

The University of Texas at Austin, Bureau of Economic Geology's Center for Energy Economics (CEE)
Qualifications¹

Country/Region	Projects
WORLDWIDE PROJECTS	
Worldwide	<p>Global Gas Demand (2014-ongoing)</p> <p>This research involves an in-depth sectoral look into natural gas markets around the world that are expected to grow significantly. It is modeled after CEE's ongoing analysis of gas consumption in various sectors in the U.S. and benefits from past CEE work on commercial frameworks for development of natural gas value chains. Following the recommendations of an advisory board, China was selected as the first country. The preliminary results were presented at the World Gas Conference in Paris in June 2015. The work on Indian natural gas markets has started while we finalize the first stage analysis of the Chinese natural gas markets.</p>
Worldwide	<p>Communicating Shale and Natural Gas Market Developments in North America (Ongoing).</p> <p>Invited talks and consultations in the Netherlands, Turkey, Chile, Mexico, the UK, Abu Dhabi and across the US in addition to conference presentations in Australia, Colombia, the Netherlands, Mexico, Trinidad & Tobago, Turkey and various locations in the U.S. CEE hosted group of managers from ONGC (India) including a Barnett well site visit; this program was organized in collaboration with the University of Alberta School of Business and the Indian Institute of Management Bangalore. CEE also hosted a group of managers from Surgutneftegaz from Russia in collaboration with the Russian Petroleum Institute. See http://www.beg.utexas.edu/energyecon/ for presentations and news.</p>
Worldwide	<p>Defining, Measuring, and Predicting Green Jobs (2011), Copenhagen Consensus Center</p> <p>This research implemented for the Copenhagen Consensus Center assessed the "state of the science" in defining, measuring, and predicting the creation of green jobs. CEE's work was funded by a gift from CCC. Previous work in this arena was funded by gifts from other organizations, including American Petroleum Institute. See http://www.copenhagenconsensus.com/Default.aspx?ID=1542#7056.</p>
Worldwide	<p>UT McCombs School of Business/ExxonMobil Upstream Commercial Overview Course (2011-ongoing)</p> <p>UT McCombs -Texas Executive Education and CEE are collaborating with ExxonMobil to build and deliver a worldwide upstream commercial overview gateway course. The focus of the program is enhanced awareness of commercial issues, strategies and options for professionals in ExxonMobil's worldwide upstream businesses. An oil and gas simulation is used and sessions have been held in Houston; Calgary; London (Leatherhead); Hannover; Kuala Lumpur; Stavanger.</p>
Worldwide	<p>LNG Supply Contracts and Trade Patterns: An Analysis of Negotiation and Investment Strategies in the World LNG Market (2009-2010)</p> <p>A comprehensive review of LNG industry evolution during the past 10-15 years and emerging commercial trends. Key themes encompass regional diversification of markets and price signals and implications for operations</p>

¹ Milestones achieved prior to 2005 were undertaken at the University of Houston where the CEE was previously based.

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	<p>(destination flexibility) and transactions (price formulas). This research was conducted in part with a gift from the Association of International Petroleum Negotiators (AIPN). The overview paper is posted on www.AIPN.org (member access only; contact AIPN or CEE).</p>
Worldwide	<p><i>Study on NOCs and Value Creation: Baseline Directory and Categorization of National Oil Companies (Phase I 2008) and Calculation of Value Creation Index and Selected Case Studies (Phase II, 2010), World Bank</i></p> <p>In 2008, CEE developed Baseline Directory and Categorization of 49 National Oil Companies in 47 different countries in collaboration with the Oil, Gas, Mining and Chemicals Division of World Bank. The Bank adapted previous work by CEE (see following section) to develop commercial frameworks indicators and metrics to evaluate value creation by NOCs. The database includes operating and financial performance data as well as information on NOC governance, country hydrocarbon sector organization and governance and other variables. The objective of the Study was to improve the awareness of the relative effectiveness and suitability of alternative policies for the management and oversight of the petroleum sector, with particular reference to role and functioning of NOCs. The final report, <i>Citizen's guide to national oil companies, Parts A & B</i>, Technical Report and Data Directory, was published as a two-volume research product. http://www.beg.utexas.edu/energyecon/nocs/ and www.worldbank.org/noc.</p> <p>➤</p>
Worldwide	<p><i>Research on National Oil Companies (1997-ongoing)</i></p> <p>Since the early 1990s CEE researchers have analyzed NOC performance challenges and hydrocarbon sector governance, and NOC professionals have participated in open enrollment and custom education programs operated by CEE (see next entry). In 2007 as part of a long term research effort on NOCs, CEE released a working paper on <i>Commercial Frameworks for National Oil Companies</i>. Using public information, CEE researchers were able to demonstrate NOC commercial performance relative to stated goals and measure non-commercial performance against explicit and implicit targets for social and economic development. The CEE team also analyzed key factors embedded in the commercial frameworks for NOCs—public sector governance, corporate governance, fiscal regimes, commercialization, and hydrocarbon regulation. Findings indicated the importance of how governance structures for NOCs are established; the difference in commercial performance relative to flexibility in tax and capital budget regimes for the NOCs themselves; and, crucially, the importance of upstream competition as a positive contributing factor to NOC and country hydrocarbon sector performance and fiscal contributions. The CEE authors also raised questions with respect to appropriate metrics for analysis of NOC performance. CEE's work on NOCs was linked to our <i>New Era in Oil, Gas & Power Value Creation capacity building program</i> and our international energy sector development assistance projects.</p> <p>CEE collaborated with the World Bank to expand our NOC research. We benchmark NOCs and hydrocarbon sector governance on an ongoing basis utilizing CEE's NOC knowledge base. CEE also has engaged in proprietary research for NOCs and governments to benchmark performance and assist with strategic development (see separate entries). Our NOC research effort is funded through gifts and is used in other grants and contracts. Working papers are posted on http://www.beg.utexas.edu/energyecon/thinkcorner/.</p>

