

The Business School

UNIVERSITY OF COLORADO DENVER

PROPOSAL FOR A MASTER OF SCIENCE DEGREE IN GLOBAL ENERGY MANAGEMENT

7/24/08

A. Description of Program

1. Design of Program

The Global Energy Management (GEM) Program is a joint effort between the University of Colorado Denver (UC Denver) Business School and energy industry leaders to provide well-trained individuals to fill a much needed management succession plan for the energy industry. The program is designed as a 36-semester credit hour, eighteen-month, cohort-based Master of Science degree in Global Energy Management. The program will be housed in the Business School at UC Denver and will use a combination of both academically qualified faculty from accredited universities with recognized energy degree programs and professionally qualified faculty who are experts in the energy industry. These individuals will also serve as a pool for guest speakers. The program is an extended studies program (D2), is fully-funded by tuition from the program, and requires minimal resources from the university.

The structure of the program will allow students to work full time while attending classes in a dynamic and cutting-edge hybrid educational approach, combining classroom and online educational systems. GEM will link students, professors, and energy professionals worldwide with streaming video, video conferencing, and virtual classrooms. Students will complete two three-credit courses per term. Each course will meet in the classroom for 20 hours over four days at the beginning of each term (40 hours combined total for the two courses). The classroom portion of the course is blocked at the beginning of each term to maximize the efficiency and effectiveness of the cohort approach and minimize interference with work schedules of the students. The remainder of the coursework for each term is completed online. This delivery format will further increase the attractiveness of the program as it allows students to continue to work anywhere in the world and still pursue a GEM degree. The combination of classroom and on-line delivery differentiates this program from other Energy Management programs which require students to physically attend on-campus classes throughout the entire term. This degree program is further differentiated by the fact it is the only dedicated Master of Science degree in Global Energy Management. Research shows that all other graduate-level energy management degrees in Colorado, the United States, and North America are specialty tracks placed within traditional MBA programs.

2. Learning Goals

The educational goals of the GEM program are to have students develop the necessary skills to lead and manage energy industry companies. GEM students will complete a set of customized core courses tailored specifically to the energy industry, including Finance, Accounting, Economics and Geography, Regulation and Public Policy, Renewable and Alternative Energy, Management and Leadership. GEM elective courses include Asset Management,

Organizational Behavior, Marketing, Information Systems Management, Advanced Financial Management, Strategic Management, and Supply Chain Management. All core and elective courses are custom designed for the energy industry and are not interchangeable with other offerings of UC Denver. Graduates of the GEM Program will be prepared to step into management and leadership positions within the energy industry immediately upon graduation and thus will help to fill the management and recruitment gaps existing in the energy industry today. (Additional detail on learning objectives is in section C.2.d of this proposal.)

B. Concerns to be Addressed

1. Bona Fide Need

a. Student Demand

1) Target market, student demand. Industry leaders have expressed an urgent need for qualified personnel to fill upper management positions. Present and future employees seeking a career in leadership and management in the energy industry are the program's target market. These individuals will either be recruited directly from companies in the energy industry or will enter the program on their own with the intent of moving into managerial positions within the energy industry. Thus the program will specifically target current energy industry employees who are strong in scientific and overall industry knowledge and who now desire to build strong business and management skills. However, the GEM Program will also recruit students who wish to earn a degree in Global Energy Management as an entry into management positions within energy companies.

The degree program will seek to enroll individuals possessing any or all of the following characteristics:

- An undergraduate or graduate degree in the energy sciences, such as engineering, petrochemical or geosciences.
- An undergraduate or graduate degree in non-energy fields, such as but not limited to, business, economics, marketing, finance, accounting, political science, *and* three or more years full-time employment in the energy industry.
- An undergraduate degree in any area, with no industry experience, if the individual is seeking employment in the energy industry upon graduation. This category of student will have to take up to four prerequisite courses in energy sciences and business in order to have a basic understanding of the industry, its unique terminology, history, and method of operation. The specific prerequisite courses required will be based on an assessment of the student's background by the GEM Director and faculty teaching in the program. The specific courses recommended as prerequisites may be taken at either UC Denver or at other accredited universities offering energy programs and must be approved by the GEM Director. It is estimated that fewer than 10% of students admitted to the degree program will fall into this category.

