Strategy #5:** Investigate opportunities to develop a new professional MPS/MS degree by combining existing BE and BRS graduate course content with additional content outside of ABE, or industry-based MS degrees.

**Tactics:**
1. Examine MS degree possibilities within the BE, BRS, and RESS offerings
**General Metrics:**
- #, cost, and income from new MS degree with collaborators

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**Goal 5: Develop facilities, including technology and communications infrastructure, utilizing sustainable practices**

**Strategy #1: Establish priorities and needs for the department's facilities including the needs of wood products faculty and new faculty hires**

**Tactics:**
1. Develop specification documents, which can be used by OPP, architects and construction personnel to help guide the renovated building design process.

**General Metrics:**
- Renovated building specifications documents.

**Strategy #2: Work with OPP, architects and construction personnel to develop a design for the renovated ABE building meeting all teaching, research, outreach and extension needs**

**Tactics:**
- Continue monthly meetings with OPP and the design/build team to design the renovated ABE building.

**General Metrics:**
- Develop a design for the renovated ABE building.

**Strategy #3: Develop a plan for relocation of ABE faculty, staff, students and visiting scholars to maintain productivity in all program areas during the construction period (May 2016 to May 2018)**

**Tactics:**
1. Develop a swing space specifications document and deliver to OPP. Work with OPP and COAS to refine and identify needed swing space.

**General Metrics:**
1. Swing space plan for relocating faculty.

**Strategy #4: Enhance funding resources from alumni and corporate supporters**

**Tactics:**
1. Team with College and University development officers in contacting potential donors
2. Explore possibility of engaging Mr. Masser, chair of Board of Trustees, to reach out to other ABE alums and related businesses
General Metrics:
• Number of contacts with alumni and industry partners eliciting support for programs

Strategy #5: Maintain an active ABE ‘Green Team’ or equivalent committee to help ensure continual improvement in sustainable practices and infrastructure

Tactics:
1. Maintain an active committee which focuses on sustainable practices and infrastructure
2. Implement recommendations of the committee

General Metrics:
• Number and impact of facilities changes or changes in practices promoting sustainability

Goal 6: Enhance extension capacity

Strategy #1: Develop a leadership position for each of the 5 ABE extension specialty areas to assure continuity of major program areas

Tactics:
1. Focus first on topics that emphasize sustainable practices.
2. Explore an Extension Educator position (county and regional) to work with the new Hydraulics Engineer faculty position NRE hire and/or Chip Elliott in the area of water quality
3. Consistent with the FFTF document, hire a Biological Process Engineer. The person should be an Associate Professor with an extension appointment to lead the Bioprocessing and Biomaterials Engineering position
4. Include an Extension Associate as part of the start-up package for the Biological Process Engineer position
5. Explore an Extension Associate position in the area of Specialty Crops.
6. Explore gaining support for extension positions from the Marcellus Center
7. Continue support of animal welfare initiative through acquisition of the Extension/research Associate position.

General Metrics:
• Number of faculty or extension associates hired
• Diversity of ABE Extension personnel

Strategy #2: Establish a new model for Extension Associate and Educator positions

Tactics:
1. Develop and submit a proposal to the Dean of COAS to model the Extension Associate position after the Research Associate position. Make this apply to current employees and new hires

General Metrics:
• College approval to improve long term commitment to positions
• University approval of new model
Strategy #3: Increase support for ABE Extension programs

*Tactics:*
1. Work with PSU office of development to create an endowment
2. Develop more fee-based programs
3. Explore developing our own departmental on-line education platform fee-based courses could be offered and also be taken for credit
4. Explore using existing content for on-line fee-based experiences of courses for credit

*General Metrics:*
• Number of new programs implemented
• Number of individuals and organizations engaged

Strategy #4: Improve communication of Extension outcomes to stakeholders and the public

*Tactics:*
1. Highlight Extension success stories at hosted events (tailgate, ASABE 'breakfast', etc.)
2. Improve college web site to include metrics and success stories

