PROPOSAL

Cross-Disciplinary, Intercollegiate Undergraduate Major in Energy & Environmental Policy

SUBMITTED BY

FACULTY

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RESOLUTION FOR FACULTY SENATE AGENDA

To Create an Intercollegiate Undergraduate Major in Energy and Environmental Policy

WHEREAS the Undergraduate Major in Energy and Environmental Policy addresses the critical issues of the energy sector and its environmental impacts in the state, nation, and global community; and

WHEREAS the Undergraduate Major in Energy and Environmental Policy examines the ways in which sustainable energy and environmental policies are developed and executed, and how such policies should be evaluated and monitored; and

WHERAS the Path to Prominence has established the goal of making the University of Delaware a national and international leader in education and research on energy and environmental sustainability; and

WHEREAS the Undergraduate Major aligns with the academic priorities of the University's stated goals to promote programs which engage in cross-disciplinary (or cross fertilization) efforts to create integrated and critically reflective solutions to the world's pressing energy and environmental challenges; and

WHEREAS the Undergraduate Major in Energy and Environmental Policy educates and builds core competencies and skills for students so that they may work effectively at the intersections of business, technology, government, research and civil society in order to improve energy and environmental policy; and

WHEREAS the Undergraduate Major in Energy and Environmental Policy provides students with a solid academic foundation for success for entrance to graduate programs in the field; and

WHEREAS, the Undergraduate Major in Energy and Environmental Policy has been based on a critical review of prominent policy programs nationally and there is no similar program within the region offering a cross-disciplinary, intercollegiate program of this type, thereby enabling the University of Delaware to be the national leader in the field; be it therefore

RESOLVED that the Faculty Senate approves provisionally, for four years, the establishment of a new major entitled Baccalaureate of Science in Energy and Environmental Policy effective September 1, 2009.

I. DESCRIPTION

The undergraduate major in Energy and Environmental Policy (ENEP) will provide students with cross disciplinary knowledge and analytical skills to address local, national and global energy and environmental issues in complex, real world contexts. The ENEP major offers an integrated set of courses in the fields of social and policy sciences, natural sciences, engineering and analytical methods to prepare its graduates with the necessary knowledge and tools to gain professional positions in the fields of energy and environmental analysis, planning and policy development. Core knowledge of the major includes an understanding of local, national and global energy and environmental issues and the policy options for addressing them in all sectors (governmental, non-governmental, and industry). This includes the policies related to local, national and international policy and governance systems, energy and resource economics, alternative energy technology development, and environmental impacts of energy utilization.

The ENEP major draws on wide-ranging strengths of the University to provide a comprehensive program that combines technical expertise, theoretical preparation and practitioner experience.¹ Utilizing the successful model of the innovative Master's and Doctoral degrees in Energy and Environmental Policy,² the proposed undergraduate major seeks to promote cross-disciplinary, intercollegiate knowledge to inform sustainable energy and environmental policy development. Its vision is to engage students in creative and unconventional approaches to problems of theory and practice, and to provide them with the requisite skills to contribute to the field in international, national and local contexts. University faculty with expertise in policy analysis, economics, the social and natural sciences, and engineering will offer students the opportunity to learn from a diverse and extensive array courses, but with a common and directed focus to address the needs of society to transition to a sustainable energy future. As with the graduate ENEP programs, the administrative home of the undergraduate ENEP program will be the Office of the Dean, College of Human Services, Education & Public Policy.

Contemporary energy and environmental problems require educated individuals who are able to bridge these disparate fields in order to develop sustainable alternatives and to facilitate policy choices toward a path of ecologically sound and socially equitable solutions. Public policy actors increasingly require analytical advice built on cross-disciplinary knowledge that can be applied to address the practical needs of near-term policy as well as longer range planning to achieve sustainable energy objectives at the international, national and community levels.

Students informed about the operations of multi-scale governance and economic systems will be well equipped to address the complex set of factors influencing our energy and environmental futures. The proposed undergraduate major will provide the necessary education to address these multidimensional problems.

¹ Completion of an internship in a policy, research or business environment is a required part of the major.

² The University of Delaware approved an intercollegiate graduate program in Energy and Environmental Policy (ENEP) in 1998. Currently, it has 60 students enrolled at the University, about evenly split between its Master of Energy and Environmental Policy (MEEP) and the Ph.D. in Energy and Environmental Policy. The Center for Energy and Environmental Policy administers the cross-disciplinary, intercollegiate ENEP graduate program under the direction of the Dean of the College of Human Services, Education and Public Policy. The program is supported by faculty in the Colleges of Agriculture & Natural Resources, Arts & Science, Engineering, Human Services, Education & Public Policy, and Marine & Earth Studies.

Learning Outcomes

The proposed undergraduate major in ENEP has five intended learning outcomes:

- 1. Students will gain cross-disciplinary knowledge and skills in the field of energy and environment associated with energy use
- 2. Students will understand the complex social and biophysical interactions
- 3. Students will gain an understanding of the influence of policy and economics on the development of the energy sector, with special emphasis on sustainable energy development
- 4. Students will gain an understanding of local, national and global energy and environmental policy interactions and the policy options for addressing them in government, civil society, and industry
- 5. Students will gain an understanding of local, national and international policy and governance systems.

II. RATIONALE AND DEMAND

A. Institutional Factors

1. Explain how the proposed program is compatible with the Academic Priorities of the University.

In Path to Prominence: Strategic Plan for the University of Delaware (2008), the University identifies an "Initiative for the Planet" as one of its strategic milestones for excellence. Initiative's goal is to make "the University of Delaware a national and international resource for environmental research, technology, education, and policy." The Strategic Plan specifically calls for building and expanding upon the University's highly regarded research and education programs in energy technology, economics and policy. Recently, the University of Delaware Energy Institute (UDEI) was launched as an action in support of the Strategic Plan (see http://www.energy.udel.edu/news.html). The founding director of UDEI, Mark Barteau (Robert L. Pigford Chair of Chemical Engineering and Senior Vice Provost for Research and Strategic Initiatives) supports the proposed undergraduate major as an important contribution to the mission of UDEI and the University's undergraduate program (see his endorsement in Appendix C). Affirming the University's commitment to promoting energy and environmental sustainability, President Harker states that in these "challenging times for the entire planet ... this University must be an active and dynamic force in addressing these global issues." This includes establishing the University as a "Green University" and to further its position "as a national and international resource for environmental research technology and policy" (www.udel.edu/PR/UDaily/2008/apr/agreements042408.html). As part of its commitment, the University has signed two important agreements. The first is the American College and University Presidents Climate Commitment, a shared university endeavor to address global warming. The second is the Talloires Declaration, a worldwide action plan led by the Association of University Leaders for a Sustainable Future.

The University has the distinction of having created the first cross-disciplinary Ph.D. in Energy and Environmental Policy and Master of Energy and Environmental Policy (MEEP) in the United States. After ten years of graduate enrollment, the program has earned national and international recognition for its innovative approach.³ The proposed undergraduate major in Energy and Environmental Policy (ENEP) builds upon the success of these graduate educational programs to provide undergraduate students with rigorous preparation for this rapidly growing field.

The undergraduate major aligns with the academic priorities of the University's stated goals to promote programs which engage in cross-disciplinary (or cross fertilization) efforts to create integrated and critically reflective solutions to the world's pressing energy and environmental challenges. The program is designed to provide students with core knowledge of the energy sector and its environmental impacts and to foster graduates who will be instrumental in developing long-term effective and sustainable solutions. Building upon the excellence of existing faculty, centers and departments that support education and research in the energy and environmental field, this major offers an intercollegiate faculty and program of courses that bridge science, social science, engineering, and public policy.

2. Describe the planning process which resulted in the development and submission of this proposal.

Planning for the undergraduate major in Energy and Environmental Policy was led by the Center for Energy and Environmental Policy in collaboration with faculty from the Colleges of Agriculture & Natural Resources, Arts & Science, Business & Economics, Engineering, Human Services & Public Policy, and Marine & Earth Studies. A Steering Committee composed of 20 faculty and research staff met over a five-month period to develop the structure of the major with three concentrations. Concentration subcommittees were formed to develop the curriculum in each of the concentration areas: Energy, Environment and Society; Energy, Economics and Public Policy; and Energy, Science and Technology. The subcommittees submitted drafts to the Steering Committee for review at several meetings. The Steering Committee reviewed and adopted the final proposed undergraduate major in Energy and Environmental Policy by consensus. A proposal for an undergraduate minor is forthcoming.

Since 1980, the Center for Energy and Environmental Policy has supported research and education in this field. It has created a partner network of more than 25 universities and research institutes. It has also organized a successful intern locator program. The Center annually supports 20-25 sponsored research projects, with students integrated into this work. CEEP's infrastructure will provide an important source of intellectual and professional support, and some financial support, to the new major.

³ In a recent Academic Program Review, a panel of international scholars (including the current Vice Chair of the Intergovernmental Panel on Climate Change) ranked the Delaware program as among the three best in the field and praised the University for its innovative decision to have the Center for Energy and Environmental Policy (CEEP) administer the program under the direction of the Dean of the College of Human Services, Education and Public Policy.

3. Describe any significant impact the proposed curricula might have on other instructional, research, or service programs of the university.

The proposed undergraduate major in Energy and Environmental Policy will complement programs being offered at the University. The proposed major is designed to educate and build core competencies and skills for prospective practitioners who will work at the intersections of business, technology, government, research and civil society sectors seeking to improve energy and environmental policy. Toward that end, the senior research paper and internship requirements of the program will contribute to the University's Initiative to Save the Planet.

Core courses are offered by faculty in the Center for Energy and Environmental Policy, Chemical Engineering, Geography, Political Science, Economics, Material Science, Physics and Urban Affairs & Public Policy. The advanced curricula of the three concentrations include courses from more than 15 departments. With its cross-disciplinary, intercollegiate approach, the major will enhance student participation in departmental and University-wide knowledge structures. It is specifically designed to complement the sustainable energy minor in the College of Engineering and it is hoped that a minor can be fashioned to serve the needs of other units and to complement the Environmental Studies major.⁴

The major will not have an adverse impact on existing instructional, research or service program resources of the University. Rather it is designed to support better use of existing resources (see below).

4. Describe how the proposed curricula would more fully utilize existing resources.

The undergraduate major in Energy and Environmental Policy draws from existing classes offered by different disciplines in the areas of energy and the environment. The core and capstone courses draw upon existing offerings in: Energy and Environmental Policy, Chemical Engineering, Physics, Economics, Geography and Political Science (or Urban Affairs & Public Policy).

Courses for the advanced curricula of the three concentrations draw from existing offerings in the University.

The Energy, Economics and Public Policy concentration integrates courses in Energy and Environmental Policy, Economics, Business and Administration, Mathematics, Statistics Engineering, Political Science, Geography, Philosophy, and Urban Affairs & Public Policy.

The Energy, Environment and Society concentration integrates courses in Climatology, Communications, Energy and Environmental Policy, Engineering, Food and Resource Economics, Geography, Geology, Economics, Philosophy, Political Science, Sociology, Mathematics, and Statistics.

⁴ As this proposal was being prepared, a revised Environmental Studies major was in development. A possible minor in energy and environmental policy to support this major has been proposed.

The Energy, Science and Technology concentration integrates courses in Chemistry, Economics, Energy and Environmental Policy, Engineering, Geography, Geology, Materials Science, Physics, Mathematics, and Statistics.

B. Student Demand

Rising interest in educational programs in Energy and Environmental Policy coincides with societal awareness of the current and future challenges to environmental sustainability, and the centrality of energy systems and policy in addressing these challenges.

The graduate curriculum's unique integration of energy and environment and its internship program are usually cited as the key reasons for student interest in the programs. Given the experience and popularity of the existing graduate programs at the University and the rising interest on campus in this field (this fall, 16 undergraduate students are taking ENEP/UAPP 625: Energy Policy & Administration), we estimate 10 to 15 new majors per year. These will be wholly new to the campus. Additionally, we estimate approximately 15 to 20 internal transfers into the proposed major per year in the initial years of implementation.

A telephone survey of university programs with national reputations in the field indicates that undergraduate majors, minors and certificates, while new (nearly all survey respondents indicated their programs are less than 5 years old), are attracting students in the range expected for the proposed ENEP major at Delaware. Duke University reports that its Energy and Environmental Policy undergraduate certificate is annually admitting 15 students. The Energy and Resources minor at the University of California, Berkeley is attracting 10-15 new undergraduate students each year and a major is now being developed. Boston University offers a BA in Energy and Environmental Studies through its Center for Energy and Environmental Studies and registered 8 new majors this year. Coordinators at these and other institutions researched for this proposal indicate that new admissions are in the range of 10-15 for this field, and growing.