Projections for enrollment are based on information from the energy industry and the current rate of inquiries about the program from individuals not connected to any of the participants in the development of the program. As of June 1, 2008, the GEM Program has received 42 inquires, with 17 of the persons expressing a strong interest in applying to the program once it is approved. Inquiries have come from throughout the United States as well as from international locations. The GEM advisory board, which consists

primarily of energy industry leaders, indicates that 40-50% of energy industry management will be eligible for retirement within the next five to seven years. Based on this information, the Business School will market the program globally through established information channels within the industry such as trade and professional associations and energy-related publications, through other universities offering undergraduate programs in energy sciences such as engineering, geosciences, petrochemical programs and broadly through the website.

2) *Enrollment projections.* Table 1 shows enrollment projections for the GEM Program. At this time, the program estimates approximately 80 percent of each cohort will be resident students and 20 percent will be nonresident students. However, since this is an extended studies program, all students will pay the same tuition rate. The program reaches full enrollment by year three. (Additional documentation, including required signatures for this table, is available in Appendix A.)

Table 1. Enrollment Projections, Master of Science degree in Global Energy Management

		Year 1	Year 2	Year 3	Year 4	Year 5	Full Implemen- tation
		2008-09	2009-10	2010-11	2011-12	2012-13	
1-a	In-state Headcount	26.0	64.0	77.0	77.0	77.0	77.0
1-b	Out-of-State Headcount	6.0	16.0	19.0	19.0	19.0	19.0
2	Program Headcount	32.0	80.0	96.0	96.0	96.0	96.0
3-a	In-state FTE	10.2	51.2	61.4	61.4	61.4	61.4
3-b	Out-of-state FTE	2.6	12.8	15.4	15.4	15.4	15.4
4	Program FTE	12.8	64.0	76.8	76.8	76.8	76.8
5	Program Graduates	0.0	32.0	64.0	64.0	64.0	64.0

3) *Working students/underrepresented groups.* As stated, the program is designed specifically to be compatible with full-time working students. The Business School will work closely with the advisory board to identify and encourage the enrollment of individuals from under represented groups.

b. Workforce Demand

Denver is a major energy hub for the United States and Canada and its role will only continue to grow. The GEM Program was conceptualized at the request of EnCana Oil & Gas (USA), Inc, whose US headquarters is in downtown Denver. The idea rapidly gained momentum as other energy companies with offices in Denver became aware of the discussions. The Canadian Consulate – Denver, the National Renewable Energy Laboratories (NREL) in Boulder, Denver Office of Economic Development, and other prominent people and organizations associated with or in the energy industry quickly became part of the planning team. By request, a GEM Advisory Board was organized to plan and assist in fundraising for this proposed program. To date, the companies and individuals on the GEM Advisory Board have contributed \$320,000 to a fund held by the CU Foundation to count as “Start-Up” funding for the program. (For a complete listing of the current GEM Advisory Board members, see Appendix B.) Support also has been verbally given by the Governor’s Energy Office and the Governor’s Office of Economic Development and International Trade. Through our partnerships with these

organizations, interested individuals, and the global energy companies on the GEM Advisory Board, the program has been developed to meet the current and future needs expressed by the energy industry. The need for graduates of this program is demonstrated by the realities facing the energy industry such as:

Close to half of the industry's management personnel (40 – 50%) are eligible for retirement in five to seven years. (Source: Oil & Gas Financial Journal, August 2007; Business Week, December 13, 2007; Denver Business Journal, April 2007; and Denver Post, June 18, 2007).

Energy companies rate recruiting problems and lack of qualified personnel for succession to upper management positions as the most critical issues facing the energy industry today. (Source: Oil & Gas Financial Journal, August 2007; Business Week, December 13, 2007; Denver Business Journal, April 2007.) The importance of this issue was verified in meetings with the Presidents, CEOs and VPs of the companies and organizations represented on the GEM Advisory Board. In addition, the proposed degree program was the subject of a meeting of the "The First Tuesday Group," an association of industry executives throughout Colorado, Utah, Montana, and Wyoming. This group also supported the need for this degree program.

Energy companies also state that a very high percentage of industry employees who are being groomed to move into leadership roles come from the engineering and scientific side of the industry and lack the business acumen necessary to fill leadership positions. (Source: Oil & Gas Financial Journal, August 2007; Business Week, December 13, 2007; Denver Business Journal, April 2007; and Denver Post, June 18, 2007 plus statements by the Presidents, CEOs and VPs of the energy companies on the GEM Advisory Board and the "First Tuesday Group.") The lack of qualified individuals in the management succession pipeline was also further verified in meetings between the GEM Director, the Business School's Associate Dean of Programs, and the President and Vice President of Colorado School of Mines.

2. Role and Mission

- a. The Global Energy Management program supports the role and mission of the University of Colorado Denver and the Business School.