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Worldwide	<p><i>New Era in Oil, Gas & Power Value Creation; Capacity-Building & Case Studies (2001-2011)</i></p> <p>For ten years the CEE held an annual innovative energy education program on commercial frameworks for energy value chain investment, <i>New Era in Oil, Gas & Power Value Creation</i>. New Era was based on years of research and hands-on technical assistance in numerous countries' energy sectors and bridged the gap between institutional capacity of emerging resource countries and investment requirements. The program was designed to assist national and private energy companies, ministries, regulators and other stakeholders understand global energy trends and commercial fundamentals so that they can develop strategy to be successful in this dynamic and complex industry, essential for a healthy economy. Portions of New Era content have been and continue to be used in other CEE instructional programs and projects. CEE's World Oil awards for best outreach in 2006 and 2007 were based in part on New Era accomplishments.</p> <p>Hundreds of energy professionals from more than 40 countries benefited from the New Era program through both the Houston and in-country sessions. Customized versions of the program were held, often in partnership with local entities, in Bangladesh, Ghana, India, Mexico, Nigeria, Turkey and the U.S. New Era was supported by open enrollment registrations, but also has benefited from corporate- and USAID-sponsored scholarships. New Era case studies and the course workbook, <i>Economics of the Energy Industries</i>, are available from http://www.beg.utexas.edu/energyecon/publications.php#case_studies.</p>
Worldwide	<p><i>Energy Cooperation in the Western Hemisphere (2006) – Center for Strategic and International Studies (CSIS)</i></p> <p>CEE conducted research and contributed the chapter on "Hydrocarbon Regulation and Cross-border Trade in the Western Hemisphere," in <i>Energy Cooperation and Confrontation in the Western Hemisphere</i>. The authors noted that, "Overall, our analysis demonstrates the importance of private investment, market determination, and appropriate regulatory oversight for Western Hemisphere hydrocarbons production and trade. A critical conclusion is that private participation can overcome institutional and governance constraints. More productive, efficient hydrocarbon regimes lead to improved regional trade. Gains from trade in turn create increased incentives for private investment. The critical challenge to be drawn from our research is how best to attain public acceptance and support for these principles... Much of our discussion in this chapter centers on the particular attributes and performance of sovereign, national oil companies, or NOCs. NOCs today exist in both domestic and international environments. Many forces within those environments can overwhelm a NOCs own management structure, decision-making processes, and performance outcomes. These forces may be mutually exclusive or interact strongly, often creating conflicts for the NOC, its government, and society." A separate appendix with case study details is available from CEE's web site, www.beg.utexas.edu/energyecon. CEE's hydrocarbon regulator database is incorporated into our overall NOC knowledge platform.</p>
Worldwide	<p><i>Commercial Frameworks for Gas-Power Value Chain Development (2001), Texaco</i></p> <p>In this project sponsored by Texaco Natural Gas International, the CEE focused on natural gas commercialization with emphasis on facilitating legal/regulatory frameworks; emphasized midstream/downstream, in particular gas commercialization via power generation and LNG (receiving markets). As part of the project, CEE surveyed several</p>

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	<p>gas and electricity restructuring models in order to identify those that facilitate gas-fired power developments the best. Then, based on the above survey, CEE generalized minimum requirements for commercial frameworks that lead to integrated gas/power project investments and allow optimal value creation from gas resource assets. A decision model was built to support complex investment decision making given regulatory and policy risk. Applicability of these minimum requirements was tested for a sample of countries such as Brazil, Nigeria, Venezuela and Mexico. CEE also participated in expert discussions and scenario analysis for the project sponsors on Mexico energy sector restructuring and related issues and trends. Post-merger with Chevron, the work sponsored by Texaco has been used by both the project sponsor and CEE for ongoing work worldwide.</p>
Worldwide	<p><i>Worldwide Oil & Gas Resource Assessment (2001), Shell</i></p> <p>The CEE collaborated with Shell's internal team to update global resource assessments for both natural gas and crude as part of RD Shell's long-term planning and scenario building process. It included an extensive review of reserves and resource estimates such as reconciliation of public and private data sources, approaches, geological and geophysical indicators, reservoir and development considerations, major trends and project developments, policies, political risks.</p>
Worldwide	<p><i>Best Practices in Energy Sector Reform - UH Shell Interdisciplinary Scholars Program (SISP) (1998-1999)</i></p> <p>The CEE conducted evaluation of fiscal regimes and investment facilitating legal/regulatory frameworks; initial focus on upstream, with conceptual development for midstream/downstream. Three pairs of countries were studied for comparative analysis: Mexico/Venezuela, Russia/Kazakhstan, U.S./Canada (base case). A key conclusion was that a significant relationship exists between size and prospectivity of resource endowment and favorability of upstream terms and conditions. The research team also derived concepts that could explain government motivations for how hydrocarbon sectors are organized and controlled. Results from the study were presented at an informal workshop on Former Soviet Union transitions held at St. Antony's College, Oxford University. Results and approaches developed for Best Practices formed the core intellectual property for all subsequent CEE research in hydrocarbon sector organization, governance and regimes and national oil companies.</p>