Currently, the Master's and Doctoral programs in Energy and Environmental Policy administered by the Center for Energy and Environmental Policy receive over 140 applications and detailed inquiries per year. The programs accept 14 to 16 students each year. About 60% of applicants have academic backgrounds in the social sciences (including economics, geography, policy studies and environmental studies), and 40% received their prior degrees in science or engineering. Recently, an Academic Program Review conducted by an internationally reputed panel of scholars ranked the CEEP administered Master's and Doctoral degrees among the top three internationally.

The proposed major includes 11 new ENEP courses⁵ and a new ECON course for a total of 36 credit hours.

⁵ The new ENEP courses include those numbered 250, 424, 425, 364 and 472, which are required of all majors (see descriptions on pp. 11-12 of this proposal); 117, which is the First Year Experience course; 402 and 410, which are undergraduate versions of currently taught graduate courses; 468 and 470, which are tutorial courses in energy readings and energy research; and 426, a new course, Climate Change: Science, Policy and Political Economy,

In addition to the enrolled majors, the new courses designed for the proposed major are expected to be used as service courses for other appropriate majors and minors in the University including the proposed intercollegiate Environmental Studies major and the sustainable energy minor in the College of Engineering. The new courses created for the major may also be used in fulfillment of breadth requirements in:

Group C: Empirically based study of human beings and their environment; Group D: The study of natural phenomena through experiment and analysis.

C. Transferability

The proposed undergraduate major would be open to all transfer students who meet admission requirements and/or who are in good academic standing with a minimum GPA of 2.0. It is proposed that students already admitted to the University of Delaware and who are matriculated in other programs should have a minimum GPA of 2.0 in order to transfer to the Energy and Environmental Policy major. Transferring students who elect this major before completion of their third semester of full-time study should be able to complete the major in four years. Those who wish to transfer after the third semester of full-time study may have to consider summer session enrollment(s) to complete in four years.⁶

Approximately 15-20 transferring students are expected annually during the initial years.

D. Access to Graduate and Professional Programs

Students with the proposed major will be prepared for graduate study at a number of universities. Graduate programs in the field are cross-disciplinary and often administered by centers and other non-traditional units at top American universities. The proposed undergraduate major will provide solid academic foundation for success in these programs. In addition, the internship and research component of the proposed major will provide students with applied policy experience in the field and enhance the competitiveness of their applications.

A sample of graduate professional programs to which graduating majors could apply with good prospects for admission include:

Energy and Resources Group University of California, Berkeley Master's in Energy and Resources

Center for Energy and Environmental Studies Boston University Masters in Energy and Environmental Analysis

which is being offered to undergraduate students (426) and graduate students (667). The new ENEP courses (except the tutorial courses – 364, 468, 470 and 472 – which will be taught by the Program Faculty listed on p. 29-30) will be taught by Drs. Byrne, Martinez, Shah and Wang, who are members of the Steering Committee submitting this proposal. The new ECON course is numbered 367, Economics of Energy, and has the approval of the chair of the Department of Economics, Dr. Saul Hoffman.

⁶ See Curriculum Specifics below for semester-by-semester course enrollment templates for new and transferring students.

Energy and Earth Resources Graduate Program University of Texas, Austin Master's in Energy and Earth Resources

Nicholas School of the Environment Energy and Environment Program Duke University Master of Environmental Management

School of Forestry and Environmental Studies Focus Area: Climate Change Science and Policy Yale University Master of Environmental Management

Princeton Environmental Institute and Woodrow Wilson School of Public and International Affairs Science, Technology and Environmental Policy Program Princeton University Master's in Public Policy

Graduates of the major will also be encouraged to consider applying to the University of Delaware's MEEP program (see <u>http://ceep.udel.edu/academics/masters/meep.htm</u>). With thoughtful undergraduate advisement, competitive applicants from the University may be able to shorten the length of time taken to complete the MEEP program.

E. Demand and Employment Factors

Graduates of the proposed Environmental and Energy Policy major will be prepared for entry into a wide range of careers in energy and environmental planning, policy analysis, management and administration, and research in the public, private, and non-profit sectors. Students will be qualified to assume positions in local and national governments, international agencies, academic, research and policy institutions (at all policy scales), consulting firms, energy utilities and companies, and corporate departments with responsibilities for energy and environmental matters. Graduates will be prepared to provide leadership on questions of theory, analysis, research and policy in the energy and environmental field.

A review of labor market trends conducted for the Steering Committee analysis found that energy and environmental careers will be a major source of new jobs in the next decade. The importance of the energy sector for major ecosystems, public health systems, urban and land use planning, rural development and agriculture, the global and domestic economies, and international governance is leading to the demand for a growing pool of educated individuals for government, industry, and research institute positions. According to a recently released United Nations report (September 2008), investment in emerging energy and environmental technologies will increase from \$1.3 billion in 2008 to \$2.74 billion by 2020. Shifting to so called 'green' economies will require private and public investment strategies as well as policy frameworks to effectively and efficiently guide this transition.

Current employment opportunities for graduates can be found in the private, public and nonprofit sectors. Prospective employers include energy and environmental consulting firms, businesses with energy and environmental concerns, energy utilities, federal, state and local environmental agencies, and research institutes (the latter can range from the Congressional Research Service to Cambridge Energy Research Associates, the Tellus Institute and units within the World Bank). Regional public sector employment prospects include: the Delaware Department of Natural Resources and Environmental Control, the Maryland Energy Administration, the New Jersey Office of Clean Energy Programs, the Pennsylvania Department of Environmental Protection, and the utility regulatory agencies of the neighboring states. Federal employment opportunities include: the U.S. Department of Energy, the Environmental Protection Agency, the National Oceanic and Atmospheric Administration, the National Renewable Energy Laboratory, the Lawrence Berkeley National Laboratory, and Sandia National Laboratories. Increasingly, other federal departments such as Housing and Urban Development, Health and Human Services, and Agriculture require individuals with energy and environmental policy expertise to effectively guide policies in agriculture and biofuels, public health and the environment, and energy and community development (among others).

In addition to the public sector, over 2,000 energy and environmental non-profit organizations in the U.S. also offer an important source of employment potential for University graduates with the proposed major.

Graduates of the University's MEEP program typically secure employment in less than three months after graduation. Over 85% of MEEP graduates in 2007 and 2008 had received professional offers before graduation. This experience suggests that undergraduates completing the proposed major can expect good employment prospects.

F. Regional, State and National Factors

Currently there are no university programs in the state or region providing an undergraduate major that integrates a cross-disciplinary set of courses in policy analysis, economics, the social and natural sciences, and engineering to address the need to build a sustainable energy and environmental future. The uniqueness of the proposed major is that it combines the rigor and content knowledge of these disciplines to educate and prepare students to be effective decision makers and problem solvers in the energy and environmental sectors.

The need for new educational approaches to address the formidable societal challenges in transitioning to a sustainable future is receiving national and international attention. There are calls at every governmental scale, from local to national to international, for programs that prepare students to understand the complex interactions between the energy and environmental sectors. (See, for example, *Final Report of the International Commission on Education for Sustainable Development Practice*, MacArthur Foundation, October 2008).

The surge of policy and legislation aimed at redesigning energy technology and energy economics to minimize environmental impacts is expected to continue. In the State of Delaware, as in most states across the country, development and implementation of policies that address climate change and other environmental issues, energy sector price and cost volatility, energy technology development, and social equity concerns are high policy priorities. Implementation of state-level Climate Action Plans and associated state energy programs that meet state level targets for carbon emission reductions will require practitioners with cross-disciplinary knowledge. The proposed undergraduate major prepares students to become effective leaders in this crucial area.

G. Describe Other Strengths

Scholarship, research and education must cross traditional disciplinary and institutional boundaries if local, national and global energy and environmental problems are to be effectively addressed. The proposed intercollegiate Environmental and Energy Policy undergraduate major advances a novel and needed model of study in this dynamic and rapidly expanding policy field.

Energy and environmental planning and policy requires cross-disciplinary knowledge that combines a level of technical understanding of society-nature interactions with a clear sense of the policy arena's strengths and limits. In this case, cross-disciplinary means more than mixing disciplinary perspectives or seeking synergistic insights. Energy and environmental problems require an understanding and knowledge that bridges science, engineering and the social sciences, while testing that understanding in complex, real world contexts.

The intercollegiate faculty of the proposed undergraduate major have designed the program to create the conditions for students to obtain a rigorous <u>and</u> analytically diverse understanding of the field and its problems. Students will benefit from the established faculty expertise at the University and will have access to graduate students enrolled in the Master's and Doctoral degree programs who are themselves engaging in path breaking research. The graduate students in the MEEP and Ph.D. programs come from around the world, with high qualifications, and typically extensive professional backgrounds, to study and work on an array of problems. Many have won numerous awards for their publications and have already demonstrated the benefits of the unique linkages and scope of the program, assuming important positions at universities, governments, and NGOs in the U.S. and around the world. In this regard, the graduate students can serve as mentors to those in the undergraduate major.

The University's Center for Energy and Environmental Policy has supported research and education in the field since 1980. Its internationally recognized expertise, well-established research programs, extensive partner network with other universities and research institutes, and success in locating internships for students offer undergraduate majors an exceptional institutional support base for educational, research and professional development. Faculty assuming key roles in the major (see in Section V. "Faculty/Administrative Resources" for a list) will hold appointments in CEEP, thereby enhancing the networks which students can utilize to explore their interests. This appointment policy has worked very effectively for the graduate programs administered by CEEP.

III. ENROLLMENT, ADMISSION AND FINANCIAL AID

A. Enrollment

Students must be in good academic standing and have a cumulative GPA of 2.0 to enroll in the major. In order to graduate, students should satisfy the general University requirements for a Bachelor of Science degree and the requirements of the Energy and Environmental Policy major. Additionally, it is proposed that enrolled majors must maintain a 2.0 GPA in all major courses in order to graduate. If a course is repeated, both the original and the subsequent grades for repeated courses contribute to the cumulative grade point index. Credit from courses taken on a pass/fail basis cannot be used to complete any major degree requirements.

B. Admission Requirements

There are no unique admission requirements for the proposed major.

C. Student Expenses and Financial Aid

There will be no additional expenses and institutional financial support will not normally be provided to undergraduate majors. In some cases, majors may be offered undergraduate research assistantships in CEEP. The Center will also help students to find paying internships, where possible.

IV. CURRICULUM SPECIFICS

A. Institutional Factors

The degree conferred will be the Bachelor of Science. Students who complete the proposed major requirements will receive a balanced liberal arts education, with cross-disciplinary general knowledge in the field of energy and environmental policy (including research and internship experience).

B. Describe the Curriculum

GENERAL OUTLINE

The proposed major requires a minimum of 125 credits to graduate. It includes three concentrations (all of which require a minimum of 125 credits for graduation). The concentrations are described in the next section ("C. Descriptions of the Three Concentrations").

10 credits

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing (minimum grade C-)3 creditsFirst Year Experience (ENEP117: Science, Society and Energy)1 creditsSecond writing course3 credits

Discovery Learning Experience (fulfilled by taking ENEP 364: Internship) Multicultural, ethnic and/or gender-related course	3 credits	
BREADTH REQUIREMENTS	31 credits	
Group A: Analysis and appreciation of the creative arts and humanities Group B: Study of culture and institutions over time Group C: Empirically-based study of human beings and their environment Group D: Study of natural phenomena through experiment or analysis	9 credits 6 credits 6 credits 10 credits	
MAJOR REQUIREMENTS	84 credits ⁷	
Core Curriculum (COC)	15 credits	

ENEP 250 Introduction to Energy Policy

This course introduces the field of energy policy and provides a substantive review of energy technology, resources and policies and the role of social, economic, political, and environmental factors in shaping the energy sector. It surveys policy, technical and economic assessments of key energy options needed to achieve a more sustainable world, and the appropriate policy mechanisms to implement these options.

3 credits

PHYS 143 Energy, Technology and Society 3 credits This course covers the basic principles of physics applied to forms of energy (mechanical, thermal, chemical, electrical and nuclear), and how energy is derived from sources such as coal, petroleum, solar, nuclear fission and fusion. Environmental consequences of energy use are examined.