The statutory mission of the Downtown Campus of the University of Colorado is, "The Denver campus of the University of Colorado shall be an urban comprehensive undergraduate and graduate research university with selective admission standards. The Denver campus shall offer baccalaureate, masters, and a limited number of doctoral degree programs, emphasizing those that serve the needs of the Denver metropolitan area. The Denver campus has statewide authority to offer graduate programs in public administration and exclusive authority in architecture and planning."

With the consolidation of the downtown Denver campus with the health sciences campus, the newly developed mission of the consolidated University of Colorado Denver is stated as: "UC Denver is a diverse teaching and learning community that creates, discovers, and applies knowledge to improve the health and well-being of Colorado and the world."

The mission as stated in the Strategic Plan of the Business School is: "In partnership with the business community we help drive economic vitality. We create and disseminate knowledge of value to academic and business communities. We empower business graduates to succeed in and positively impact a changing global economy."

- b. The Global Energy Management program is consistent with specific goals of the University of Colorado Strategic Plan.

Goal 2.1 Deliver superior educational programs on multiple campuses and academic centers across the state, nation, and around the world.

Goal 2.2 Graduate students who meet the needs of the city, state, nation, and world.

Goal 6.1 Promote partnerships and active engagement with business, industry, nonprofits, government, schools, and venture capitalists to optimize intellectual and cultural capital for societal use.

Goal 6.2 Expand partnerships in all sectors to advance the success of our students and partners.

- c. The strength of the program resides in its ability to provide a specialized education in a manner that is conducive to the current work/life environment for the targeted student. The courses are designed in collaboration with the energy industry to ensure the applicability of the courses. The program is taught in a "learning on the go" format that allows students to pursue their education "anywhere, anytime." These attributes strengthen the GEM program and will contribute to its success.
- d. The Business School faculty voted unanimously to recommend the degree, curricula, and course descriptions in a faculty meeting held on February 14, followed by a unanimous vote of the Graduate Council to approve the program, curriculum, and course descriptions on March 14, 2008.

3. Duplication

There is no duplication of the GEM MS degree program in Colorado, the US, North America, and Europe where universities offering energy management programs are located. This conclusion is based on a rigorous study and analysis of 19 universities worldwide offering programs in energy management. The population surveyed and analyzed consisted of three universities in Colorado, twelve universities in other states within the United States, two universities in Canada and two universities in Europe. The proposed degree's uniqueness lies in the hybrid format for course delivery and is explained in section B.1.a of this document. The hybrid delivery format utilizes a unique combination that begins with a classroom teaching environment in the first week of each three month term and continues with the rest of each term delivered completely on line. Within Colorado, we find no other university offering this hybrid delivery system for an energy-related program. This conclusion has also been borne out through research and analysis of the programs from other universities. (A complete listing of the universities surveyed is in Appendix C.)

The research disclosed there were many undergraduate programs in energy areas, but there was little emphasis on courses in energy management and leadership. Many of the universities surveyed offered master's level programs, but almost all these programs were offered as either tracks in an MBA program or as MS degrees either in energy economics or in engineering areas and had few if any business management or leadership components related to the energy

industry. There were no universities offering a MS degree in energy management. The GEM MS degree program is unique in this regard. It is the only program offered as a complete MS in Global Energy Management dedicated to educating the future leaders in the industry.

In addition, the GEM MS program is the only program relying substantially on on-line delivery mechanisms to reach students anywhere in the world. Its unique hybrid approach of 40 hours of in class instruction over four days in the first week of each term, with the rest of the term delivered on-line where students work in teams with their professors to study, analyze, and propose solutions to real world energy leadership issues, is a prototype for meeting the educational needs of a global workforce who travel extensively and are unable to come to the traditional night and weekend classes. The hybrid delivery system is thus uniquely suited to meet the needs of the work/travel requirements of the companies in the energy industry.

Companies on the GEM Advisory Board (mentioned in Section B1b of this proposal and also listed in Appendix B) provided employees from their Human Resources departments to assist the GEM Director in researching other universities which have high quality energy programs. Guided by the UC Denver Business School GEM Director, this group examined, analyzed and compared curricula and programs at the 19 universities. The group also provided assistance to the UC Denver GEM Director by identifying subject matter they felt was important to include in the GEM curriculum, emphasizing critical material they felt other university programs omitted. However, the actual decision regarding courses and content to include in the curriculum was determined by the Business School GEM Director with the advice and consent of the Business School faculty and both courses and academic content will remain under the control of the Business School.