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West Africa	<p><i>Smart Development Initiative for Energy Sector Governance (2005-2011), US Agency for International Development</i></p> <p>Starting in 2005, CEE held a multi-year cooperative agreement with USAID, a “smart development” initiative to improve energy sector governance in a variety of geographic locations. From 2005-2009, West Africa was the principle region of interest. The work centered on regional natural gas utilization following operation of the West Africa Gas Pipeline (WAGP). CEE conducted capacity building based on the <i>New Era in Oil, Gas & Power Value Creation</i> training deck and provided technical assistance to assist with development of workable natural gas markets at the regional level and internal to the respective countries.</p> <p>Key accomplishments included four regional natural gas workshops (in Nigeria and Ghana, with participation from Togo, Benin and Cote D’Ivoire), training in the U.S., long-term exchange visits and joint publications, such as <i>The Guide to Natural Gas in Ghana (2006)</i>. http://www.beg.utexas.edu/energyecon/IDA/Smart_Development/</p> <p>In 2009-10, CEE conducted the oil and gas industry needs assessment study for Ghana. The discovery of the Jubilee field in 2007, which started production in late 2010, brought Ghana into the league of oil exporting countries. Without a history of major oil production, the country needs to develop institutional and human capacity to develop its oil and gas resources efficiently and safely.</p>
Ghana	<p><i>Energy Sector Governance Program (2003-2005), USAID</i></p> <p>In 2003, the CEE received a USAID grant to create a pilot <i>Energy Sector Governance Program</i>. The grant and pilot program were aimed at improving institutional capability for energy sector governance in emerging markets using a local education partner (LEP) model and networks to achieve multiplier effects. Ghana was selected as the recipient country. CEE helped to establish the Resource Center for Energy Economics and Regulation (RCEER) at the Institute of Statistical, Social and Economic Research (ISSER), University of Ghana-Legon in August 2004. RCEER was designed with an advisory board and steering committee drawn from the key Ghanaian energy sector bodies led by a faculty coordinator. CEE provided RCEER with tailored training materials, focused on energy value chain economics and supporting commercial frameworks; tools; and ongoing mentoring necessary to address public education and participation as well as transparency needs for more effective energy sector governance. CEE work in Ghana not only shows CEE’s experience in international capacity building but also offers a model for developing sustainable local expert resources who can continue to design, develop and run their own training programs with input and for the benefit of stakeholders in the local energy industry (including companies, government agencies, and the public). In addition, Ghana is part of the West Africa Power Pool (WAPP); the RCEER, with CEE guidance, produced a <i>Guide to Electric Power in Ghana (2005)</i>, which naturally requires an understanding of electricity market design and regulation as well as economic principles of electricity contracts and trade, and a <i>Guide to Natural Gas in Ghana</i>. This grant was successfully completed in March 2005. Following our work and evaluation, CEE won a five-year expansion.</p> <p>See “<i>Smart Development Initiative for Energy Sector Governance</i>” for more details: http://www.beg.utexas.edu/energyecon/IDA/Smart_Development/</p>
Nigeria	<p><i>Partnership with the University of Ibadan and Nigerian Association for Energy Economics (2008-</i></p>

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	<p><i>ongoing), MacArthur Foundation (2010-ongoing)</i></p> <p>CEE assisted the University of Ibadan in establishing the IAEE chapter in Nigeria (NAEE). The chapter is expanding and appears to be quite proactive. NAEE held its first annual NAEE/IAEE conference titled “Developing and Supporting Critical Energy Infrastructure for Vision 2020: Challenges, Constraints and Prospects” in Abuja, Nigeria on April 29-30, 2008. CEE staff members are active in USAEE and IAEE and served as executive officers. CEE helped the Nigerian Chapter with preparations for 2nd and 3rd conferences and held a regional event around the conference to maximize the benefit to regional delegates of coming to Abuja. The 4th NAEE conference is scheduled for April 25-26, 2011.</p> <p>In 2010, the University of Ibadan won a grant from the MacArthur Foundation to establish a Center for Petroleum, Energy Economics and Law (CPEEL); CEE is the primary international partner and helped to develop energy economics curriculum and research. Since 2013, CEE instructors have lectured via WebEx on natural gas and electric power economics to students registered in the first class of CPEEL’s graduate program. CEE is also assisting CPEEL to write a comprehensive book on the Nigerian energy sector, a first of its kind book with multiple authors from industry and academia authoring chapters on oil, gas, and power sectors.</p>
Uganda	CEE developed an Oil Value Chain course held in Uganda in summer of 2011 as a model for other emerging oil and gas producing countries.
Angola	<p><i>Partnership with the Catholic University of Angola, UCAN, Angola Educational Assistance Fund (2006)</i></p> <p>Jointly with the Angola Educational Assistance Fund (AEAF) housed in Citizens Energy, CEE has worked to build capacity of the Center for Investigative and Scientific Studies (CEIC) at UCAN. Partnership activities included training, Angola energy publications (following our model in Ghana and West Africa; see above), energy curriculum development, and public outreach activities. Key accomplishments include the first issue of an annual energy report and the first-of-its-kind international energy conference in Luanda.</p>
Nigeria	<p><i>Partnership with the Nigerian National Petroleum Corporation, NNPC (2006-2009)</i></p> <p>CEE cooperated with the NNPC in support of the USAID Smart Development Initiative grant to CEE. Partnership activities include support of participants’ attendance to events and a regional natural gas workshop for decision makers and customers, with NNPC, RCEER and other organizations, in Nigeria. NNPC supports CEE energy education by sending delegates to New Era programs and helping to support past training sessions in Nigeria.</p>
Africa	<p><i>Africa Initiative (2002-2003)</i></p> <p>The CEE developed an Africa Initiative designed to focus on energy value chain economics, policy and regulatory frameworks, a precursor to our USAID awards. The initiative linked CEE’s research education consortium on <i>Commercial Frameworks for LNG in North America</i>, with upstream initiatives in exporting countries and the <i>New Era</i> capacity building program. Key products included:</p> <ul style="list-style-type: none"> ➤ Roundtable on Africa energy and socioeconomic development issues in March, 2003 (Houston). ➤ Development of concept papers on “smart development pathways” to manage and mitigated socioeconomic impacts and economic development benefits of energy investment in the African region, in particular for oil and gas. ➤ Development of content on smart development for inclusion in the <i>New Era</i> program.