*General Metrics:*
• Talking points accomplished
• Updated web site

Strategy #5: Improve strategic planning and development activities by developing a business plan for major extension program areas

*Tactics:*
1. Explore models for developing a business plan appropriate for a variety of extension programs
2. Develop business plans as appropriate

*General Metrics:*
• A documented process for planning and justifying extension programs including the structure of committees, approval process, and implementation process

Strategy #6: Integrate department Resident Education and Extension functions more closely

*Tactics:*
1. Identify Extension expertise that could guest lecture in specific BE and BRS courses
2. Identify resident education expertise that could provide extension teaching or research support to extension program areas
3. Explore opportunities for faculty with professor status to have a formally appointment in all three missions of the COAS
4. Emphasize sustainable, practical and ethical examples from field experiences
**General Metrics:**
- Number and extent of contributions by extension and resident education faculty
- Number of split appointments created

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**Goal 7: Increase appropriate faculty, instructor, and staff capacity and diversity**

**Strategy #1:** Document the need for additional faculty, instructors and staff—and for greater diversity among our personnel. Pursue revenue streams or opportunities that facilitate growth

**Tactics:**
1. Identify existing faculty, instructor and staff needs. The output from this will result in an updated “Faculty, Instructors, and Staff for the Future” document.
2. Vision-cast emerging research areas and opportunities for curricular developments, especially relating to sustainability, and ethics and integrity. Identify associated personnel needs in these areas.
3. As appropriate, develop tenure-track faculty, instructor, and staff hire proposals for priority areas such as bioenergy and biofuels, bioproducts and biomaterials, bioprocessing, GPS and GIS applications targeted toward more sustainable agricultural and biological systems, safety and biosafety, etc.
4. Seek funding for additional personnel through institutes and consortia, as justifiable, or through endowed funds for professorships, potentially in conjunction with Strategies 2 and 3.
5. Assess student to faculty ratio for various departmental programs, and set benchmark ratio(s) to ensure that the quality of our programs (BE, BRS, ABE) is not compromised.
6. Evaluate and benchmark diversity within the Department, and develop a plan for embracing additional diversity

**Metrics:**
1. A new Faculty and Staff for the Future document will be prepared to reflect personnel needs, as well as emerging areas where expertise is needed.
2. One or more proposals submitted for new faculty hires
3. Data obtained on student to faculty ratio, diversity metrics
4. Two or more new faculty hired to meet the desired student to faculty ratio

**Strategy #2: Increase the number of faculty supporting new BioRenewable Systems (BRS) program**

**Tactics:**
1. In conjunction with Strategy 1, develop proposals for new hires and pursue funding opportunities that will have a teaching role within the BRS program
2. Grow the BRS program by developing an additional option in recyclable systems and/or bioenergy

**Metrics:**
1. One or more new faculty hires affiliated with the BioRenewable Systems program
2. Addition of one or more options within the BRS major (perhaps Bioenergy, or Recyclable Systems)
Strategy #3: Promote and support professional development opportunities not only in skill-specific areas, but also in a broader sense, including international activities, leadership, team-building, ethics and integrity, and diversity

Tactics:
1. Encourage stakeholders and industry partners to endow professional development funds, perhaps by hosting regional and employer-located alumni events with a PSU ABE pride and philanthropy focus
2. Encourage faculty and staff to participate in training, sabbatical, Fulbright, international exchanges, and other professional development opportunities that enhance skills, leadership and/or team building experiences, ethics and integrity, and diversity

Strategy #4: Consider reallocating personnel for various tasks, such that our best resource – our personnel – have the opportunity to use their strengths.