The group of HR representatives found that while undergraduate programs focusing on technical energy studies did exist, none of these programs focused on building the managerial skills needed by the industry. It also found many generalized MBA programs with some type of energy track and MS programs emphasizing specific knowledge in energy-related economics, engineering, petroleum engineering, and sustainable energy development for third world countries; however, none of these programs offered the unique attributes of the GEM Program's MS curriculum or method of delivery.

The GEM Program stands out as unique among these specialized offerings because of its world-view, managerial focus, interdisciplinary approach, and accessibility. The GEM Program brings current energy industry realities into the classroom by focusing on specific regional, national and international issues and related business applications. Emphasis is placed on providing fundamental understanding about how energy firms do business in volatile marketplaces and providing strategic tools to students designed to help graduates of the program create and drive long term strategy as well as manage change within their organizations. Both core and elective courses are drawn from a carefully designed set of course offerings to provide exposure to a broad spectrum of business applications used in the energy field and also to provide exposure to alternative energy sources and their role in the future of the energy industry. Finally, GEM is unique because of its accessibility for students worldwide. The hybrid delivery model is intended to provide working professionals the opportunity to directly apply their knowledge on the job in real time.

4. Statutory Degree Requirements

GEM, with its 36 hour requirement, surpasses the 30-semester credit hour requirement established for the Master of Science programs within the Business School. The program complies with all statutory requirements.

C. Program Quality and Institutional Capacity

1. Admission, Transfer and Graduation Standards

- a. The admission requirements for GEM are aligned with the admission requirements for all graduate programs within the Business School. Applicants will complete the same application materials, submit a resume, letters of recommendation (if their undergraduate coursework is not at a 3.0 or higher), undergraduate transcripts, TOEFL scores (for international students), and a GMAT score. Our average GMAT score in the Business School is 550 (the 55th percentile). In keeping with this average, admission to the GEM Program would require a GMAT score within a range of 450 to 600 (45th – 60th percentile) or higher. If an applicant has five years of experience in the energy industry, or has an undergraduate degree in engineering/geo-sciences, petro-chemical or other similar energy oriented scientific degree areas, he/she can request a waiver of the GMAT, a policy similar to that of the University of Colorado's Executive MBA program. In addition, if an applicant has a previous graduate degree, he or she can also request a waiver of the GMAT. An admissions committee will review and rule on waiver requests.
- b. One of the signature aspects of the new MS in Global Energy Management is that it is a cohort program in which all students start the program together, progress through the program together, and graduate together. Therefore there are no provisions for transfer students. Should a student have to drop out of the program, the student could return and continue the program at the point of drop out in a future cohort group within a 12-month period, provided the student had maintained the minimum grade requirement. However, if the decision to leave the program were based on poor academic performance, the student would not be allowed back into the program unless he or she started over with a new cohort. The degree coursework, while of the same caliber and rigor as all our other MS courses, is customized to the industry and therefore not generic in nature. Therefore, courses from other programs, schools, colleges, and universities will not be acceptable as transfer credits for the GEM Program. This program is designed as a self-contained program and is expected to build life-long networks among its graduates.
- c. Class enrollment will be limited to 32 students per cohort. There will be three cohort classes running at one time, starting every six months, for a total of 96 students. The limit of 32 students per cohort class was established to ensure a good cohort experience.
- d. Students must maintain the same performance standards as other graduate business students at UC Denver to remain in the program. Students must maintain a 3.0 cumulative GPA or face probation and/or suspension. The Business School provides an advising staff to ensure the success of our students and will be available to work with GEM students. Because this is an extended studies, cash funded, degree granting program, funds will be allocated to cover these advising costs.

2. Curriculum Description and Assessment Process

a. Program Requirements:

The program consists of six three-month terms, each term consisting of two three-credit-hour courses, for a total of 36 semester credit hours. The curriculum will be delivered in a non-traditional and technologically advanced manner as noted previously. Each course will meet in the classroom for 20 hours the first week of each term. These sessions will be held in the Business School's own classroom space. The remainder of the coursework for each term is completed using advanced internet technology. The Business School currently offers many of its courses and even entire programs online, but because this is a cohort program, the week of on-campus instruction has been added to the GEM Program to build a stronger cohort environment which will support more cohesive team interaction as well as provide the experience of a classroom education. No other program in this field offers the advantages of GEM's delivery system.

b. List of Courses

The following are core curriculum and elective courses. They are all newly designed and created specifically for the GEM Program. The degree requirements include taking all eight core courses in the first year and four of the elective courses in the second year.