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Bangladesh	<p><i>“Partnership to Strengthen Local Capacity for Economic, Financial and Social Analysis of Energy Sector Initiatives” in Bangladesh (2003-2005), USAID/ALO</i></p> <p>In 2003, the CEE was awarded a grant by USAID/Association Liaison Office (American Association of State Colleges and Universities) to assist with <i>New Era</i>-based expansion of energy economics and policy training and analysis at the Department of Petroleum and Mineral Resources Engineering (PMRE) at the Bangladesh University of Engineering and Technology (BUET) in Dhaka. CEE worked to enhance energy economics education and research capabilities at (BUET/PMRE) through training sessions in Houston and Bangladesh, exchange visits between CEE and university faculty and BUET/PMRE faculty, and continuous mentoring. The partnership offered several training sessions to energy industry professionals and journalists. CEE personnel also interacted with energy sector government and business professionals in Bangladesh to assist BUET/PMRE with planning and development. CEE and BUET/PMRE personnel collaborated in publications, including peer review articles, and BUET/PMRE personnel were appointed to government positions that enabled deployment of partnership accomplishments in direct ways. Grant was successfully completed in September 2005. http://www.beg.utexas.edu/energyecon/IDA/ALO/</p>
China	<p><i>CNOOC Leadership Executive Education Program (2015)</i></p> <p>Lecture on global oil markets to 15 managers from CNOOC.</p>
China	<p><i>Sinopec Leadership Executive Education Program (2011, 2012, 2013)</i></p> <p>CEE is collaborating with UT McCombs to develop and deliver lectures on global and regional strategic challenges for energy; global industry organization; scenario building; and economic evaluation for Sinopec Leadership Executive Education Program.</p>
China	<p><i>U.S.-China Oil and Gas Industry Forum, U.S. Department of Energy (2002-ongoing)</i></p> <ul style="list-style-type: none"> ➤ In 2002, CEE hosted the Fourth U.S.-China Oil and Gas Industry Forum, 2002, on behalf of the U.S. Department of Energy and U.S. Department of Commerce (held at University of Houston). ➤ In 2004, CEE assisted U.S. Department of Energy and U.S. Department of Commerce with the organization of the Fifth U.S.-China Oil and Gas Industry Forum held in Pudong, Shanghai. The U.S.-China Oil & Gas Industry Forum is a public-private partnership involving government and industry representatives from the United States and China. ➤ CEE personnel have participated as speakers, resource personnel/experts and delegates at several OGIF events including the U.S. sessions in Ft. Worth, 2010, and San Antonio 2012. <p>The U.S.-China Oil and Gas Industry Forum enables China and the U.S. to meet common oil and gas industry goals, including assisting China in its efforts to secure reliable and economical sources of oil and natural gas while facilitating investment by U.S. industry.</p> <p><i>Training programs and visiting scholars</i></p>

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	<p>Over the years, CEE has hosted several training programs and visiting scholars in our capacity building effort for Chinese industry and government professionals. A major study was released, <i>Asia Oil and Gas Megatrends, Balance and Geopolitics: A Closer Look at China</i> (1997), the first comprehensive look at China's transition to net importer of oil and associated geopolitical implications. CEE personnel participated in the opening and restructuring of the National Development and Reform Commission (NDRC) in Beijing in 2003. CEE research on China energy has been supported by discretionary gifts.</p>
China-Hong Kong	<p><i>China Power & Light LNG Public Education Forums (2004-2005)</i></p> <p>CEE provided expert assistance for a series of public forums and other initiatives aimed at improving public education on LNG for Hong Kong. CEE LNG knowledge base materials were adapted and translated for use.</p>
Japan	<p><i>Sponsored Research Papers on Topics of Strategic Interest to Japan:</i></p> <p><i>Impact of North American Shale Gas on Global Gas Markets (2011)</i></p> <p>Extensive review and assessment of emerging shale gas basins and plays in the U.S. and associated technology, commercial and environment challenges. The report concentrates on North American shale gas resources and production potential subject to cost and regulatory uncertainties, and the impact of North American shale gas production on the gas markets around the world. Supported by Japan External Trade Organization-Houston (JETRO-Houston).</p> <p><i>The Evolving Relationship Between International and National Oil Companies (2009)</i></p> <p>Data analysis and summary findings from CEE's national oil company research with implications for global oil and gas industry organization, structure, trends and implications for Japanese partnerships and joint ventures. Supported by JETRO-Houston.</p> <p><i>Outlook for Unconventional Hydrocarbon Resources: A Survey of North American and Global Context (2008)</i></p> <p>Review and status of key unconventional resource plays and technologies, investment and future outlooks. Supported by JETRO-Houston.</p> <p><i>Russian Natural Gas – A Review (2007)</i></p> <p>Complement to the 2005 report on oil production and exports. Supported by JETRO-Houston.</p> <p><i>FSU Oil Production and Export Projections to 2010 (2005)</i></p> <p>Comprehensive review and analysis of major oil fields and locations in the Former Soviet Union, pipeline export routes, oil sector geopolitics and related issues and impacts of various price assumptions. Supported by JETRO-Houston</p> <p><i>Study on LNG in Japan: Implications for the United States (2004)</i></p> <p>In 2004, CEE researchers prepared a comprehensive review of LNG industry evolution, operations and safety and security protocols as a case study for U.S. LNG developments. The study incorporated extensive analysis of the Japan and U.S. LNG industries to review similarities and differences, and derive implications for the nascent U.S. LNG</p>