ECON 151 Introduction to Micro-Economics: Prices and Markets 3 credits This course introduces supply and demand concepts with basic economic graphs. It examines models of perfect and imperfect competition and the determinants of product prices and quantities. The course also covers current microeconomic issues such as the effect of government regulation and environmental problems.

POSC 220 Introduction to Public Policy or UAPP 225 Crafting Public Policy 3 credits POSC 220 reviews what government does, with a focus on substantive policy areas as well as the mechanisms of policy making. Case studies of policy areas (e.g., environmental policy, health policy, etc.) are used to illustrate processes of agenda setting, decision making and policy implementation. UAPP 225 examines processes of public policy formulation and implementation and processes of policy evaluation in the U.S., with examples drawn from several areas of policy (e.g., health and education).

⁷ There are 30 to 36 elective credits in the Advanced Curricula of each concentration.

GEOG 236 Conservation of Natural Resources: Global Issues 3 credits This course introduces students to the global nature of resources and their management and discusses the relationships between population growth, the market economy, agricultural and industrial production and mineral and energy exploitation worldwide.

Advanced Curriculum (AC)

The Advanced Courses component consists of required courses (noted as **ACR**) and electives from a menu of designated course options (**ACE**). Three concentrations are available: Energy, Science and Technology; Energy, Economics and Public Policy; and Energy, Science and Technology. The advisor will assist students in selection of courses, fieldwork, study abroad and internships opportunities, and supervise participation in research projects. The advisor will also serve as advisor for the Senior Research Paper.

The Advanced Courses component is taught at the 300-400 level or higher and is organized to support the three concentrations. For each concentration, specific prerequisites may apply which can include intermediate level methods courses. Each concentration contains Advanced Courses (AC) which includes both a set of Advanced Required (ACR) courses and a set of Advanced Elective (ACE) courses. Students are must take all ACR courses specified in each concentration. Students may select from a list of courses supplied by each concentration to fulfill the ACE requirements of the proposed major. Advisors must approve all elective (ACE) courses prior to student enrollment.

Capstone Courses (CAP)

GEOG 422 Resources, Development and the Environment 3 credits This course focuses on food, resources, energy and population issues in relationship to economic development and the global environment. The main objective is to engage students in discussion and debate on sustainable development polices.

ENEP 424 Sustainable Energy Policy and Planning 3 credits This course analyzes sustainable energy strategies in terms of their technology, economics, impacts on the environment and governance attributes. Policy options to facilitate a sustainable energy future are assessed.

ENEP 425 Energy: Resources, Technologies and Policies 3 credits This course prepares students to analyze at an advanced level the policies associated with different energy resources, technologies and uses. It teaches techniques to evaluate the role of social, economic, political, and environmental factors in energy policy choice. The course focuses on interrelationships among energy, environment, economy and equity considerations (so called 'E4' models). It considers the energy policy options needed to achieve a more sustainable world.

12 credits

3 credite

48 credits

13

CHEG 625 Green Engineering⁸

This course provides an understanding of the design, commercialization and use of processes and product which are feasible and economical while minimizing generation of pollution at the source and the risk to human health and the environment.

Internship and Senior Research Paper (IRP)

ENEP 364 Internship Fieldwork (Discovery Learning Experience)

Students intern in an organization in the field of energy and environmental policy. The Internship fulfills the requirement for the Discovery Learning Experience. It provides an educational and practical experience that integrates previously mastered classroom study and experience in the work place into a planned and supervised learning opportunity aimed at fulfilling the educational competencies of the student's concentration and of the major.

ENEP 472 Senior Research Paper

This is a tutorial course taken with approval from an Energy and Environmental Policy Program faculty member. Course elements include: an initial description of the intended research; a clear statement of the research thesis; an initial definition of the conceptual and methodological framework intended for the research; and a list of at least 10 research publications directly relevant to the intended research. The faculty instructor and the student then must agree upon a research plan which will realize a major research paper that will be used for grading. The objective of the research paper is to provide an opportunity to develop and implement a research project and report on its results.

TOTAL CREDITS NEEDED TO GRADUATE

C. Descriptions of the Three Concentrations

1. Energy, Economics and Public Policy Concentration

The Energy, Economics and Public Policy Concentration intends to provide a broad understanding of the influence of policy and economics on the development of the energy sector, with special emphases on sustainable energy development. It is vital to have economically, socially and environmental beneficial policy interventions if sustainable energy development is to succeed. There are a number of policy and economic concepts and instruments that can be utilized to address market and governmental barriers that currently impede efficient development of sustainable energy system.

This Concentration prepares undergraduate students for a wide range of careers in sustainable energy planning, policy analysis, management and administration, consulting, and research and

125 credits

3 credits

9 credits

6 credits

⁸ This course is taught by Professor Richard Wool, a member of the Steering Committee submitting this proposal. He has given his permission for this course to be listed as a required capstone course but has recommended that students enroll in their senior year. This proposal's semester-by-semester plans of study specify enrollment in the senior year. The chair of the Department of Chemical Engineering, Professor Norman Wagner, has also communicated his approval – see Appendix

advocacy in the public, private and non-profit sectors. Students will also be prepared to continue their education in graduate study in the ENEP and related fields at the master's level. Local and regional public sector employment opportunities include: state energy offices, offices of the Public Advocate, state public utility commissions. Federal employment opportunities include the Federal Energy Regulatory Commission, U.S. Department of Energy, and DOE's national laboratories. Potential private sector employers include: energy utilities and companies, economics consulting firms, regulatory affairs departments of corporations. In addition, over 2,000 energy and environmental non-profit organizations in the U.S. might offer employment opportunities.

OVERVIEW OF REQUIREMENTS FOR THE CONCENTRATION IN ENERGY, ECONOMICS AND PUBLIC POLICY

Breadth Requirement (BRR) University Requirement (UNR) Core Courses (COC) Advanced Courses (AC) *Required (ACR) Electives (ACE)* Capstone Courses (CAP) Internship and Senior Research Paper (IRP) *Internship Senior Research Paper* 31 credits10 credits15 credits48 credits

(18 credits) (30 credits)

12 credits9 credits

(3 credits) (6 credits)

CURRICULUM SPECIFICS FOR THE CONCENTRATION IN ENERGY, ECONOMICS AND PUBLIC POLICY

Advanced Curriculum Required Courses (ACR)	18 credits
ACR: ECON 300 Intermediate Microeconomic Theory ⁹	3 credits
ACR: ENEP 402 Electricity Policy and Planning	3 credits
ACR: FREC/ECON 343 Environmental Economics	3 credits
ACR: POSC 350 Politics and the Environment	3 credits
One of the following:	
ACR: ENEP 468 Research in Global Energy Policies	3 credits
ACR: ENEP 470 Readings in U.S. Energy Policy	3 credits
One of the following	
ACR: ECON 422 Econometric Methods & Models I	3 credits
ACR: MATH 201 Introduction to Statistical Methods I	3 credits
ACR: POSC 300 Data Analysis for Political Sciences	3 credits
ACR: STAT 370 Introduction to Statistical Analysis I	3 credits

⁹ This course will be replaced with ECON 367 (Economics of Energy) when it receives a permanent number.

30 credits are to be chosen from the list below to satisfy this part of the ACE requirement. Other courses can be added with the approval of the advisor.

ACE: BUAD 301 Introduction to Marketing	3 credits
ACE: BUAD 472 Marketing, Society and the Environment (Prerequisite:	
BUAD 301	3 credits
ACE: ECON 152 Introduction to Macroeconomics	3 credits
ACE: ECON 311 Economics of Developing Countries	3 credits
ACE: ECON 360 Government Regulation of Business	3 credits
ACE: ECON 422 Econometric Methods & Models I	3 credits
ACE: ECON 426 Mathematical Economic Analysis	3 credits
ACE: ECON 463 Economics of Regulation	3 credits
ACE: ECON/FREC 471 Futures and Options Markets	3 credits
ACE: ENEP 410 Political Economy of Environment	3 credits
ACE: POSC/COMM 425 Energy/Environmental Policy, Public	
Opinion, Media and Politics	3 credits
ACE: ENEP 468 Research in Global Energy Policies	3 credits
ACE: ENEP 470 Readings in U.S. Energy Policy	3 credits
ACE: ENEP 426 Climate Change: Science, Policy and Political Economy	3 credits
ACE: GEOG 250 Computer Methods in Geography	4 credits
ACE: GEOG 372 Geographic Information Systems	3 credits
ACE: GEOG 412 Physical Climatology	4 credits
ACE: GEOG/UAPP 428 Land Use & Environmental Planning	3 credits
ACE: GEOL 421 Environmental and Applied Geology	3 credits
ACE: MATH 201 Introduction to Statistical Methods I	3 credits
ACE: MATH 202 Introduction to Statistical Methods II	3 credits
ACE: MATH 221 Calculus 1	3 credits
ACE: MATH 241 Analytical Geometry and Calculus A	4 credits
ACE: MATH 242 Analytical Geometry and Calculus B	4 credits
ACE: PHIL 340 Cross Cultural Environmental Ethics	3 credits
ACE: POSC 300 Data Analysis for Political Sciences	3 credits
ACE: POSC 301 State and Local Government	3 credits
ACE: POSC 311 Politics of Developing Nations	3 credits
ACE: POSC 323 International Political Economy	3 credits
ACE: STAT 370 Introduction to Statistical Analysis I	3 credits
ACE: STAT 371 Introduction to Statistical Analysis II	3 credits
ACE: UAPP 325 Public Policy Analysis	3 credits
ACE: UAPP 410 Making Convincing Policy Arguments	3 credits
ACE: UAPP 419 Policy Leadership and Ethics	3 credits
ACE: UAPP 427 Evaluating Public Policy	3 credits
ACE: UAPP 440 Contemporary Policy Issues	3 credits
ACE: Foreign Language (up to 8 credits)	8 credits

ILLUSTRATIVE SEMESTER-BY-SEMESTER PLANS OF STUDY ENERGY, ECONOMICS AND PUBLIC POLICY CONCENTRATION

Illustrative Plans of Study for the Energy, Economics and Public Policy Concentration are provided below for two cases: 1.) a full-time student choosing the major upon admission (1st through 4th years); 2.) a full-time student transferring into the major in their third semester of full-time study (2nd through 4th year). Courses to satisfy BRR, UNR, COC, CAP and IRP requirements are specified by semester, but this is for illustrative purposes only. There is flexibility in scheduling.

<u>Illustrative Semester-by-Semester Plan of Study for a Student Admitted to the Major in their 1st</u> Semester (1st through 4th Year)

Year 1: First Semester	
UNR: First Year Experience (ENEP 117: Science, Society and Energy)	1
BRR: Group A & B	6
COC: POSC 220 Introduction to Public Policy	3
COC: ECON 151 Introduction to Microeconomics	3
ACR: POSC 300 Data Analysis for Political Sciences	3
Year 1: Second Semester	15 credits
UNR: ENGL 110 Critical Reading and Writing	3
BRR: Group A	6
COC: PHYS 143 Energy, Technology and Society	3
COC: ENEP 250 Introduction to Energy Policy	3
Year 2: First Semester	15 credits
BRR: Group C & D	6
COC: GEOG 236 Conservation of Natural Resources	3
ACR: ENEP 470 Readings in U.S. Energy Policy	3
ACE: ECON 311 Economics of Developing Countries	3
Year 2: Second Semester	15 credits
UNR: Second Writing Course	3
BRR: Group B & D	6
ACR: ECON 300 Intermediate Microeconomic Theory	3
ACE: UAPP 325 Public Policy Analysis	3
Year 3: First Semester	15 credits
UNR: Multicultural Requirement	3
BRR: Group C	3
CAP: GEOG 422 Resources, Development and the Environment	3
10	