<u>GEM Core Courses (8 - 3 semester credit hour courses):</u>	<u>GEM Elective Courses</u> <u>(students choose 4 – 3 semester credit hour courses):</u>
21st Century Global Energy Issues and Realities	Land Management & Energy Contracts
Global Energy Economics and Geography	Organizational Behavior in the Energy Industry
Environmental, Regulatory, Legal & Political Environment	Strategic Management for the Energy Industry
Renewable and Alternative Energy: Opportunities & Challenges	Integrated Information Management for Energy Firms
Leadership and Decision Making in the Global Environment	Energy Marketing
Energy Accounting in the Global Markets	Advanced Financial Management in the Energy Industry
Financial Management and Hedging in the Global Environment	Energy Asset Management
People Management in the Global Energy Environment	Production and Supply Chain Management in the Energy Industry

c. Sample Curriculum

Below is a sample curriculum plan to illustrate the credit hours taken and the number of terms to complete the GEM degree. Course descriptions follow the sample curriculum plan.

Table 2. Sample Curriculum Plan

Year 1 (Core Courses)				SCH	
Term 1	21st Century Global Energy Issues and Realities		Global Energy Economics and Geography	6	
Term 2	Environmental, Regulatory, Legal & Political Environment		Renewable and Alternative Energy: Opportunities & Challenges	6	
Term 3	Leadership and Decision Making in the Global Environment		Energy Accounting in the Global Markets	6	
Term 4	Financial Management and Hedging in the Global Environment		People Management in the Global Energy Environment	6	
Year 2 (Elective Courses - Choose two courses per term)					
Term 5	Land Management & Energy Contracts OR	Organizational Behavior in the Energy Industry OR	Strategic Management for the Energy Industry OR	Integrated Information Management for Energy Firms	6
Term 6	Energy Marketing OR	Advanced Financial Management in the Energy Industry OR	Energy Asset Management OR	Production and Supply Chain Management in the Energy Industry	6

GEM Core Course Descriptions:

GEMM 6000 – 21st Century Global Energy Issues and Realities

This core course provides an introduction to the global energy industry—past, present, and future. History and current issues faced in regions such as the Atlantic Basin, former Soviet Union, East of Suez, North and South America will be covered. World production centers and markets are discussed as well as relevant energy security, scenario planning and risk management. Regulation, deregulation, and environmental concerns in these regions are also introduced.

GEMM 6100 – Global Energy Economics and Geography

This core course includes energy geo-economics with an introduction to managerial tools of the trade. Topics will include world energy markets--demand and supply, refining and marketing, energy forecasts, oil and gas transportation, and national oil companies vs. international oil companies. An introduction to environmental economics will also help students connect the energy industry to sustainable work practices. In addition, students will learn the geographic distribution of energy resources worldwide along with the political and governmental systems associated with those resources.

GEMM 6200 – Environmental, Regulatory, Legal, & Political Environment

This core course explores the current political situation regarding the energy industry and its environmental impact, both in the short term and long term. The course deals with environmental and energy laws and regulations from a regional to international level. Topics will include the effect of climate change, pollution, solid wastes, and the conservation of natural resources on the energy industry. Additionally, students will be introduced to operating agreements and financial arrangements on domestic and foreign lands, confidentiality, and bidding processes.

GEMM 6300 – Renewable and Alternative Energy: Opportunities & Challenges

This core course is designed to familiarize students with the newest renewable, alternative, and sustainable energy sources. This course examines the challenges and opportunities that exist for the establishment of those energy sources as viable industries.

GEMM 6400 – Leadership and Decision Making in the Global Environment

This core course provides an opportunity to examine leadership from the executive perspective in energy organizations. Topics that are covered include how successful executives lead change and innovation, how successful executives interact with their top management teams and deal with their Board of Directors and how successful leaders ensure good corporate governance policies. The course will also include strategies for enhancing executive influence while insuring ethical and responsible leadership.

GEMM 6500 – Energy Accounting in the Global Markets

This core course builds a basic understanding of how information regarding a firm's resources and obligations is conveyed to decision makers both outside and inside the firm. Emphasis is placed on analysis of the income statement, balance sheet, and statement of cash flows, which allows students to interpret historical financial accounting information. Joint interest accounting and revenue accounting, which are industry-specific processes for the energy business, will be explored. The course also includes coverage of cost-volume-profit analysis, treatment of variances from forecasts and measurements of divisional performance.