Tactics:
1. Consider the strengths and interests of the current faculty, instructors and staff and then determine whether there are opportunities to:
   • further leverage existing talents and resources for the common departmental good
   • shift responsibilities to achieve maximum job satisfaction, productivity and impact
   • incorporate training to encourage greater diversity in skills, knowledge and perspectives

Metrics:
1. Biennial survey of Departmental personnel regarding skills, talents, abilities, and the aspects of their job that they like the most or least

Strategy #5: Broaden the capacity of the Department with respect to international and interdisciplinary opportunities, particularly in fields relating to sustainability

Tactics:
1. Invite a diverse array of seminar presenters who have recently completed international experiences (Fulbright Scholars, Sabbaticals, International Exchanges)
2. Invite seminar presenters from other departments and units, or persons focusing on ethics and integrity in science, engineering, or sustainability
3. Encourage faculty to make presentations to other departments and units
4. Advertise, university-wide, our department seminars or special presentations to other units

Metrics:
1. Two or more seminar presenters invited annually to speak on international activities
2. One or more presentations our personnel have given regarding international activities
3. One or more seminars or invited presenters annually with a focus on ethics/integrity
Goal 8: Improve and promote national and international recognition of ABE department programs and people

Strategy #1: Increase university press releases related to ABE programs and people

Tactics:
1. Establish formal processes for managing and gathering department and college news items
2. Provide examples of categories for news content to faculty
3. Develop template for submission of news items, including category tag to facilitate dissemination of news to relevant University newswires (e.g. relevant research and student stories to the Sustainability Institute)
4. Facilitate transfer of news items from faculty members to Colleges of Engineering and Agricultural Sciences news departments
5. Develop student/alumni stories webpage to highlight diversity of student population and activities (one undergraduate student, graduate student, alumnus per semester)
6. Quarterly or semi-annual department head letter to alumni and friends with information from department.

General Metrics:
- Number of press releases per year related to department programs and people
- Number of news items on department website

Strategy #2: Maintain up-to-date content on department webpages, especially those related to department programs and faculty research activities

Tactics:
1. Request annual updates from faculty on web content, including faculty review of information in PSIEE/Sustainability Institute expertise database
2. Recommend that faculty link department research page to social media account (e.g. Facebook) to increase diversity in communication methods
3. Re-evaluate costs and benefits of department use of social media (Facebook, Twitter, etc.)

General Metrics:
- Number of webpage hits (faculty pages, undergraduate and graduate program pages)
- Number of ways updated content is released (webpages, social media, etc.)
- Timeliness of web content

Strategy #3: Pursue recognition by professional societies for new BRS programs

Tactics:
1. Seek accreditation or certification by Society of Wood Science and Technology (SWST) for BRS undergraduate program
2. Seek certification by American Society of Agricultural and Biological Engineers (ASABE) for BRS undergraduate program
3. Present information on BRS programs at conference sessions on educational programs

General Metrics:
- Completion of accreditation or certification process for BRS undergraduate major by SWST
- Completion of certification process for BRS undergraduate major by ASABE
• Number of presentations on BRS programs at national and international conferences

**Strategy #4: Increase student participation in regional, national, and international conferences and competitions**

*Tactics:*
1. Examine funding opportunities for student travel to conferences
2. Create a website resource on “Professional Development Opportunities” for students (appropriate venues, funding, etc.)
3. Utilize student experiences to market professional development opportunities

**General Metrics:**
• Number of students participating at conferences
• Number of students giving research or design competitions presentations at conferences
• Diversity of conferences (ASABE, SWE, IBE, others) and competitions (1/4-scale tractor, Fountain Wars, NABEC, ASABE Open Format Environmental Design) in which students participate
Section 3. Progress made on the previous Strategic Plan (2009-2013)