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	<p>industry expansion. The study effort included interviews and site visits in Japan. Supported by JETRO-Houston.</p> <p><i>Study on the Impact of Increasing LNG Facilities in North America on the Asian LNG Market (2002), JETRO-Houston</i></p> <p>In 2002, the CEE conducted a study for Japan External Trade Organization (JETRO)-Houston to assess the impact of increasing LNG facilities in North America on the Asian LNG market. The CEE analyzed:</p> <ul style="list-style-type: none"> ➤ Global projected demand for LNG in the long term, medium term and near term. ➤ Capacity, timing and destination of future LNG projects in North America. ➤ Anticipated increase demand for LNG in the US and the effect of economic slowdown on LNG demand. ➤ Effect of growing North America LNG markets and opportunities for imports from Asia. ➤ LNG pricing mechanisms. ➤ Long term and short term contracting . <p>The potential for LNG spot trade for Asia market.</p> <p><i>Development and Regulation of Natural Gas Pipelines in the U.S. (2001), Sanwa Research Institute Corporation</i></p> <p>A comprehensive review of U.S. natural gas pipeline and market development as a case study for Japan. Included extensive assessment of Federal and State regulation, key project case studies, supply and demand growth and development.</p>
South Asia	<p><i>South Asia Regional Initiative for Energy program, SARI-E (2008), USAID/TetraTech</i></p> <p>CEE worked with TetraTech (previously known as PA Consulting) group on a USAID-funded energy program for South Asia region. The program is focused on cross border energy trade, energy market formation, and regional clean energy development.</p> <p>CEE was involved in the following aspects:</p> <ul style="list-style-type: none"> ➤ Training programs. The first regional training event, the “Global Energy Markets Program,” was held in February 2008 in New Delhi, India and covered key issues the global energy sector as they relate to South Asian economies. The next training program on global coal industry trends as part of the Regional Clean Coal Partnership (RCCP) was held in September 2008 in Kolkata, India. ➤ Creation of the Energy Security Quarterly (ESQ). The report is a concise description of key energy security and sector performance indicators and figures. The report focused on eight SARI-E countries: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. Sectors of interest included power, oil and gas and regulatory trends and available benchmarks. Two issues of ESQ were produced by CEE to help launch the publication. http://www.sari-energy.org/PageFiles/What_We_Do/EnergySecurityUpdates.asp

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NORTH AMERICA	
North America	<p><i>Commercial Frameworks for LNG in North America (2003-ongoing)</i></p> <p>The CEE has established a multi-year research and public education consortium specifically to address the role of LNG in North American energy security. The CEE research and public education effort on LNG is supported by a number of public and private organizations. The U.S. Department of Energy - Office of Fossil Energy provides a federal interface to the federal and state agencies that play lead roles in ensuring public safety and security associated with LNG facilities. The CEE's LNG research consortium also is a part of our overall research and public education efforts on natural gas and the role of natural gas in the U.S. and world energy mix, as well as our ongoing, overall research and education on the energy value chains (in particular for crude oil, natural gas and electric power), energy markets and energy policy and commercial frameworks.</p> <p>The CEE has already produced several papers, which form a <i>Guide to LNG in North America</i>, including <i>LNG Backgrounder</i>, <i>Introduction to LNG</i> (in English and Spanish), <i>LNG Safety and Security</i> (in English and Spanish), <i>The Role of LNG in North American Natural Gas Supply and Demand</i>, <i>Interstate Natural Gas: Quality Specifications and Interchangeability</i>, <i>Offshore LNG Receiving Terminals</i>, and has completed special projects: <i>Defining Community and Economic Benefits Associated with Large Energy Infrastructure Projects: LNG Case Study</i>. http://www.beg.utexas.edu/energyecon/lng/. CEE researchers are completing a research paper on LNG for truck and marine transportation.</p> <p>CEE tracks global LNG market developments (see worldwide research above). Postings on current topics and work in progress are available at http://www.beg.utexas.edu/energyecon/thinkcorner/.</p>
North America	<p><i>North American Energy Integration: The Prospects for Regulatory Coordination and Seamless Transactions of Natural Gas and Electricity - UH Shell Interdisciplinary Scholars Program, SISP (1996-1998)</i></p> <p>CEE conducted extensive review of gas/power value chain development, cross-border trade and regulatory practices and issues with scenarios for the NAFTA members.</p>
United States	<p><i>McCombs Executive MBA Program (2007-ongoing)</i></p> <p>CEE personnel serve as executive instructors in the McCombs Executive MBA (Houston) energy certificate program (Economics and Technology of the Crude Oil, Natural Gas & LNG Value Chains).</p>
United States	<p><i>U.S. Natural Gas Scenarios and Prices to 2015 (2007) and Henry Hub at \$3 or \$10 in 2020 (2011)</i></p> <p>Significant overview of U.S. natural gas market dynamics and <u>one of the few major public domain research products to indicate possible price deterioration</u>. The main hypothesis and analysis focused on a \$3-5/MMBtu price range and related drivers and implications. The follow on paper, NG 58, focused on unconventional plays and dynamics in the U.S. and pointed to higher volatility and prices for forward planning. Both published through Oxford Institute for Energy Studies-Natural Gas Program as part of the OIES-NGP/BEG-CEE MOU. Supported by gifts from various donors.</p>