GEMM 6600 – Financial Management and Hedging in the Global Environment

This core course provides an introduction to the fundamental principles of asset valuation and financing in competitive global financial markets. These principles will provide the student with the necessary tools to analyze the financial issues they will face on a day-to-day basis in the energy industry. Students completing this course will be fully conversant with the time value of money, valuation of income streams, and risk weighted investment returns. Topics such as risk management will help students understand risk and return. In discussing arbitrage and hedging, students will learn how to hedge market risk, interest rate risk, and foreign exchange risk through the use of futures and options.

GEMM 6410 – People Management in the Global Energy Environment

This core course will focus on the company's people as their most important energy asset. The latest research in human resource theories, various human resource models and ways to develop organizational effectiveness from the firm's human capital will be covered. Concepts and techniques on developing effective international teamwork, attracting and retaining talent, and using human resource processes such as performance management and development to drive engagement will also be discussed.

GEM Elective Course Descriptions:

GEMM 6210 – Land Management and Energy Contracts

This elective course will focus on the process of managing the use and development of land resources in a sustainable way. Topics such as public controls, regulation, and an introduction to real estate will be covered to enhance the ability to understand effective land management in the energy industry.

GEMM 6430 – Organizational Behavior in the Energy Industry

This elective course is intended for students responsible for leading and managing human assets inside the energy industry. The course will expose students to fundamental principles of understanding human behavior and increase their competence in working across a wide

variety of group settings. Proper management of the organization can create a sustainable competitive advantage over competition.

GEMM 6450 – Strategic Management for the Energy Industry

This elective course will focus on how to improve an organization's competitiveness in ever-changing global energy environments. With emphasis placed on sustainable strategies, students develop skills to formulate, implement, and evaluate organizational strategies in rapidly changing environments.

GEMM 6460 – Integrated Information Management for Energy Firms

This elective course examines options available to management when dealing with technological issues such as technology strategies, selecting technology standards, managing the research and development process, and encouraging and rewarding innovation.

GEMM 6470 – Energy Marketing

This elective course will cover the challenges faced by the energy industry in developing brand image as well as developing new markets for its products. Students will learn practical marketing tools and how they can reinforce corporate strategy through marketing both products and the company to its many stakeholders while facing competitive pressures.

GEMM 6610 – Advanced Financial Management in the Energy Industry

This elective course will focus on providing managers in the energy industry with practical skills and knowledge needed to attract and preserve capital as well as communicate with capital providers. This course examines the costs and benefits of various forms of capital. Through study of internal and external models, managers will be able to assess alternative capital sources to achieve their strategic objectives. The course will also introduce effective investor communication techniques.

GEMM 6620 – Energy Asset Management

This elective course covers the management of an organization's energy resources and facilities as well as broad coverage of project management processes. Portfolio strategy, planning, scope, time, cost, quality, and organizational effectiveness will be addressed. Additionally, when budgets, lack of material, deteriorating vendor relations, or other factors disrupt a project, students will be prepared to react in a way to get positive results.

GEMM 6630 – Production and Supply Chain Management for the Energy Industry

This elective course focuses on managing the flow of information, materials, services, and money to maximize the efficiency of capital expenditure and production processes. Traditional techniques in supply chain management within the energy industry will be reviewed as well as new methods including equipment management, scheduling, control operations, inventory management, and other macro/micro-logistics.

d. **Assessment Plan**

Stated learning objectives and means of assessment of the GEM Program are:

- The ability to recognize, analyze, and propose effective and efficient solutions to leadership and management problems within energy companies and the industry. This extends to accounting, operations, marketing, and management, among others.
- The ability to propose and communicate an appropriate plan or solution.

- The ability to implement and assess the company business plan or solution.
- The ability to solve recruiting, training, and education issues within their companies
- The ability to understand, plan, and ensure their companies succeed in a globally competitive and demanding environment.
- The ability to lead their companies in an era of increasing nationalization within energy supplying nations.
- The ability to understand and successfully operate their companies in a constantly changing political environment with more government regulation.
- The ability to guide companies toward more renewable and alternative energy options as part of their product mix.

As required by the Association to Advance Collegiate Schools of Business (AACSB) accreditation, both general and management-specific goals are embedded in each of these learning objectives. The general program goals focus on the acquisition and assessment of critical thinking skills, problem solving abilities and abilities to communicate the analysis and potential solutions in both written and oral form to appropriate parties. The energy industry specific nature of each course focuses on industry specific approaches to addressing and solving management problems for that area.