ACR: ENEP 402 Electricity Policy and Planning	3
ACE: POSC 323 International Political Economy	3
Year 3: Spring Semester or Summer Session	
IRP: ENEP 364 Internship Fieldwork (UNR: Discovery Learning Experience)	3
Year 3: Second Semester	16 credits
CAP: ENEP 424 Sustainable Energy Policy and Planning	3
BRR: Group D	4
ACR: POSC 350 Politics of the Environment	3
ACE: ENEP 410 Political Economy of Environment	3
ACE: From the list by approval of the advisor	3
	15 1.
Year 4: First Semester	15 creatts
CAP: ENEP 425 Energy: Resources, Technologies & Policies	15 credits
CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: FREC/ECON 343 Environmental Economics	3 3
CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: FREC/ECON 343 Environmental Economics ACE: PHIL 340 Cross Cultural Environmental Ethics	3 3 3
 Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: FREC/ECON 343 Environmental Economics ACE: PHIL 340 Cross Cultural Environmental Ethics ACE: ENEP 426 Climate Change: Science, Policy and Political Economy 	3 3 3 3
 Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: FREC/ECON 343 Environmental Economics ACE: PHIL 340 Cross Cultural Environmental Ethics ACE: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: From the list by approval of the advisor 	3 3 3 3 3 3 3 3 3 3 3 3 3 3
 Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: FREC/ECON 343 Environmental Economics ACE: PHIL 340 Cross Cultural Environmental Ethics ACE: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: From the list by approval of the advisor Year 4: Second Semester	15 credits 3 3 3 3 3 3 15 credits
 Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: FREC/ECON 343 Environmental Economics ACE: PHIL 340 Cross Cultural Environmental Ethics ACE: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: From the list by approval of the advisor Year 4: Second Semester CAP: CHEG 625 Green Engineering	15 credits 3 3 3 3 15 credits 3
 Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: FREC/ECON 343 Environmental Economics ACE: PHIL 340 Cross Cultural Environmental Ethics ACE: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: From the list by approval of the advisor Year 4: Second Semester CAP: CHEG 625 Green Engineering IRP: ENEP 472 Senior Research Paper 	15 creatts 3 3 3 3 3 3 15 credits 3 6
 Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: FREC/ECON 343 Environmental Economics ACE: PHIL 340 Cross Cultural Environmental Ethics ACE: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: From the list by approval of the advisor Year 4: Second Semester CAP: CHEG 625 Green Engineering IRP: ENEP 472 Senior Research Paper ACE: POSC/COMM 425 Energy/Environmental Policy, Public 	15 credits 3 3 3 3 3 15 credits 3 6
 Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: FREC/ECON 343 Environmental Economics ACE: PHIL 340 Cross Cultural Environmental Ethics ACE: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: From the list by approval of the advisor Year 4: Second Semester CAP: CHEG 625 Green Engineering IRP: ENEP 472 Senior Research Paper ACE: POSC/COMM 425 Energy/Environmental Policy, Public Opinion, Media and Politics 	15 credits 3 3 3 3 15 credits 3 6 3
 Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: FREC/ECON 343 Environmental Economics ACE: PHIL 340 Cross Cultural Environmental Ethics ACE: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: From the list by approval of the advisor Year 4: Second Semester CAP: CHEG 625 Green Engineering IRP: ENEP 472 Senior Research Paper ACE: POSC/COMM 425 Energy/Environmental Policy, Public Opinion, Media and Politics ACE: From the list by approval of the advisor 	15 credits 3 3 3 3 15 credits 3 6 3 3 3 3 3 3 3 3 3 3 3 3 3 3

<u>Illustrative Semester-by-Semester Plan of Study for a Student Transferring into the Major in their 3rd Semester (2nd through 4th Year)</u>

The 2nd year transfer student receives credit for courses taken in their 1styear that satisfy UNR, BRR, ACR, COC and/or ACE requirements (approximately 30 credit hours).

Year 2: First Semester	15 credits
BRR: Group C	3
COC: UAPP 225 Crafting Public Policy	3
COC: GEOG 236 Conservation of Natural Resources	3
ACR: ENEP 470 Readings in U.S. Energy Policy	3
ACE: ECON 311 Economics of Developing Countries	3

Year 2: Second Semester	15 credits
UNR: Second Writing Course BRR: Group B & D ACR: ECON 300 Intermediate Microeconomic Theory ACE: UAPP 325 Public Policy Analysis	3 6 3 3
Year 3: First Semester	15 credits
UNR: Multicultural Requirement BRR: Group C CAP: GEOG 422 Resources, Development and the Environment ACR: ENEP 402 Electricity Policy and Planning ACE: POSC 323 International Political Economy	3 3 3 3 3
Year 3: Spring Semester or Summer Session	3 credits
IRP: ENEP 364 Internship Fieldwork (UNR: Discovery Learning Experience)	3
Year 3: Second Semester	16 credits
CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group D ACR: POSC 350 Politics of the Environment ACE: ENEP 410 Political Economy of Environment ACE: From the list by approval of the advisor	3 4 3 3 3
Year 4: First Semester	15 credits
CAP: ENEP 425 Energy Policy and Administration ACR: FREC/ECON 343 Environmental Economics ACE: PHIL 340 Cross Cultural Environmental Ethics ACE: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: From the list by approval of the advisor	3 3 3 3 3
Year 4: Second Semester	15 credits
CAP: CHEG 625 Green Engineering IRP: ENEP 472 Senior Research Paper ACE: POSC/COMM 425 Energy/Environmental Policy.	3 6
Public Opinion, Media and Politics ACE: From the list by approval of the advisor	3 3

2. Energy, Environment and Society Concentration

The Energy, Environment and Society Concentration intends to provide a broad understanding of various climate change and GHG emissions projection scenarios such as those developed by the Intergovernmental Panel on Climate Change (IPCC). The concentration includes coursework in social science, econometrics and statistical analysis as well as science and technology in order to prepare the student for a research career or graduate education in energy and environmental scenario analysis, policy simulations, and long-term policy analysis and planning.

This Concentration prepares undergraduate students for a wide range of careers in sustainable energy planning, analysis, consulting, and research in the public, private and non-profit sectors. Students will also be prepared to continue their education in graduate study in the ENEP and related fields at the master's level. Local and regional public sector employment opportunities include: state energy offices, utility regulatory commissions, and state planning offices. Federal employment opportunities include the U.S. Department of Energy, EPA, DOE's national laboratories, the National Oceanic and Atmospheric Administration, and the Congressional Research Office. Research institutes and organizations such as the World Bank, the UNEP, the World Resources Institute, the World Wildlife Fund, the Energy Foundation, the Pew Center for Climate Change, and the Institute of Applied Systems Analysis could offer opportunities fro employment after graduation. Finally, over 2,000 energy and environmental non-profit organizations in the U.S. could be a fertile source for employment inquiries.

OVERVIEW OF REQUIREMENTS FOR THE CONCENTRATION IN ENERGY, ENVIRONMENT AND SOCIETY

Breadth Requirement (BRR)		31 credits
University Requirement (UNR)		10 credits
Core Courses (COC)		15 credits
Advanced Courses (AC)		48 credits
Required (ACR)	(12 credits)	
Electives: Science/Methods Menu (ACE)	(12 credits)	
Electives: Social Science Menu (ACE)	(24 credits)	
Capstone Courses (CAP)		12 credits
Internship and Senior Research Paper (IRP)		9 credits
Internship	(3 credits)	
Senior Research Paper	(6 credits)	

CURRICULUM SPECIFICS FOR THE CONCENTRATION IN ENERGY, ENVIRONMENT AND SOCIETY

12 credits

Advanced Curriculum Required Courses (ACR)

ACR: ENEP 426 Climate: Science, Policy and Political Economy	3 credits
ACR: POSC 350 Politics and the Environment	3 credits
ACR: POSC/COMM425 Energy/Environment Policy,	
Public Opinion, Media and Politics	3 credits
ACR: ECON 300 Intermediate Microeconomic Theory ¹⁰	3 credits

¹⁰ This course will be replaced with ECON 367 (Economics of Energy) when it receives a permanent number.

Advanced Curriculum Elective Courses (ACE)	36 credits
Methods Menu (ACE)	12 credits
12 credits are to be chosen from the list below to satisfy this part of the ACE requirement. Other courses can be added with the approval of the advisor.	
ACE: MATH 201 Introduction to Statistical Methods I	3 credits
ACE: MATH 202 Introduction to Statistical Methods I	3 credits
ACE: MATH 221 Calculus 1	3 credits
ACE: MATH 241 Analytical Geometry and Calculus A	4 credits
ACE: GEOG 250 Computer Methods for Geography and	
Environmental Science	4 credits
ACE: GEOG 412 Physical Climatology (MATH 241 and	
GEOG 250 required)	4 credits
ACE: GEOG 456 Hydro-Climatology (MATH 241 and	
GEOG 250 required)	3 credits
ACE: GEOG 372 Geographic Information Systems (GIS)	3 credits
ACE: ECON 422 Econometric Methods & Models I	3 credits
ACE: POSC 300 Data Analysis for Political Sciences	3 credits
ACE: STAT 370 Introduction to Statistical Analysis I	3 credits
ACE: STAT 371 Introduction to Statistical Analysis II	3 credits
ACE: STAT 408 Statistical Research Methods I	3 credits
ACE: STAT 475 Statistics for Environmental Sciences	3 credits
Social Science Menu (ACE)	24 credits
24 credits are to be chosen from the list below to satisfy this part of the ACE requirement. Other courses can be added with the approval of the advisor.	
ACE: ECON/EREC444 Economics of Environmental Management	3 credits
ACE: ENEP 402 Electricity Policy and Planning	3 credits
ACE: ENEP 410 Political Economy of the Environment	3 credits
ACE: ENEP 468 Research in Global Energy Policies	3 credits
ACE: ENEP 470 Readings in U.S. Energy Policy	3 credits
ACE: FREC/ECON 343 Environmental Economics	3 credits

ACE: FREC/ECON 343 Environmental Economics	3 credits
ACE: FREC 424 Resource Economics	3 credits
ACE: FREC 450 Topics in Environmental Law	3 credits
ACE: GEOG/UAPP 428 Land Use & Environmental Planning	3 credits
ACE: GEOL 112 Earth Resources and Public Policy	3 credits
ACE: GEOL 304 Earth System Science	4 credits
ACE: GEOL 421 Environmental and Applied Geology	3 credits
ACE: PHIL 340 Cross Cultural Environmental Ethics	3 credits

ACE: PHIL 448 Environmental Ethics	3 credits
ACE: POSC 311 Politics of Developing Countries	3 credits
ACE: POSC 323 International Political Economy	3 credits
ACE: POSC 456 Disaster and Politics	3 credits
ACE: SOCI 331 World Population, Profiles and Trends	3 credits
ACE: SOCI 470 Environmental Sociology	3 credits
ACE: SOCI 471 Disasters, Vulnerability and Development	3 credits
ACE: UAPP 325 Public Policy Analysis	3 credits
ACE: UAPP 427 Evaluating Public Policy	3 credits
ACE: Foreign Language (up to 8 credits)	8 credits

ILLUSTRATIVE SEMESTER-BY-SEMESTER PLANS OF STUDY ENERGY, ENVIRONMENT AND SOCIETY CONCENTRATION

Illustrative Plans of Study for the Energy, Environment and Society Concentration are provided below for two cases: 1.) a full-time student choosing the major upon admission (1st through 4th years); 2.) a full-time student transferring into the major in their third semester of full-time study (2nd through 4th year). Courses to satisfy BRR, UNR, COC, CAP and IRP requirements are specified by semester, but this is for illustrative purposes only. There is flexibility in scheduling.