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	<p><i>Ongoing Market Monitoring (1991-present)</i></p> <p>CEE conducts and releases regular snapshots and analyses on oil/liquids, gas and power value chain dynamics including supply-demand balances, logistics, outlooks, prices and sectoral highlights. Output is posted on CEE's Think Corner web site, www.beg.utexas.edu/energyecon/thinkcorner. CEE research personnel also engage in commentary, provide external presentations, and release results in external publications.</p> <p>➤ See "Forward Curves in Energy" (August 2013) and "Sharp Cycles Ahead" (September 2013) in <i>Oil & Gas Investor</i>, for most recent example (downloadable with permission from http://www.beg.utexas.edu/energyecon/)</p>
United States	<p><i>Northeast U.S. Natural Gas Market Study (2006)</i></p> <p>CEE conducted research and completed a review on northeastern U.S. natural gas market dynamics and the role of LNG. Support for the research was provided through various gifts.</p>
United States	<p><i>Economics of the Alaska Natural Gas Pipeline (2007), ConocoPhillips</i></p> <p>CEE conducted research and provided expert input associated with State of Alaska review of Alaska gas pipeline contracts and related fiscal issues. Research included natural gas market dynamics and price trends, royalty-in-kind programs and related considerations (Federal and State case studies) and completed a report on estimation techniques for large scale pipeline projects, with application to Alaska natural gas transportation. The report was featured in an <i>Oil & Gas Journal</i> article, "Historical data provide low cost estimating tool" in 2007.</p>
United States	<p><i>FutureGen Proposal (2006-2007), State of Texas</i></p> <p>The Bureau of Economic Geology led the team that worked on developing the Texas response to U.S. DOE's \$1 billion competition for building the power plant of the future, a research facility proposed to be the world's first fossil-fuel burning facility that would produce electricity and hydrogen while sequestering carbon dioxide. Within the BEG, the CEE team provided background information on the Texas electricity market, with particular emphasis on transmission grid development, generation interconnection procedures, congestion points on the grid, congestion management approaches, and load growth, and conducted a survey of potential offtakers and associated terms for FGT production. Texas proposed sites were selected as finalists. The winning site was located in Illinois. The FutureGen effort was reorganized given escalation in costs (to roughly \$2 billion).</p>
United States	<p><i>National Petroleum Council Studies (funding for CEE participation provided through discretionary accounts)</i></p> <p><i>Prudent Development of North American Natural Gas and Oil Resources (2011)</i></p> <p>CEE supported the industrial subgroup of the Demand committee for a major review of deployment of domestic/continental resources to meet low carbon emissions targets.</p> <p><i>Hard Truths (2007)</i></p> <p>CEE supported the Supply Task Group and the Technology Task Groups. The study reviewed and analyzed current forecasts for energy demand and energy supply to 2030 under different scenarios and provided a series of recommendations to the U.S. Secretary of Energy on what actions can be taken to moderate energy demand growth,</p>

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	<p>increase energy supply, and provide energy security while meeting the environmental goals that are sought.</p> <p><i>Balancing Natural Gas Policy – Fueling the Demands of a Growing Economy (2003)</i></p> <p>CEE provided peer review of the LNG chapter, hosted a meeting of study group leaders for presentation and exchange of findings with U.S. DOE representatives and participated in the final closing dinner and release of the 2003 study.</p>
United States	<p><i>Collaboration with the American Petroleum Institute (2006)</i></p> <p>CEE provided support to API in its research on "Oil and Gas Industry Investments in Alternative Energy, Frontier Hydrocarbons and Advanced End-Use Technologies." CEE also provided independent technical reviews of technical reports on energy usage in the U.S., investment in new energy sources and in GHG reducing efforts (led by T² and Associates). See http://www.api.org/ehs/climate/new/upload/T2_Investments_in_GHG_Mitigating_Tech_6_2009.PDF. Results from the CEE research are used in API's background materials on energy topics. See http://www.api.org/aboutoilgas/upload/Energizing_America_Facts.pdf.</p>
United States	<p><i>The Critical Role of Natural Gas in the U.S. Energy Mix (2010-ongoing)</i></p> <p>CEE launched a series of research papers to complement our widely accessed and used LNG knowledge base on domestic natural gas resources and utilization, with particular emphasis on natural gas industry dynamics resulting from large shale gas resources. Research paper releases address the overview of shale gas plays, utilization and demand-side applications of natural gas in the U.S., and commercial frameworks including environmental protection and regulation. CEE is participating in a comprehensive book on international gas markets and pricing being undertaken by Oxford Institute for Energy Studies-Natural Gas Programme with associated working papers and an update to CEE's NG 18 and 58 research papers (see above). Associated forums and workshops include:</p> <ul style="list-style-type: none"> ➤ Joint seminar with OIES-NGP, May 18, 2011 (Oxford) ➤ CEE's annual meeting and natural gas forum (December each year; Houston) <p>A separate grant awarded to BEG from the Sloan Foundation will support analysis of well-by-well data for the major plays, Barnett, Haynesville and Fayetteville among others. The grant builds on BEG geoscience research on underground characteristics of shale plays. CEE is involved in economic modeling of shale investment decisions and their long-term implications for the energy mix in the U.S.</p> <p><i>Natural Gas Demand (2011 – Ongoing)</i>. Evaluation of key market segments:</p> <p>Power generation is the largest consumer of natural gas with largest potential for growth but there are many uncertainties including the price and deliverability of natural gas at different regions, environmental regulations that might lead to closing of up to 50-60 GW of coal-fired capacity by 2020, retirement of nuclear plants, increasing capacity of renewables among others. CEE analyzes these uncertainties and models their impact using AURORAxmp, a commercial software for economic dispatch.</p> <p>Industrial sector, led by the petrochemicals facilities, has been increasing its demand for natural gas fueled by its low cost since 2009. CEE has developed a projects database to keep track of the evolution of various facilities in order to</p>