Achievement of the learning objectives listed above will be measured in most classes using real-world projects developed in partnership with industry professionals. The projects will be submitted in written form for some classes (assessing both content, ability to analyze and solve, and ability to communicate in written form) and presented to a panel of energy industry professionals in others (assessing both content, ability to analyze and solve, and ability to communicate persuasively in an oral setting). The cases, whether written or oral, will be graded according to a rubric developed by the faculty member to determine whether the individuals and/or the cohort as a whole is “exceeding expectations, meeting expectations, or is not meeting expectations”. Following each term, the results will be examined by the GEM faculty to determine whether there is any necessary program or content change needed – the feedback loop.

In addition to the ongoing assessment of student learning outcomes, the program will be reviewed as part of the regular Academic Program Review process at the University of Colorado Denver.

The Business School will review courses on a continuing basis to ensure rigor of material and applicability of content. Because none of the proposed courses are currently being taught, the initial assessment was conducted externally via members of the GEM Board of Advisors and its Program Committee. In addition, an outside assessment was conducted by Joseph Doucet, Ph.D. Enbridge Energy Professor, University of Alberta, Canada. Dr. Doucet is a world renowned expert in the energy field and his review is attached, as required, to this proposal.

3. Professional Requirements or Evaluations

There are no specific regional or professional accrediting requirements that shaped the creation of this program. However, the program has been designed within the guidelines for programs of AACSB accredited business schools. The courses will be taught by academically qualified faculty with industry expertise in the energy industry as well as by professionally qualified

industry experts. All faculty members will be recruited based on these qualifications. Because this is a highly specialized program requiring demonstrated expertise in the energy industry, and because the Business School at present does not have many academically-qualified faculty with this specialized background and experience, it is anticipated that in the initial stages 95% or more of faculty members will come from outside the current UC Denver faculty. Those outside faculty members will be recruited from a pool of academically qualified faculty from AACSB accredited universities. The GEM Program Director and the Business School will provide all training and supervision of the faculty used in the program. As the program grows, attempts will be made to hire tenure track faculty that meet the requirements of the program.

4. Institutional Factors

a. Achieving Diversity Goals

The GEM Program will maintain and support the school's diversity mission statement to establish a diverse faculty, staff and student population with its hybrid delivery class structure. The hybrid class structure will create an environment that encourages diversity by allowing students and faculty from all over the globe to interact with each other via the secure website. In addition, every effort will be given in both the faculty hiring process and student recruitment to achieving the diversity goals of the university. The unique structure of the program will also allow companies, focused on maintaining and developing their world-wide management staff, to aid in the Business School's recruitment of students and staff from energy rich and ethnically diverse regions outside of the United States, further increasing diversity within the class. The world's energy demand continues to increase and supply is becoming more problematic, countries and cultures world-wide will be exploring ways to increase their business acumen in this industry. This offers the GEM Program a wide variety of cultural and ethnically diverse people who can be recruited as both faculty and students, which will provide the opportunity for both faculty and students to enhance their knowledge and understanding of various cultures, values, and histories that are critical to successful business operations. With the help of technology, the GEM Program will involve students and faculty from a growing industry, regardless of location or background, to meet, share ideas and learn, helping UC Denver continue its pursuit of academic excellence by creating one of the first truly globally diverse classrooms.

b. Impact Upon Other Programs

This program will not affect any other programs on this UC Denver campus nor will it affect any programs at any of the other University of Colorado campuses. This is due to the fact that there are no other programs in the University of Colorado system similar to the GEM Program in content or delivery system.

c. Impact Upon Campus Resources

The implementation of this program will have little effect on existing resources including the library, computer labs, etc., because the students will participate primarily through online technology from significant distances. The program will pay CU Online for the use of its resources at a rate of \$50 per student per course, as required by CU Online. Additionally, all fees paid by students to CU Online will be paid by the GEM Program on behalf of the students. Any costs incurred by the Business School or university relating to advising services, and other administrative support/services will be paid by the program to the Business School. Services provided by the UC Denver registrar, bursar, finance office, and human resources are included in a campus general administrative recharge for extended studies programs.

d. Formal Relationships and Affiliations

GEM has established relationships with professionals in the industry through its advisory board to assist the Business School and GEM Director with the development and content of the degree program. However, the Business School is the final authority on all academic decisions. The GEM Advisory Board includes some of Denver's premier energy companies, including EnCana Oil & Gas (USA), Inc., Venoco Inc., Forest Oil, Energy Corporation of America, Pioneer Natural Resources, and DCP Midstream. In addition to these companies, the Board also includes representatives from the Canadian Consulate and the National Renewable Energy Laboratory. The current members of the GEM advisory board have pledged various company resources such as employee time to assist in the development of the program. These pledges include marketing assistance, advertising advice, meeting spaces, classroom spaces, industry professional mentoring time and seed funding to aid in the smooth implementation and prolonged success of the GEM Program. GEM Board members have promised to place many of their current employees in the GEM Program. The GEM board and Director also anticipate that other public and private institutions and associations within the state who are interesting in promoting Colorado and the extended Rocky Mountain Region as the leading sustainable energy community will aid the degree program by hiring graduates from the program as well as assisting in the recruitment of students to enroll in the program. There is even the opportunity to partner with Colorado universities with programs in engineering and energy sciences to offer their graduates the opportunity to enroll in this program at the master's degree level.