Illustrative Semester-by-Semester Plan of Study for a Student Admitted to the Major in their 1st Semester (1st through 4th Year)

Year 1: First Semester	15 credits
UNR: First Year Experience (ENEP 117: Science, Society and Energy)	1
BRR: Group D	4
COC: ECON 151 Introduction to Microeconomics	3
COC: POSC 220 Introduction of Public Policy	3
ACE: MATH 241 Analytical Geometry and Calculus A	4
Year 1: Second Semester	15 credits
UNR: ENGL 110 Critical Reading and Writing	3
BRR: Group A	6
COC: GEOG 236 Conservation of Natural Resources	3
COC: ENEP 250 Introduction to Energy Policy	3
Year 2: First Semester	15 credits
BRR: Group C & D	6
COC: PHYS 143 Energy, Technology and Society	3
ACR: ENEP 426 Climate: Science, Policy and Political Economy	3
ACE: FREC/ECON 343 Environmental Economics	3

Year 2: Second Semester	16 credits
UNR: Second Writing Course	3
BRR: Group B & D	6
ACR: POSC 350 Politics and the Environment	3
ACE: GEOG 250 Computer Methods for Geography and	
Environment	4
Year 3: First Semester	16 credits
UNR: Multicultural Requirement	3
BRR: Group C	3
CAP: GEOG 422 Resources, Development and the Environment	3
ACR: POSC/COMM425 Energy/Environment Policy,	
Public Opinion, Media and Politics	3
ACE: GEOG 412 Physical Climatology	4
Year 3: Spring Semester or Summer Session	3 credits
IRP: ENEP 364 Internship Fieldwork (UNR: Discovery Learning	
Experience)	3
Year 3: Second Semester	15 credits
CAP: ENEP 424 Sustainable Energy Policy and Planning	3
BRR: Group A & B	6
ACR: ECON 300 Intermediate Microeconomic Theory	3
ACE: GEOG 372 Geographic Information Systems (GIS)	3
Year 4: First Semester	15 credits
CAP: ENEP 425 Energy: Resources, Technologies & Policies	3
ACE: SOCI 331 World Population, Profiles and Trends	3
ACE: PHIL 340 Cross Cultural Environmental Ethics	3
ACE: ENEP 468 Research in Global Energy Policies	3
ACE: From the list by approval of the advisor	3
Vaar 4: Sacond Samastar	15 anadita
	15 creaits
CAP: CHEG 625 Green Engineering	3
IKP: ENEP 4/2 Senior Research Paper	6
ACE: SOCI 470 Environmental Sociology	3
ACE: ENEP 470 Readings in U.S. Energy Policy	3

<u>Illustrative Semester-by-Semester Plan of Study for a Student Transferring into the Major in their 3rd Semester (2nd through 4th Year)</u>

Year 2: First Semester	15 credits
BRR: Group C	3
COC: PHYS 143 Energy, Technology and Society	3
COC: UAPP 225 Crafting Public Policy	3
ACR: ENEP 426 Climate: Science, Policy and Political Economy	3
ACE: FREC/ECON 343 Environmental Economics	3
Year 2: Second Semester	16 credits
UNR: Second Writing Course	3
BRR: Group B & D	6
ACR: POSC 350 Politics and the Environment	3
ACE: GEOG 250 Computer Methods for Geography and	
Environment	4
Year 3: First Semester	16 credits
UNR: Multicultural Requirement	3
BRR: Group C	3
CAP: GEOG 422 Resources, Development and the Environment	3
ACR: POSC/COMM425 Energy/Environment Policy,	
Public Opinion, Media and Politics	3
ACE: GEOG 412 Physical Climatology	4
Year 3: Spring Semester or Summer Session	3 credits
IRP: ENEP 364 Internship Fieldwork (UNR: Discovery Learning	
Experience)	3
Year 3: Second Semester	15 credits
CAP: ENEP 424 Sustainable Energy Policy and Planning	3
BRR: Group A & B	6
ACR: ECON 300 Intermediate Microeconomic Theory	3
ACE: GEOG 372 Geographic Information Systems (GIS)	3
Year 4: First Semester	15 credits
CAP ENEP 425 Energy: Resources Technologies & Policies	3
ACE: SOCI 331 World Population Profiles and Trends	3
ACE: PHIL 340 Cross Cultural Environmental Ethics	3
ACE: ENEP 468 Research in Global Energy Policies	3
ACE: From the list by approval of the advisor	3
red. I form the fist by approval of the advisor	J

15 credits

Year 4: Second Semester

CAP: CHEG 625 Green Engineering	3
IRP: ENEP 472 Senior Research Paper	6
ACE: SOCI 470 Environmental Sociology	3
ACE: ENEP 470 Readings in U.S. Energy Policy	3

3. Energy, Science and Technology Concentration

The Energy, Science, and Technology concentration will enable students to understand the scientific and technological constraints and opportunities that are pertinent to sustainable energy development. The courses will bridge scientific and technological knowledge with an understanding of energy and environmental policy. Thorough awareness of the scientific and technological challenges is combined with an in-depth study of the prevailing policy paradigms influencing energy technology design and choice. Additionally, a number of policy and economic concepts and instruments will be utilized to develop viable analytical approaches for the assessment of sustainable energy options.

This concentration prepares undergraduate students for a wide range of careers in sustainable energy science, technology assessment, consulting, and research in the public, private and non-profit sectors. Students will also be prepared to continue their education in graduate study in the ENEP and related fields at the master's level. Local and regional public sector employment opportunities include: state energy offices, utility regulatory commission, R&D policy and planning offices, etc. Federal employment opportunities include the U.S. Department of Energy, Environmental Protection Agency (EPA) and DOE's national laboratories. The concentration will also be pertinent for private sector employment with companies that are developing sustainable energy pathways through technical consulting, materials synthesis, process design, etc. In addition, over 2,000 energy and environmental non-profit organizations in the U.S. may include opportunities for employment of graduates.

OVERVIEW OF REQUIREMENTS FOR THE CONCENTRATION IN ENERGY, SCIENCE AND TECHNOLOGY

Breadth Requirement (BRR) University Requirement (UNR) Core Courses (COC) Advanced Courses (AC) *Required (ACR) Electives (ACE)* Capstone Courses (CAP) Internship and Senior Research Paper (IRP) *Internship Senior Research Paper* 31 credits10 credits15 credits48 credits

(18 credits) (30 credits)

(3 credits)

(6 credits)

12 credits9 credits

CURRICULUM SPECIFICS FOR THE CONCENTRATION IN ENERGY, SCIENCE AND TECHNOLOGY

Advanced Curriculum Required Courses (ACR)	18 credits
ACR: CHEM 103 General Chemistry ACR: ECON 300 Intermediate Microeconomic Theory ¹¹ ACR: ENEP 426 Climate Change: Science, Policy and Political Economy ACR: MATH 241 Analytic Geometry and Calculus A ACR: PHYS 201 Introductory Physics I	4 credits 3 credits 3 credits 4 credits 4 credits
Advanced Curriculum Elective Courses (ACE)	30 credits
30 credits are to be chosen from the list below to satisfy the ACE requirement. Other courses can be added with the approval of the advisor.	
ACE: BUAD 301 Introduction to Marketing	3 credits
ACE: BUAD 472 Marketing, Society and the Environment (Prerequisite:	
BUAD 301)	3 credits
ACE: CHEM 104 General Chemistry II	4 credits
ACE: ECON 311 Economics of Developing Countries	3 credits
ACE: ELEG415/615 Electric Power and Renewable Energy Systems	3 credits
ACE: ELEG 491 Ethics and Impacts of Engineering	2 credits
ACE: ELEG/MSEG 676 Sustainability	3 credits
ACE: ENEP 402 Electricity Policy and Planning	3 credits
ACE: ENEP 410 Political Economy of Environment	3 credits
ACE: ENEP 468 Research in Global Energy Policies	3 credits
ACE: ENEP 4/0 Readings in U.S. Energy Policy	3 credits
ACE: FREC/ECON 343 Environmental Economics	3 credits
ACE: GEOG 250 Computer Methods in Geography (MATH 115 or	
MATH 117 required)	4 credits
ACE: GEOL 421 Environmental and Applied Geology	3 credits
ACE: GEOG 372 Geographic Information Systems	3 credits
ACE: GEOG 412 Physical Climatology (Prerequisite: MATH 241	
and GEOG 250)	4 credits
ACE: GEOG/UAPP 428 Land Use & Environmental Planning	3 credits
ACE: MATH 115 Pre-Calculus	3 credits
ACE: MATH 117 Pre-Calculus for Scientists & Engineers	4 credits
ACE: MATH 221 Calculus 1	3 credits
ACE: MATH 241 Analytic Geometry and Calculus A	4 credits
ACE: MATH 242 Analytic Geometry and Calculus B (MATH 241	
Required)	4 credits
ACE: MEEG 435 Wind Power Engineering	3 credits

¹¹ This course will be replaced with ECON 367 (Economics of Energy) when it receives a permanent number.

ACE: MEEG 442 Introduction to Fuel Cells	3 credits
ACE: PHIL 340 Cross Cultural Environmental Ethics	3 credits
ACE: POSC 350 Politics and the Environment	3 credits
ACE: POSC/COMM 425 Energy/Environmental Policy,	
Public Opinion, Media and Politics	3 credits
ACE: STAT 370 Introduction to Statistical Analysis I	3 credits
ACE: STAT 371 Introduction to Statistical Analysis II	3 credits
ACE: UAPP 325 Public Policy Analysis	3 credits
ACE: UAPP 427 Evaluating Public Policy	3 credits
ACE: Foreign Language (up to 8 credits)	8 credits

ILLUSTRATIVE SEMESTER-BY-SEMESTER PLANS OF STUDY ENERGY, SCIENCE AND TECHNOLOGY CONCENTRATION

Illustrative Plans of Study for the Energy, Science and Technology Concentration are provided below for two cases: 1.) a full-time student choosing the major upon admission (1st through 4th years); 2.) a full-time student transferring into the major in their third semester of full-time study (2nd through 4th year). Courses to satisfy BRR, UNR, COC, CAP and IRP requirements are specified by semester, but this is for illustrative purposes only. There is flexibility in scheduling.

<u>Illustrative Semester-by-Semester Plan of Study for a Student Admitted to the Major in their 1st</u> Semester (1st through 4th Year)

Year 1: First Semester	15 credits
UNR: First Year Experience (ENEP 117: Science, Society & Energy)	1
BRR: Group D	4
COC: POSC 220 Introduction to Public Policy	3
COC: ECON 151 Introduction to Microeconomics	3
ACR: MATH 241 Analytic Geometry and Calculus A	4
Year 1: Second Semester	15 credits
UNR: ENGL 110 Critical Reading and Writing	3
BRR: Group A	6
COC: PHYS 143 Energy, Technology and Society	3
COC: ENEP 250 Introduction to Energy Policy	3
Year 2: First Semester	15 credits
BRR: Group C & D	6
COC: GEOG 236 Conservation of Natural Resources	3
ACR: STAT 370 Introduction to Statistical Analysis I	3
ACE: From the list by approval of the advisor	3
Year 2: Second Semester	16 credits
UNR: Second Writing Course	3

BRR: Group B & D	6
ACR: CHEM 103 General Chemistry I	4
ACE: From the list by approval of the advisor	3
Year 3: First Semester	16 credits
UNR: Multicultural Requirement	3
BRR: Group C	3
CAP: GEOG 422 Resources, Development and the Environment	3
ACR: PHYS 201 Introductory Physics I	4
ACE: From the list by approval of the advisor	3
Year 3: Spring Semester or Summer Session	3 credits
IRP: ENEP 364 Internship Fieldwork (UNR: Discovery Learning	
Experience)	3
Year 3: Second Semester	15 credits
CAP: ENEP 424 Sustainable Energy Policy and Planning	3
BRR: Group A & B	6
ACR: ECON 300 Intermediate Microeconomic Theory	3
ACE: From the list by approval of the advisor	3
Year 4: First Semester	15 credits
CAP: ENEP 425 Energy: Resources, Technologies & Policies	3
ACR: ENEP 426 Climate Change: Science, Policy and Political Economy	3
ACE: FREC/ECON 343 Environmental Economics	3
ACE: POSC 350 Politics of the Environment	3
ACE: From the list by approval of the advisor	3
Year 4: Second Semester	15 credits
CAP: CHEG 625 Green Engineering	3
IRP: ENEP 472 Senior Research Paper	6
ACE: POSC/COMM 425 Energy/Environmental Policy,	
Public Opinion, Media and Politics	3
ACE: From the list by approval of the advisor	3
Illustrative Semester-by-Semester Plan of Study for a Student Transferring in	to the Major in
their 3 rd Semester (2 nd through 4 th Year)	