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	<p>estimate call on natural gas from this sector.</p> <p>Exports via LNG or pipelines. CEE has developed a database of LNG projects to keep track of their status (DOE and FERC approvals, FEED, FID, construction) in addition to evaluating the cost of US LNG deliveries to Atlantic and Pacific Basin markets. CEE is also tracking the natural gas market in and pipeline capacity expansion to Mexico.</p> <p>Transportation sector has the potential consume significant amounts of natural gas but the cost and distribution infrastructure challenges are curtailing demand. CEE evaluates the technologies and economics of switching from diesel to LNG or CNG to assess the potential market for natural gas in the transportation sector.</p>
United States	<p><i>Shale Resource Assessment (2011 – Ongoing)</i>. An interdisciplinary team of geoscientists, engineers and economists led by the BEG evaluating the resource potential of major shale gas and oil plays in the U.S. (Barnett, Fayetteville, Haynesville, Marcellus, Eagle Ford and Bakken). CEE economists participate in this team to evaluate well economics and field production outlook. Information on the research team, publications and presentations can be found at http://www.beg.utexas.edu/shale/.</p>
United States	<p><i>Electricity Sector Modeling (2011 – Ongoing)</i>. Using AURORAxmp, a commercial software for economic dispatch, CEE evaluates the impact of various policies on electricity markets (consumption of various fuels – particularly natural gas, electricity prices, demand curtailment, emissions and so on). The impacts of raising energy price caps in the competitive electricity market of Texas, the impacts of increasing share of renewables, the impacts of coal and/or nuclear retirements in response to environmental regulations are some of the recent examples.</p>
United States	<p><i>Full Cost of Electricity (2014 – Ongoing)</i>. CEE researchers participate in a university-wide effort led by the Energy Institute at UT-Austin. Topics cover a wide range from enhancements to levelized cost of electricity calculations to business model for the utility of the future.</p>
United States	<p><i>BEG Gulf Coast Carbon Center (GCCC) - Commercial Frameworks for CO₂ Management and the CO₂ Value Chain (2004-ongoing)</i></p> <p>The GCCC team at BEG has been testing CO₂ sequestration at a brine site, with promising results so far. Next steps include improving the understanding of sequestration characteristics of hydrocarbon reservoirs, modeling CO₂ emissions in the Gulf Coast, and economic evaluation of the CO₂ value chain. The CEE team carried out a literature search on economics of CO₂ capture technologies, pipeline transportation costs, and commercial use of CO₂ in enhanced oil recovery. We continue to evaluate the commerciality of CO₂ capture under various scenarios, considering CO₂ trading or credit schemes and EOR factors. With a CEE visiting researcher from Ghana, Mr. Essandoh-Yeddu, work was initiated on development of a model matching CO₂ sources with EOR site on the Gulf Coast. The economic analysis of CO₂-EOR value chain is continued via an interdisciplinary team. CEE submitted a proposal to the EPA with a focus on capture, use and sequestration of CO₂ in the Gulf Coast. In particular, CEE proposed to build a general equilibrium model for the Gulf Coast that would analyze the impact of various carbon policies (tax, mandates, permit trading) on the Gulf Coast industries that emit CO₂ and the rest of the regional economy; we also proposed to use real options analysis to evaluate the decision to invest in capture technologies. In 2004, CEE helped to organize and conduct a workshop on CO₂-EOR to integrate geoscience and technical issues with policy and economic considerations (Houston), which was followed by several papers on CO₂-EOR value chain economics with other researchers from UT-Austin</p>

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<p>United States</p>	<p><i>State of Texas Advanced Resource Recovery (STARR) Texas and Global Energy Databases (2005-ongoing)</i></p> <p>This program is a revenue-neutral effort designed to enhance oil and gas resource assessment and production on Texas State lands and waters. Among other things, the CEE team provided economic and market analysis to support a new focus on low-pressure natural gas resources in Texas and assisted with expanding STARR's databases and building a global energy data effort that will link to STARR and other BEG programs. As part of the effort, CEE conducted research on use of LNG for bringing low-pressure gas resources to market. CEE also provides ongoing economic and market insight and provides input on State of Texas oil and gas taxes and related policies through the STARR Energy Economics component.</p>
<p>United States</p>	<p><i>Research on Electricity Sector Restructuring in Texas (1996 - Ongoing)</i></p> <p>The CEE is actively involved in the energy sector of our home state. Researchers monitored implementation of Senate Bill 7, passed in May 1999 by the Texas Legislature to restructure the state's electric power industry and participated in "market readiness" stakeholder work sessions for network policy design.</p> <p>Key products of this initiative include:</p> <ul style="list-style-type: none"> ➤ "Scenarios of Resource Adequacy in ERCOT: Mandated Reserve Margin, Impact of Environmental Regulations and Integration of Renewables", <i>The Electricity Journal</i>, v. 28, no. 2, p. 89-100 (2015) ➤ "The impacts of raising the energy price cap in ERCOT", <i>The Electricity Journal</i>, v. 26, no. 7, p. 43-54 (2013) ➤ Chapter in "Electricity Restructuring: The Texas Story," published by the American Enterprise Institute for Public Policy Research (2009) ➤ <i>Lessons Learned from Renewable Energy Credit (REC) Trading in Texas</i>, research and report to State Energy Conservation Office (2009) ➤ <i>Harmonization of Renewable Energy Credit (REC) Markets across the U.S.</i>, research and report to State Energy Conservation Office (2009) ➤ <i>Guide to Electric Power in Texas</i> (with the Center for Global Studies, Houston Advanced Research Center, 1997, 1999 and 2003). ➤ <i>Electricity Restructuring in Texas: A Status Report</i> (public release October, 2003). ➤ Study on economics of time of use pricing for Reliant Energy Business Services (2002). ➤ Training workshops on electric power restructuring in the Electric Reliability Council of Texas (ERCOT) and nationwide (2000). ➤ Sponsorship of the Energy CEE Internship at the Texas Railroad Commission's Gas Services Division and participation in development of the Texas Natural Gas Model, a Web-based system for analysis of the state's natural gas sector (1998-1999). ➤ <i>Electricity Industry Restructuring in Texas: A White Paper</i> (public release June 28, 2001), assessment of Texas