The Agricultural and Biological Engineering Department evolved quickly during the 2009-13 period. The department has been strengthening its commitment to sustainability, particularly in the past couple of years. This is reflected in our curriculum at both undergraduate and graduate levels, outreach and extension areas, research, and department operations. While not specifically stated as a strategic goal, the concept of sustainable systems is infused in our department’s function and this will be continued and expanded in the 2014-18 strategic plan. Additionally, while diversity remains a challenge in certain aspects (such as the undergraduate ASM population), we have made great strides in several areas of diversity. We have had a quadrupling of the number of female faculty in the last three years. Our graduate student population is a very diverse mix of national origins, ethnicity, and gender. In the last two years our undergraduate Biological Engineering program has had the highest percentage of women in all of the College of Engineering majors. We have broadened the scope of our department’s expertise with the addition of the wood products faculty, which brought in new perspectives and opportunities. Our research and extension programs are intentionally reaching and improving the livelihoods of diverse groups of people. Finally, ethics is a core value of our department culture, and we strive to instill ethical considerations and thinking in our faculty and staff, also in our students as well, including the application of ethics as content in courses for all students in department programs.

The 2009-13 strategic plan included six goals.

Goal 1: Develop Facilities Commensurate with the Needs and Opportunities for Our Evolving Discipline.

Goal 2: Increase the Numbers of BE Graduates to 50 per Year and ASM Graduates to 30 per Year, and Improve the Quality of the Students.

Goal 3: Continue Strengthening the ABE Graduate Program.


Goal 5: Lead Development of the Biological Engineering Discipline at the University

Goal 6: Strengthen Faculty, Staff, Student, and Resource Capacities.

The 2008-13 period brought bigger and more drastic changes than perhaps any other time in the University’s and College’s history. A forced restructuring plus a major budget cut during this period changed the dynamics of the strategic approach. However, the ABE department was still able to accomplish or make major strides on most of its goals.

Goal 1: Develop Facilities Commensurate with the Needs and Opportunities for Our Evolving Discipline. Some progress was made in facilities improvements. These were targeted at specific needs and not based on a holistic view. Fortunately, there are better opportunities for major improvements in the 2013-18 timeframe.

2009 Bionanotechnology lab completed (Catchmark)
2009  First floor (old building section) renovated, asbestos removed, new lighting installed.
2010-11 Ground floor lab/shop level renovation, including expansion of Area Services 5 shop space, new archive rooms, new multi-user bathrooms, new automation/mechatronics lab (room 119), new dynamometer test cell and infrastructure, chilled water extension into the building and mechanical capacity put in place for cooling the entire building.
2011  Clean-out and reorganization of ground floor lab/shop area, freeing up flexible teaching and research areas, disposing of old and outdated equipment.
2013  Plans for major renovation/rebuild underway, slated for the next strategic planning period (see new goal #5).

**Goal 2: Increase the Numbers of BE Graduates to 50 per Year and ASM Graduates to 30 per Year, and Improve the Quality of the Students.** Enrollments continued to increase during the 2009-13 time frame, with a peak in the 2010 incoming junior class in both Biological Engineering and Agricultural Systems Management majors. The peak in BE was 60 students and ASM was 25. Since then, the BE per class average has been around 40 and ASM around 20. With the introduction of the new BRS major (which includes the ASM and Bioproducts options), we anticipate increased growth in this major. Enrollments in BE can be dependent upon enrollment controls imposed on other College of Engineering majors and the ability of departments to enforce those controls.

**Diversity of undergraduate programs:** The number of female undergraduate students in the BE major has greatly increased during the last three years of the previous strategic plan. The BE major has had the second highest percentage of women in the last three years (31-33%) of all engineering majors and this percentage appears to have increased for the 2013-14 academic year. We still struggle with diversity in the ASM program, but we are hoping that the new BRS program will appeal to a wider range of individuals from many different backgrounds. Minority enrollment still remains a challenge in both majors but we have built diversity strategies into our next strategic plan.