Year 2: First Semester	15 credits
BRR: Group D	3

COC: GEOG 236 Conservation of Natural Resources	3
COC: UAPP 225 Crafting Public Policy	3
ACR: STAT 370 Introduction to Statistical Analysis I	3
ACE: From the list by approval of the advisor	3
Year 2: Second Semester	15 credits
UNR: Second Writing Course	3
BRR: Group B & D	6
ACR: CHEM 103 General Chemistry I	3
ACE: From the list by approval of the advisor	3
Year 3: First Semester	15 credits
UNR: Multicultural Requirement	3
BRR: Group C	3
CAP: GEOG 422 Resources Development and the Environment	3
ACR: PHYS 201 Introductory Physics I	3
ACE: From the list by approval of the advisor	3
Year 3: Spring Semester or Summer Session	3 credits
IRP: ENEP 364 Internship Fieldwork (UNR: Discovery Learning Experience)	3
• · · · ·	
Year 3: Second Semester	15 credits
Year 3: Second Semester	15 credits
Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BPP: Group A & B	15 credits
Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACP: ECON 300 Intermediate Microeconomic Theory	15 credits 3 6 3
Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACR: ECON 300 Intermediate Microeconomic Theory ACE: From the list or approval of the advisor	15 credits 3 6 3 3
Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACR: ECON 300 Intermediate Microeconomic Theory ACE: From the list or approval of the advisor	15 credits 3 6 3 3 3
 Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACR: ECON 300 Intermediate Microeconomic Theory ACE: From the list or approval of the advisor Year 4: First Semester 	15 credits 3 6 3 3 15 credits
 Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACR: ECON 300 Intermediate Microeconomic Theory ACE: From the list or approval of the advisor Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies 	15 credits 3 6 3 3 15 credits 3
 Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACR: ECON 300 Intermediate Microeconomic Theory ACE: From the list or approval of the advisor Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: ENEP 426 Climate Change: Science, Policy and Political Economy 	15 credits 3 6 3 3 15 credits 3 3 3
 Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACR: ECON 300 Intermediate Microeconomic Theory ACE: From the list or approval of the advisor Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: FREC/ECON 343 Environmental Economics 	15 credits 3 6 3 3 15 credits 3 3 3 3 3
 Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACR: ECON 300 Intermediate Microeconomic Theory ACE: From the list or approval of the advisor Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: FREC/ECON 343 Environmental Economics ACE: POSC 350 Politics of the Environment 	15 credits 3 6 3 3 15 credits 3 3 3 3 3 3 3
 Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACR: ECON 300 Intermediate Microeconomic Theory ACE: From the list or approval of the advisor Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: FREC/ECON 343 Environmental Economics ACE: POSC 350 Politics of the Environment ACE: From the list by approval of the advisor 	15 credits 3 6 3 3 15 credits 3 3 3 3 3 3 3 3 3
 Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACR: ECON 300 Intermediate Microeconomic Theory ACE: From the list or approval of the advisor Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: FREC/ECON 343 Environmental Economics ACE: POSC 350 Politics of the Environment ACE: From the list by approval of the advisor Year 4: Second Semester 	15 credits 3 6 3 3 15 credits 3 3 3 3 3 15 credits
 Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACR: ECON 300 Intermediate Microeconomic Theory ACE: From the list or approval of the advisor Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: FREC/ECON 343 Environmental Economics ACE: POSC 350 Politics of the Environment ACE: From the list by approval of the advisor Year 4: Second Semester CAP: CHEG 625 Green Engineering 	15 credits 3 6 3 3 15 credits 3 3 3 3 15 credits 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
 Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACR: ECON 300 Intermediate Microeconomic Theory ACE: From the list or approval of the advisor Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: FREC/ECON 343 Environmental Economics ACE: POSC 350 Politics of the Environment ACE: From the list by approval of the advisor Year 4: Second Semester CAP: CHEG 625 Green Engineering IRP: ENEP 472 Senior Research Paper 	15 credits 3 6 3 3 15 credits 3 3 3 3 15 credits 3 3 5 15 credits 3 6
Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACR: ECON 300 Intermediate Microeconomic Theory ACE: From the list or approval of the advisor Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: FREC/ECON 343 Environmental Economics ACE: POSC 350 Politics of the Environment ACE: From the list by approval of the advisor Year 4: Second Semester CAP: CHEG 625 Green Engineering IRP: ENEP 472 Senior Research Paper ACE: POSC/COMM 425 Energy/Environmental Policy	15 credits 3 6 3 3 15 credits 3 3 3 15 credits 3 3 5 15 credits 3 6
 Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACR: ECON 300 Intermediate Microeconomic Theory ACE: From the list or approval of the advisor Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: FREC/ECON 343 Environmental Economics ACE: POSC 350 Politics of the Environment ACE: From the list by approval of the advisor Year 4: Second Semester CAP: CHEG 625 Green Engineering IRP: ENEP 472 Senior Research Paper ACE: POSC/COMM 425 Energy/Environmental Policy, Public Opinion. Media and Politics 	15 credits 3 6 3 3 15 credits 3 3 3 3 15 credits 3 6 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
 Year 3: Second Semester CAP: ENEP 424 Sustainable Energy Policy and Planning BRR: Group A & B ACR: ECON 300 Intermediate Microeconomic Theory ACE: From the list or approval of the advisor Year 4: First Semester CAP: ENEP 425 Energy: Resources, Technologies & Policies ACR: ENEP 426 Climate Change: Science, Policy and Political Economy ACE: FREC/ECON 343 Environmental Economics ACE: POSC 350 Politics of the Environment ACE: From the list by approval of the advisor Year 4: Second Semester CAP: CHEG 625 Green Engineering IRP: ENEP 472 Senior Research Paper ACE: POSC/COMM 425 Energy/Environmental Policy, Public Opinion, Media and Politics ACE: From the list by approval of the advisor 	15 credits 3 6 3 3 15 credits 3 3 3 15 credits 3 6 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3

[See Appendix A. Sample Course Timelines, for a tabular presentation of possible course sequences for each concentration.]

V. RESOURCES AVAILABLE

A. Learning Resources

Existing University library holdings, audio-visual materials, special equipment and collections will adequately support the proposed undergraduate major. The learning resource infrastructure for the graduate programs in energy and environmental policy are already in place. No additional learning resources are required to support the educational needs of students in the major. Susan Brynteson, Vice Provost and Director of Libraries, has confirmed no new library resources are required to support the undergraduate program.

The computer lab and its software, library holdings and meeting rooms of the Center for Energy and Environmental Policy will be made available to undergraduate majors, with priority given to juniors and seniors in the major.

B. Faculty/Administrative Resources

1. Faculty

The proposed major shall initially be governed by the 20 faculty who prepared the proposal and have agreed to commit time to the advisement, instruction, research supervision and internship placement of undergraduates in the major. These 20 faculty will hold appointments in CEEP, and the Center will be responsible for providing salaried staff support for the program.

These 20 faculty (hereinafter referred to as the Program Faculty) will be responsible for activities and obligations customarily assigned by the University to departmental faculty.

The Director of the Program will be appointed by the Dean of the College of Human Services, Education and Public Policy for a three year renewable term with the advice of the Program Faculty. The Director will be a member of the Program Faculty and will be responsible for general management of the Program.

Appointment of faculty members to committees will take into consideration the full range of disciplines and interests of the Program Faculty.

Additional faculty can be added to the Program Faculty by a favorable vote of three-fourths of the full Program Faculty.

This governance approach parallels the one in place for the University graduate programs in energy and environmental policy and has proved, after 10 years of operations, to effectively serve the interests of the students, the faculty and the University.

PROGRAM FACULTY

David Ames Director Center for Historic Architecture & Design Professor, Urban Affairs and Public Policy

Allen M. Barnett Professor Electrical and Computer Engineering

Ralph J. Begleiter Professor Communication

John Byrne Professor and Director Center for Energy & Environmental Policy

Jingguang Chen Professor Chemical Engineering and Director UD Energy Institute

Steven K. Dentel Professor Civil & Environmental Engineering

Dominic DiToro Professor Civil & Environmental Engineering

Lado Kurdgelashvili, Policy Fellow Center for Energy & Environmental Policy

William Latham, III Associate Professor Economics

Raul F. Lobo Professor Chemical Engineering Cecilia Martinez Senior Policy Fellow & Adjunct Faculty Center for Energy & Environmental Policy

Robert L. Opila, Professor and Chairperson Materials Science

William F. Ritter Professor and Chairperson, Bioresources Engineering

Yda Schreuder Associate Professor Geography

S. Ismat Shah Professor Materials Science and Physics Richard T. Sylves Professor Political and International Relations

Young-Doo Wang Associate Director Center for Energy & Environmental Policy Professor, Urban Affairs and Public Policy

Robert Warren Professor Urban Affairs and Public Policy

John Wehmiller Professor Geological Sciences

Richard P. Wool Professor Chemical Engineering

2. Administration

Administrative responsibility for the proposed major shall reside with the Office of the Dean of the College of Human Services, Education and Public Policy. The Center for Energy and Environmental Policy shall be responsible for day-to-day administration of the proposed major under the direction of the Dean.

This administrative approach parallels the one in place for the graduate programs and has proved, after 10 years of operations, to effectively serve the interests of the students, the faculty and the University.

C. External Funding

No new external funding is necessary to launch the major. However, external funding will play a role in its development.

The Center for Energy and Environmental Policy currently has 25 academic and research exchange agreements with university and research organizations around the world. In addition, for 28 years it has assisted students in finding internships throughout the U.S. and abroad. Undergraduate majors will have access to internship opportunities that CEEP's partner network and internship placement program generates. These can be a source of paid internships. As well, majors will be able to participate in the Center's applied research projects in order to develop their Senior Research Paper. In some cases, this may mean majors will be able to compete for undergraduate research assistantships.

External funding for the major will be a future priority for CEEP, as the program matures.

VI. Resources Required

A. Learning Resources

No additional learning resources will be required for the proposed major.

B. Personnel Resources

No new faculty positions will be required to implement the proposed major at this time.

As enrollment in the major grows, there will be a need to add faculty positions with a focus on energy. New positions will be needed especially to supplement faculty efforts in the Center for Energy and Environmental Policy. Initially, Advanced Curriculum courses offered by CEEP will be taught with 400/600 level designations. With increases in undergraduate enrollment, additional faculty positions will be necessary to maintain the quality and rigor of the graduate programs and to support growth in the undergraduate program.

The proposed undergraduate major will require three Teaching Assistants. The positions will assist in the instruction of selected ENEP undergraduate courses. One source of TA candidates will be the University's Ph.D. program in Energy and Environmental Policy (see http://ceep.udel.edu/academics/phd/enep.htm). Currently, it receives no TA support.

A Staff Assistant serving as Undergraduate Coordinator will also be required.

C. Budgetary Needs

Three categories of budgetary needs have been identified by the Steering Committee:

- Teaching Assistantships The proposed major will need three Teaching Assistantships annually, beginning in September 2009. As noted above, the University's intercollegiate graduate program in Energy and Environmental Policy does not receive TA support. The positions will assist in the instruction of selected ENEP undergraduate courses. A rough estimate of the annual cost is \$48,000.
- Staff Assistant The proposed major will need salaried staff support. CEEP's current salaried staff support is nearly 50% soft-funded and already has responsibility for the University's intercollegiate graduate program in Energy and Environmental Policy. It is requested that by January 2010, support for a Staff Assistant to serve the undergraduate major is provided. A rough estimate of annual cost (with fringes) is \$28,000.
- New Faculty By 2011, we expect advisements for the undergraduate major to be at or slightly above the capacity of the current Program Faculty (see pp. 28-31 for a description of the Program Faculty). We hope to receive permission in late 2011 to begin the process of hiring a new faculty member at the rank of assistant professor with expertise in Energy Policy. A rough estimate of annual cost (with fringes) is \$70,000. After 2012, there may be a need for an additional faculty hire with expertise in Energy Engineering, Science and Policy but specifics regarding this need will depend upon experience with the undergraduate major.

VII. IMPLEMENTATION AND EVALUATION

A. Implementation Plan

The curriculum will be implemented according to the following schedule:

Spring/Summer 2009:	New course (ENEP 250: Introduction to Energy Policy) developed Schedule of faculty advisors developed Faculty advisor guide developed First Teaching Assistants hired and oriented
2009/2010:	Undergraduate major open for student enrollment New course finalized and added to University curriculum (ENEP 250 Introduction to Energy Policy) Advanced curriculum courses assigned 400/600 level designation Internship requirements and student resource guide finalized

	Staff Assistant to serve the undergraduate major is hired			
2011/2012	Recruit for and hire a new tenure-track assistant professor position in Energy Policy			
2012/2013	Recruit for and hire a new tenure-track faculty position in Engineering, Science and Policy with a specialization in energy.			

B. Assessment Plan

Assessment of the program will follow University guidelines and regulations. The Director of the Program and the Program Faculty will be responsible for the criteria and outcomes for the proposed major assessment plan in consultation with and under advisement from the University Office of Assessment. This will include developing a curriculum map to align proposed courses with the intended learning outcomes of the program. Initial learning outcomes were developed through the proposed major planning process. Selection of existing courses, identification of new courses, the internship and senior research paper were identified to meet the learning goals and outcomes.