5. Physical Capacity and Needs

The GEM MS is an extended studies (D2) program, which is completely self-sustaining based on tuition and industry provided funding, except for the first year in which revenue is not able to cover campus indirect services. This program will occupy current available space in the UC Denver Building and eventually at 1475 Lawrence Street, recently acquired by UC Denver. Renovation costs for the program will be included in the building renovation costs to be incurred regardless of this program. Therefore, no new or additional renovation costs will be incurred due to the approval of the proposed GEM degree program.

6. Cost Description and Source of Funds

The GEM Program cost categories are detailed below. (Additional detail is found in Appendix A. The appendix also includes a statement from the School of Business Dean verifying resources are available to support the program.) Per Regent Interim Policy 4J regarding new degree program proposals, these expenses were not inflated. However, any inflation for salaries, benefits, or operating costs will be covered by the GEM Program revenue.

- a. *Administration:* The GEM Program will have an executive director, an associate director, a technology director, and a program assistant. In the second year of operation, the program will add a technology assistant and additional administrative support from student workers. The GEM Program will also require some administrative support from the Business School for faculty hiring, instructor contracts, and academic support. GEM and the Business School identified these costs and these costs are included in the budget.
- b. *Instruction:* The GEM Program will contract for instruction on a per-course basis, offering up to \$30,000 for instruction of each core course and up to \$20,000 for each elective course. These amounts are consistent with the Business School's Executive Health Administration program. They are also necessary in order to attract the kind of highly specialized energy competence and expertise necessary for the success of this program. Because the program

expects some additional team-taught instruction, the GEM Program budget includes additional remuneration for contract instructors. By year three, the GEM Program will invest in a tenure-track professor, adding a second faculty member in year four. Once the faculty member is hired in year four, there will be 32 course sections offered, eight taught by faculty and 24 by contract instructors.

- c. *Operating Costs.* This includes marketing, outreach, recruitment, fundraising, advisory board support for the GEM Program. Operating costs also include administrative and faculty travel. This also includes online course fees GEM will pay on behalf of students. After some one-time expenses for faculty recruitment, total ongoing annual operating costs are estimated at approximately \$700,000.
- d. *Revenue.* Students are expected to take two three-credit courses per term at \$9,000 per term, which covers all tuition and fees assessed by the university and any unit of the university. The tuition of the program is \$54,000 for the entire degree, with no distinction between in or out-of- state tuition. The cash flow projection over the 18-month degree program is \$9,000 per quarter per student, or \$36,000 for the first year per student and \$18,000 for the second year of the program per student. The program projects an entering cohort in January 2009 of 32 students; tuition cash flow projections for the first fiscal year total \$576,000. In the second fiscal year, tuition is estimated at \$2.88 million because two more cohorts will begin the program. In the third fiscal year and each year thereafter, the program estimates \$3.456 million in tuition as the program stabilizes at three cohorts per year at any one time.

7. Reviewers Comments

The GEM Program asked Joseph Doucet, Ph.D., Enbridge Professor of Energy, University of Alberta, Edmonton, Alberta, Canada, to serve as an external evaluator to review the program. (The review letter is attached as Appendix B.) Professor Doucet believes the MS Degree in Global Energy Management "is a well structured program that meets a significant need for highly skilled professionals." He further states that he believes a market exists for this program and that the tuition is in line with what MBA and other Master's degree programs command. He also was strongly in agreement with the statement that the program would help to fill the recruiting needs of the energy industry globally as it faces an impending loss of 40% - 50% of its management teams to retirement in the coming years.

The UC Denver Graduate Council considered the degree program and voted unanimously to approve the degree, "... with great enthusiasm" on April 11, 2008. Appendix C contains the letter from the Graduate Council, chaired by Robert Damrauer, Interim Graduate School Dean, UC Denver and Chair of the Graduate Council.

Sueann Ambron, Ph.D., Dean of the Business School also wrote a very supportive letter about the program. (Dean Ambron's letter is attached as Appendix D.)