**Goal 3: Continue Strengthening the ABE Graduate Program.** Prior to 2008, we had several faculty serve in short-term capacities as the ABE graduate program coordinator. Circumstances played a role in the frequent changes, but designating an individual who would stay in the coordinator’s role for a reasonable length of time (Dr. Virendra Puri) helped to add consistency to the graduate student application, review, acceptance, and progress process. This also allowed the department to spend time looking for ways to improve the process. The department successfully created the BioRenewable Systems graduate program (M.S. and Ph.D.), which was approved by the graduate council in September, 2013, and should be effective for the 2014 Spring semester. There is already interest in the program as several students who have been conditionally accepted into the ABE program will switch to BRS when it becomes effective. The entire department is supportive of this program and it will increase our capacity to develop graduate
students in the technology, business, and management aspects of renewable systems. We were able to almost double the number of graduate courses offered by the department with the addition of this new graduate program. Faculty in the department were also successful in leading the development of the iMPS-RESS online program (inter-college Master of Professional Studies in Renewable Energy and Sustainable Systems). While this is an interdisciplinary offering, ABE faculty are leading the overall program as well as the bio-energy option, which created three new ABE graduate courses.

**Diversity in the graduate program:** The graduate student population has become quite diverse in both terms of gender, ethnicity, and geography during the period of the previous strategic plan.

**Goal 4: Strengthen Our Capacity to Offer Cooperative Extension and Applied Research Programs.** The department saw a loss of capacity after 2010 due to retirements and budget constraints. In 2010, we had 4.2 extension FTEs in seven standing appointment faculty. By 2013, that had dropped to 1.4 extension FTEs distributed between two standing appointment faculty. Clearly, the trend has been in the wrong direction. To address this drain on our extension capacity, the ABE department developed the Extension Faculty for the Future plan, which identified the areas where we should have an extension presence, and how we can address extension capacity in an era when obtaining new standing appointment faculty positions is very difficult. Some of these areas are being covered by fixed-term positions and county-based educators. For example, under the new extension restructure, Dan McFarland and John Tyson, both involved with engineering for animal production, have been aligned with the department. Additionally, Dan Ciolkosz is an extension associate working in the bioenergy area, and a search is on for extension support in the animal welfare area.

**Goal 5: Lead Development of the Biological Engineering Discipline at the University.** The department has strengthened its role in development of biologically-based products and processes, particularly with the hire of Dr. Howard Salis in Synthetic Biology, and the movement of the Wood Products faculty (Brown, Smith, Janowiak, and Michael) to the ABE department. The result of the addition of these four faculty led to the development of the BioRenewable Systems undergraduate and graduate programs, which put us at the forefront in the university in educational programs oriented towards biologically-based systems. It also has increased our capacity to do bio-product and biologically-based materials research. We have strengthened our bio-based energy capacity in all areas – research, teaching, and extension.

**Goal 6: Strengthen Faculty, Staff, Student, and Resource Capacities.** The department was successful in developing endowments for support of student, faculty, and resource capacities. **Scholarships:** increased the capital in scholarships that were established prior to 2008. Established new scholarships: Masser Memorial Trustee Matching Scholarship, Ray and Jan Evans Scholarship in ABE, and the Al
and Ellen Jarrett Scholarship. Development funds: Agricultural Systems Management and Biological Engineering Communications and Leadership Development Fund, Robert and Anne Graves Extension Endowment in ABE, Ag Safety Building development fund, Agricultural Safety & Health Development fund. We established donation ties with several companies, which helps support our instructional and research efforts, including Deere & Co., CNH, and Merck.

During the restructuring in 2012, four faculty joined our department from the former School of Forest Resources, strengthening our capacity our bio-product development, management, and marketing. The restructuring also allowed the College of Ag Sciences to establish a staffing model, identifying essential staff positions within each department.

Unfortunately, though, severe budget cuts has reduced our overall faculty numbers significantly, especially in extension. The new strategic plan is addressing approaches for having appropriate capacity for all of our missions as well as ensuring that we have adequate staff support to carry out these goals.

Diversity in the faculty: The department has been successful in increasing the number of female faculty during the past couple of years. In Spring of 2010, we had one female faculty in the department. By Summer 2013, we have four (three tenure track and one instructor).

**Section 4. Connection between Department plan and Colleges plans**
(to be completed when College plans are drafted)