Key learning outcomes for students in the ENEP major. The Program Faculty are responsible for reviewing and revising learning outcomes. The Center for Energy and Environmental Policy and the Program Director will coordinate these activities. Initial learning outcomes for the proposed major are:

- 1. Students will gain cross-disciplinary knowledge and skills in the field of energy and environment associated with energy use
- 2. Students will understand the complex social and biophysical interactions
- 3. Students will gain an understanding of the influence of policy and economics on the development of the energy sector, with special emphasis on sustainable energy
- 4. Students will gain an understanding of local, national and global energy and environmental policy interactions and the policy options for addressing them in government, civil society, and industry
- 5. Students will gain an understanding of local, national and international policy and governance systems.

Courses, assignments, or experiences that provide students with the opportunity to achieve the learning goals and outcomes. A curriculum map will be designed and will include identification of student learning opportunities. Considered together, the Core and Capstone Courses, Internship and Senior Research Paper are expected to meet all five of the learning outcomes. The Program Faculty will identify concentration-specific learning outcomes for the Advanced Required and Advanced Elective courses.

Instruments, methods, timetable for assessing student achievement and implementation of assessment. The Program Faculty will evaluate and select measures to assess the program and guide its implementation. This will include selection of assessment methods, milestones, and timetables for assessment, as well as selection of appropriate parties for collection and

interpretation of data. The results of the assessment will be reported to the appropriate University bodies.

COURSES/EXPERIENCES/		EXPECTED LEARNING OUTCOMES				
ASSIGNMENTS TO ACHIEVE LEARNING OUTCOMES	General Education Goals	1	2	3	4	5
CORE COURSES						
ENEP 250		Х	Х	Х	Х	Х
GEOG 236			Х		Х	
POSC 220					Х	Х
ECON 151				Х	Х	
PHYS 143		Х	Х		Х	
ADVANCED COURSES		Х	Х	Х	Х	Х
CAPSTONE COURSES						
GEOG 422		Х	Х	Х		Х
ENEP 424		Х	Х	Х		Х
ENEP 425		Х		Х	Х	Х
CHEG 625		Х	Х	Х		
EXPERIENCES						
Internship				Х	Х	Х
ASSIGNMENT						
Senior Research Paper		Х	Х	Х	Х	Х

Assessment results and program modification. The Program Faculty will review the assessment results and make appropriate modifications to the program.

VIII. Appendices

A. Sample Course Timelines

ILLUSTRATIVE COURSE SEQUENCE FOR INCOMING MAJORS Energy, Economics and Public Policy Concentration

	Fall Semester	Credits	Spring Semester	Credits
Freshman	UNR: First Year Experience	1	UNR: ENGL 110	3
	Breadth Requirements	6	Breadth Requirements	6
	ECON 151	3	PHYS 143	3
	POSC 220	3	ENEP 250	3
	POSC 300	3		
Sonhomore				2
Sophomore	Breadth Requirements	6	Second Writing Class	3
	GEOG 236	3	Breadth Requirements	6
	ECON 311	3	ECON 300	3
	ENEP 470	3	UAPP 325	3
Junior	Multicultural Req.	3	Breadth Requirement	4
	Breadth Requirement	3	POSC 350	3
	POSC 323	3	ENEP 410	3
	ENEP 402	3	ENEP 424	3
	GEOG 422	3	Advanced Curriculum Elective	3
Spring on	Discourse Learning			
Summer Session	Experience ENEP 364: Internship	3		
Senior	PHIL 340	3	POSC/COMM 425	3
	FREC/ECON 343		ENEP 472: Senior Research Paper	6
	ENEP 425	3	CHEG 625	3
	ENEP 426	3	Advanced Curriculum Elective	3
	Advanced Curriculum Elective	3		

Illustrative Course Sequence for Transferring Students Energy, Economics and Public Policy Concentration

	Fall Semester	Credits	Spring Semester	Credits
Sophomore	Discovery Learning Experience		Second Writing Class	3
	Breadth Requirements	6	Breadth Requirements	6
	GEOG 236	3	ECON 300	3
	ECON 311	3	UAPP 325	3
	ENEP 470	3		
Junior	Multicultural Req.	3	Breadth Requirement	4
	Breadth Requirement	3	POSC 350	3
	POSC 323	3	ENEP 410	3
	ENEP 402	3	ENEP 424	3
	GEOG 422	3	Advanced Curriculum Elective	3
Spring or Summer Session	ENEP 364: Internship	3		
Sonior				
Senior	PHIL 340	3	POSC/COMM 425	3
	FREC/ECON 343		Paper	6
	ENEP 425	3	CHEG 625	3
	ENEP 426	3	Advanced Curriculum Elective	3
	Advanced Curriculum Elective	3		

ILLUSTRATIVE COURSE SEQUENCE FOR INCOMING MAJORS ENERGY, ENVIRONMENT AND SOCIETY CONCENTRATION

	Fall Semester	Credits	Spring Semester	Credits
Freshman	UNR: First Year Experience	1	UNR: ENGL 110	3
	Breadth Requirement	4	Breadth Requirements	6
	ECON 151	3	GEOG 236	3
	POSC 220	3	ENEP 250	3
	MATH 241	4		
Sophomore	Breadth Requirements	6	Second Writing Class	3
	PHYS 143	3	Breadth Requirements	6
	FREC/ECON 343	3	GEOG 250	3
	ENEP 467	3	POSC 350	3
Junior	Multicultural Requirement	3	Breadth Requirements	6
	Breadth Requirement	3	ECON 300	3
	GEOG 412	3	GEOG 372	3
	GEOG 422	3	ENEP 424	3
	POSC/COMM 425	3		
Spring or Summer	Discovery Learning Experience	3		
Session	ENEP 364: Internship			
Carrier				
Senior	SOCI 331	3	SOCI 470	3
	PHIL 340	3	ENEP 470	3
	ENEP 425	3	ENEP 472: Senior Research Paper	6
	ENEP 468	3	CHEG 625	3
	Advanced Curriculum Elective	3		

	Fall Semester	Credits	Spring Semester	Credits
Sophomore	Breadth Requirements	6	Second Writing Class	3
	PHYS 143	3	Breadth Requirements	6
	FREC/ECON 343	3	GEOG 250	3
	ENEP 467	3	POSC 350	3
Junior	Multicultural Requirement	3	Breadth Requirements	6
	Breadth Requirement	3	ECON 300	3
	GEOG 412	4	GEOG 372	3
	GEOG 422	3	ENEP 424	3
	POSC/COMM 425	3		
Spring or Summer Session	Discovery Learning Experience ENEP 364: Internship	3		
Senior	SOCI 331	3	SOCI 470	3
	PHIL 340	3	ENEP 470	3
	ENEP 425	3	ENEP 472: Senior Research Paper	6
	ENEP 468	3	CHEG 625	3
	Advanced Curriculum Elective	3		

ILLUSTRATIVE COURSE SEQUENCE FOR TRANSFERRING STUDENTS ENERGY, ENVIRONMENT AND SOCIETY CONCENTRATION

ILLUSTRATIVE COURSE SEQUENCE FOR INCOMING MAJORS ENERGY, SCIENCE AND TECHNOLOGY CONCENTRATION

	Fall Semester	Credits	Spring Semester	Credits
Freshman	UNR: First Year Experience	1	UNR: ENGL 110	3
	Breadth Requirement	4	Breadth Requirements	6
	ECON 151	3	PHYS 143	3
	POSC 220	3	ENEP 267	3
	MATH 241	4		
Conhomono				
Sopnomore	Breadth Requirements	6	UNR: Second Writing Class	3
	GEOG 236	3	Breadth Requirements	6
	STAT 370	3	CHEM 103	4
	Advanced Curriculum Elective	3	Advanced Curriculum Elective	3
Junior	Multicultural Req.	3	Breadth Requirements	6
	Breadth Requirement	3	ECON 300	3
	PHYS 201	4	ENEP 424	3
	GEO 422	3	Advanced Curriculum Elective	3
	Advanced Req. Elective	3		
Spring or Summer Session	Discovery Learning Experience ENEP 364: Internship	3		
Senior	FREC/ECON 343	3	POSC/COMM 425	3
	POSC 350	3	ENEP 472: Senior Research Paper	6
	ENEP 425	3	CHEG 625	3
	ENEP 426	3	Advanced Curriculum Elective	3
	Advanced Curriculum Elective	3		

	Fall Semester	Credits	Spring Semester	Credits
Sophomore	Breadth Requirements	6	Second Writing Class	3
	GEOG 236	3	Breadth Requirements	6
	STAT 370	3	CHEM 103	4
	Advanced Req. Elective	3	Advanced Req. Elective	3
Junior	Multicultural Req.	3	Breadth Requirements	6
	Breadth Requirement	3	ECON 300	3
	PHYS 201	4	ENEP 424	3
	GEOG 422	3	Advanced Curriculum Elective	3
	Advanced Curriculum Elective	3		
Spring or Summer Session	Discovery Learning Experience ENEP 364: Internship	3		
Senior	FREC/ECON 343	3	POSC/COMM 425	3
	ENEP 425		ENEP 472: Senior Research Paper	6
	ENEP 426	3	CHEG 625	3
	POSC 350	3	Advanced Curriculum Elective	3
	Advanced Curriculum Elective	3		

ILLUSTRATIVE COURSE SEQUENCE FOR TRANSFERRING STUDENTS ENERGY, SCIENCE AND TECHNOLOGY CONCENTRATION

B. University Library Assessment Letter



UNIVERSITY OF DELAWARE LIBRARY OFFICE OF THE VICE PROVOST AND MAY MORRIS DIRECTOR OF LIBRARIES University of Delaware Newark, Delaware 19717-5267 Phone: 302/831-2231 Fax: 302/831-1046 Library Web: www.udel.edu/library

November 3, 2008

MEMORANDUM

To: Beth A. Maliner Administrative Assistant Center for Energy and Environmental Policy

From: Susan Brynteson Vice Provost and May Morris Director of Libraries

Re: New Undergraduate Degree in Energy and Environmental Policy

I am responding to your request to supply information about the capability of the University of Delaware Library to support the proposal for a new Undergraduate Degree in Energy and Environmental Policy.

The University of Delaware Library is well able to support the proposed new major. Enclosed is a description of collections, resources and services available.

I would be pleased to respond to any questions.

SB/nb Enclosure

 c: John M. Byrne, Director and Distinguished Professor of Public Policy, Center for Energy and Environmental Policy
 R. Cecilia Martinez, Policy Fellow, Center for Energy and Environmental Policy Michael Gutiérrez, Associate Librarian, Reference Department Thomas C. Melvin, Librarian, Reference Department

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UNIVERSITY OF DELAWARE LIBRARY OFFICE OF THE VICE PROVOST AND MAY MORRIS DIRECTOR OF LIBRARIES

University of Delaware Newark, Delaware 19717-5267 Phone: 302/831-2231 Fax: 302/831-1046 Library Web: www.udel.edu/library November 3, 2008

<u>Report on Library Services and Collections in Support of a</u> <u>New Undergraduate Degree in Energy and Environmental Policy</u>

General Description

The University of Delaware Library includes the Hugh M. Morris Library, where the main collection is housed; three branch libraries located on the Newark campus, the Agriculture Library, the Chemistry Library, and the Physics Library; and a fourth branch library, the Marine Studies Library, located in Lewes, Delaware. The Library collections parallel the University's academic interests and support all disciplines. In addition to collections which directly support the new degree proposal, the Library has strong collections in other areas that relate to the new degree proposal, such as Agriculture, Biology, Biotechnology, Chemical Engineering, Chemistry and Biochemistry, Environmental and Civil Engineering, Environmental Sciences, Geography, Geology Legal Studies, Marine Studies, Political Science, Public Policy, Sociology, and Urban Affairs.

Books, periodicals, microforms, government publications, computer databases and other electronic resources, maps, manuscripts, and media provide a major academic resource for the University of Delaware, the surrounding community, the state of Delaware, and the nation. Library staff members provide a wide range of services, including reference assistance, circulation, interlibrary loan, instructional programs, and assistance to the visually impaired.

The University of Delaware Library is a U.S. depository library and a U.S. patent depository library and contains a complete file of every patent the U.S. Office of Patents and Trademarks has issued.

The online catalog, called DELCAT, provides access to millions of items by author, title, subject, and keyword.

Library collections number over 2,700,000. In 2007/2008, the Library Web <www.udel.edu/library> received over 1,700,000 virtual visits.

The University of Delaware Library is a member of the Association of Research Libraries, OCLC, the Center for Research Libraries, PALINET, CIRLA (The Chesapeake Information and Research Library Alliance), and NERL (NorthEast Research Libraries).

Specific Support for the Center for Energy and Environmental Policy

Funds are designated at the beginning of each fiscal year for the support and strengthening of the collections including those related to the Center for Energy and Environmental Policy. Support for the Center for Energy and Environmental Policy is

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Beth A. Maliner November 3, 2008 Page 2

supplemented by funds used to purchase materials in the related areas noted previously as well as funds for the licensing of electronic resources.

The Library subscribes to many print journals and electronic journals which support the Center for Energy and Environmental Policy. A list of electronic journals by subject is available from the Library Web by clicking on "Electronic Journals" at the top of the main page </www.udel.edu/library>. In addition to various reference sources in print (see the "Research Guides" sections of the Subject Guides for Energy, Environmental Sciences, and Public Policy available under the section "Subject Guides A-Z" on the Library Web page), the Library also makes available several electronic databases which support the Center for Energy and Environmental Policy, including Agricola, Aquatic Sciences and Fisheries (ASFA), Biological Abstracts, Biological and Agricultural Index Plus, Biological Sciences Set, CAB Abstracts, Chemical Abstracts (SciFinder Scholar), Compendex, Engineering Village, Environmental Sciences and Pollution Management, GEOBASE, GeoRef, GreenFILE, OceanBase, PAIS International, TOXNET, Web of Science, and Wildlife and Ecology Studies Worldwide.

In addition, the Library provides access to such important electronic resources as ABI/INFORM, Academic OneFile, America: History and Life, ASSIA: Applied Social Sciences Index and Abstracts, Biography Resource Center, CQ (Congressional Quarterly) Researchers Plus Archive, CQ (Congressional Quarterly) Weekly, EconLit, Expanded Academic ASAP Plus, General Business File ASAP, General OneFile, GPO Access, Historical Abstracts, LegalTrac, LexisNexis Academic, LexisNexis Congressional, LexisNexis Statistical Universe, MarciveWeb DOCS, New York Times (Historical), Opposing Viewpoints Resource Center, Population Index, ProQuest Digital Dissertations (Dissertation Abstracts), Sociological Abstracts, Statistical Abstract of the United States, and STAT-USA. Several databases incorporate the Library's major linking service, Article Express, for electronic access to the full text of journal articles. The Library also subscribes to RefWorks, a Web-based bibliographic and database management system that can be used with most databases, and has just released a major new service, WorldCat Local, which provides access to a vast number of resources in libraries worldwide. The Library also maintains an Institutional Repository (see: <dspace.udel.edu:8080/dspace>), which archives research reports and documents and the like produced by University of Delaware faculty, including some documents from the Center for Energy and Environmental Policy. Census information and other demographic data are available as is a wide range of printed and electronic reference sources.

The Library has a strong collection of videotapes and films which cover a wide range of subjects which could possibly relate to Center for Energy and Environmental Policy. The video collection is heavily used; is increasing in size; and there has been much consultation about it by Francis Poole, Librarian and Head of the Instructional Media Collection Department, with faculty in all areas.

Beth A. Maliner November 3, 2008 Page 3

A professional librarian, Thomas Melvin, Librarian in the Reference Department, serves as liaison to the faculty in the Center for Energy and Environmental Policy. Suggestions for purchases received by the Library for materials related to the Center for Energy and Environmental Policy are directed to Mr. Melvin who also regularly consults faculty about priorities and the direction the collections should take. Mr. Melvin is also available for instruction in the use of the Library for students and faculty. He maintains subject Web sites that support the Center for Energy and Environmental Policy, which can be accessed from the Library Web <www.udel.edu/library> by clicking on "Subject Guides A to Z" or directly by the Energy URL <www2.lib.udel.edu/subj/energy> or by the Environmental Sciences URL <www2.lib.udel.edu/subj/envi>.

A professional librarian, Michael Gutiérrez, Associate Librarian in the Reference Department, serves as liaison to the faculty in the School of Urban Affairs and Public Policy. Suggestions for purchases received by the Library for materials related to Public Policy are directed to Mr. Gutiérrez who also regularly consults faculty about priorities and the direction the collections should take. Mr. Gutiérrez is also available for instruction in the use of the Library for students and faculty. He maintains a subject Web site for Public Policy, which can be accessed from the Library Web <www.udel.edu/library> by clicking on "Subject Guides A to Z" or directly by the URL </www2.lib.udel.edu/subj/urba>.

Susan Brynteson

Vice Provost and May Morris Director of Libraries

SB/nb

C. Approval by the Chair of the Department of Chemical Engineering of Enrollment of ENEP Undergraduate Students in CHEG 625

Date: Wed, 3 Dec 2008 21:44:10 -0500 From: "Wagner, Norman J." <wagnernj@UDel.Edu> To: "mgm@udel.edu" <mgm@UDel.Edu> Cc: Richard P. Wool <wool@UDel.Edu>, Raul F. Lobo <lobo@UDel.Edu>, John Michael Byrne <jbbyrne@UDel.Edu> Subject: CHEG 625 Green Engineering

Dear Dean Michael Gamel-McCormick,

I approve and support the use of CHEG 625 Green Engineering as a capstone requirement of the proposed undergraduate major in energy and environmental policy.

The Department of Chemical Engineering typically has undergraduate students enrolled in all of its 600-level courses and requires its own undergraduate students to take certain 600-level courses to fulfill requirements for our very popular Biochemical Engineering Minor. This was presented to and approved by the faculty senate.

Regarding enrollment space, CHEG can normally accommodate the expected 10-15 additional students from the proposed ENEP major. If problems arise, I will work with Professor Wool and the director of the undergraduate ENEP major to solve enrollment difficulties.

We are pleased to support this new initiative in energy and environmental policy education and appreciate your continued support for the very popular energy minor in the college of engineering.

Sincerely,

Norman J. Wagner

Alvin B. and Julia O. Stiles Professor and Chair Department of Chemical Engineering

PS as with all 600 courses that are popular with undergraduates in our program, we may consider renumbering courses such as these to be at the 400 level (i.e., a method by which new knowledge becomes incorporated into the undergraduate curriculum). I will take this up with our undergraduate curriculum coordinator (Prof. Lobo) and Prof. Wool.

D. Letters of Approval from Supporting Colleges and the Administration

Date: Fri 5 Dec 16:08:11 EST 2008 From: "Gamel-McCormick, Michael" <mgm@UDel.Edu> Subject: Intercollegiate Major in Energy and Environmental Policy To: "John Michael Byrne" <jbbyrne@UDel.Edu>

JB:

The College of Human Services, Education and Public Policy fully supports the proposed intercollegiate major in energy & environmental policy. The interdisciplinary nature of the major and the inter-college structure creates an open, collegial program that ensure an interdisciplinary approach. I look forward to the program being approved and the many departments working to support our students.

Michael Gamel-McCormick

Michael Gamel-McCormick, Ph.D.

Interim Dean

College of Human Services, Education and Public Policy

106 Alison Hall West

University of Delaware

Newark, DE 19716

(302) 831-2394 (voice)

(302) 831-4605 (FAX)

www.udel.edu/chep (web site)

Date: Tue, 18 Nov 2008 15:23:15 -0500 From: "Apple, Tom" <tapple@art-sci.udel.edu> To: "mgm@udel.edu"' <mgm@UDel.Edu> Cc: John Michael Byrne <jbbyrne@UDel.Edu> Subject: major in environmental and energy policy

Michael,

I have carefully reviewed John Byrne's superb write-up of the proposed new major in EEP. I want to add my full endorsement and strong enthusiasm for this major. The proposal has been carefully crafted and has involved all the key stakeholders.

Best regards,

Tom

Tom Apple, PhD Dean of Arts & Sciences Professor of Chemistry University of Delaware

4 Kent Way Newark, DE 19716

(302) 831-2793 - ph (302) 831-6398 - FAX Date: Mon, 10 Nov 2008 08:34:38 -0500 From: Mark Barteau <barteau@UDel.Edu> To: "Gamel-McCormick, Michael" <mgm@UDel.Edu> Cc: John Byrne <jbbyrne@UDel.Edu> Subject: Support for the proposed intercollegiate major in energy & environmental policy

Michael - I would like to add my unequivocal support to the proposal for an undergraduate major in Energy and Environmental Policy. The proposal from John Byrne and colleagues across the campus is outstanding. It will not only be a significant addition to our energy offerings on campus, but will significantly increase the benefits to our undergraduates from our interdisciplinary research centers. Please let me know if I can provide any additional assistance to the process of approval and implementation.

Mark

Mark Barteau Robert L. Pigford Chair of Chemical Engineering and Senior Vice Provost for Research and Strategic Initiatives

[Founding Director of the UD Energy Institute]

Date: Tue, 25 Nov 2008 05:14:51 -0500
From: "Chajes, Michael J." <chajes@UDel.Edu>
To: "Gamel-McCormick, Michael" <mgm@UDel.Edu>
Cc: 'John Byrne' <jbbyrne@UDel.Edu>, Dominic Di Toro <dditoro@UDel.Edu>
Subject: RE: Request for your support for the proposed intercollegiate major in energy & environmental policy

Michael,

The College of Engineering is happy to support the proposed intercollegiate major in energy & environmental policy. Several of the College of Engineering faculty have been involved in its development, and their input has and continues to be incorporated into the program.

Michael

Michael J. Chajes, Dean 102 DuPont Hall College of Engineering University of Delaware Newark, DE 19716 From: Gempesaw, Bobby [mailto:gempesaw@lerner.udel.edu] Sent: Thursday, November 06, 2008 10:36 PM To: Gamel-McCormick, Michael Subject: Energy and Environmental Policy Major

Michael,

As requested by John Byrne, I am writing to offer my support to the proposed energy and environmental policy major as described in the attached document.

Thanks.

Bobby

Conrado M. Gempesaw II Dean Lerner College of Business and Econmics



OFFICE OF ADMISSIONS

116 Hullihen Hall University of Delaware Newark, Delaware 19716-6210 *Ph:* 302/831-6123 *Fax:* 302/831-6905 *Email:* admissions@udel.edu www.udel.edu/viewbook

January 19, 2009

John Bryne, Ph.D. Director Center for Energy and Environmental Policy University of Delaware Newark, DE 19716

Dear Dr. Byrne:

I am pleased to write in support of the new major in Energy and Environment Policy.

The major you have developed combines two themes that have become increasingly attractive to very bright students: interdisciplinary education and curricula that focus on environmental and energy issues. My guess is that those students who are attracted to your new major are likely to be among our most academically accomplished and creative students.

I say this because for many years I worked for the University's Honors Program. This experience taught me that many of our brightest students resist being pigeonholed. They tend to have broadly-based intellectual enthusiasms, and the curricula that you and your colleagues have developed for this new major do a nice job of integrating coursework from a variety of fields, including math and science, political science, public policy, geography, and economics. In addition, the major very cleverly melds theoretical coursework with the practical application of theory, and that strikes me as good pedagogy that will attract some of our best students.

As for the major's focus: I can tell you that at college fairs my staff are frequently asked about majors that focus on environmental and energy issues. Showcasing this major will certainly help us present the University to prospective students and parents.

With best wishes, I am,

Sincerely,

Louttirsz

Louis L. Hirsh Director of Admissions louhirsh@udel.edu

AN EQUAL OPPORTUNITY UNIVERSITY



COLLEGE OF HUMAN SERVICES, EDUCATION & PUBLIC POLICY

SCHOOL OF URBAN AFFAIRS AND PUBLIC POLICY Graham Hall University of Delaware Newark, Delaware 19716-7310 Ph: 302/831-1687 Fax: 302/831-3587 E-mail: SUAPP@UDEL.EDU Internet: www.udel.edu/suapp

 To:
 Young-Doo Wang, Professor and Program Director

 Maria Mistigueta
 Mistigueta

 From:
 Maria Aristigueta, Director, School of Urban Affairs & Public Policy

Re: Undergraduate Major in Energy and Environmental Policy

Date: November 19, 2008

I am writing to state my support for the Undergraduate degree in Energy and Environmental Policy as described in the proposal. The program will serve as a nice complement to students in the proposed Public Policy major who may want to specialize in Energy and Environmental Policy. The theme of the proposed interdisciplinary program is timely, given the energy and environmental issues facing the U.S. and countries throughout the world.

Thank you for the opportunity to collaborate with this exciting program. We look forward to participating in its success.