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	Electric Choice program.
Canada	<p><i>Partnership with the Center for Applied Business Research n Energy and the Environment (CABREE), University of Alberta School of Business (2005, 2007)</i></p> <p>The CEE has been cooperating with the University of Alberta’s Center for Applied Business Research in Energy and Environment for a number of years. The partnership activities included exchange visits for faculty and students of the Natural Resource & Energy specialization to the U.S.</p>
Canada	<p><i>Eastern Canada Oil and Gas Value Chain (2001)</i></p> <p>This study for the Canadian Consulate General, Dallas focused on NGLs and downstream value added for provincial economic development.</p>

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LATIN AMERICA AND THE CARRIBBEAN	
Mexico	<p>SENER Training Course (2010)</p> <p>CEE developed a customized version of "New Era in Oil, Gas & Power Value Creation," for Mexico's Secretaría de Energía (SENER), as well as the staff of CNH, CRE and PEMEX, held in Mexico City on August 23-27, 2010.</p> <p>CEE is currently developing the second course to be delivered for SENER.</p>
Mexico	<p><i>UT-ITAM Partnership for Mexico Energy Sector Advancement, The Training, Internships, Exchanges, and Scholarships (TIES) Initiative (2007-2010), USAID/Higher Education for Development</i></p> <p>In cooperation with the Center for Energy & Environmental Policy (CIEEP) and the interdisciplinary Energy & Earth Resources (EER) program, all part of the Jackson School of Geosciences (JSG) at UT, CEE collaborated with ITAM to expand energy sector content and outreach. The objective of this partnership, funded by the USAID through HED was to educate and train skilled professionals for the energy industry and contribute to better informed decision makers and citizens. Key components of the partnership included student exchange, ITAM faculty capacity building, collaboration on targeted research, and targeted outreach activities in Mexico. Accomplishments include:</p> <ul style="list-style-type: none"> ➤ Three ITAM students and one student graduate from Tecnológico de Monterrey (ITESM) were awarded Master's degree from UT JSG's Energy and Earth Resources graduate program. ➤ Five ITAM faculty members attended the intensive CEE capacity-building program <i>New Era in Oil, Gas & Power Value Creation</i>. Through participation in this program and interaction with UT faculty, ITAM faculty has been exposed to valuable information on the international energy industry, which will help them shape their future course contents. ➤ ITAM and UT faculty collaborated on research publications, including: <ul style="list-style-type: none"> ○ Update to CEE's <i>Guide to Electric Power in Mexico</i> ○ Research papers on energy security, electric power sector, and renewable energy.
Mexico	<p><i>Research, Education and Outreach on Energy Sector Restructuring in Mexico (1991-ongoing)</i></p> <p>CEE has been a leading U.S.-based institution for the study of energy sector development in Mexico and implications of the North American Free Trade Agreement (NAFTA). Our research has incorporated economics, legal, policy and regulatory, historical and other aspects of energy sector restructuring and development in Mexico, as well as Mexico's integration into the converging North American energy marketplace. We also provide training and outreach opportunities. Milestones for our experience in Mexico are provided below.</p> <p>Much of our work has been conducted in collaboration with Centro de Estudios Estratégicos/Instituto Tecnológico y Estudios Superiores de Monterrey (CEE-UT/ITESM; see www.itesm.mx). However, we maintain other key institutional relationships that enhance the CEE's stature in Mexico and facilitate research, training and outreach activities.</p> <p>The CEE's work in Mexico is supported by a high level group of senior professionals with national reputations in energy through their endeavors in business, government and research. The CEE also hosts visiting scholars from</p>

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Mexico to support their energy research. Our Mexico research is supported by gifts from a variety of donors.

Highlights of our Mexico experience follow.

- *"Guide to Electric Power in Mexico," published in 2007. A second edition was released in 2013 in English/Spanish. <http://www.beg.utexas.edu/energyecon/publications.php#guides>. The Guide, modeled after the Texas power guide, was initially undertaken jointly with the Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM). Dr. Francisco Garcia Hernández (retired) was collaborator and co-author. In preparing the *Guide to Electric Power in Mexico*, CEE interacted extensively with Comisión Federal de Electricidad (CFE) and the Electric Reliability Council of Texas Independent System Operator (ERCOT ISO), which has an MOU with CFE for cross-border electricity transmission. Update of the report was made as part of the UT-ITAM partnership.*
- Numerous white papers and commentary in U.S., Mexican and European industry trade publications, academic journals, newspapers and business publications on natural gas industry restructuring, including
 - *"National Oil Companies and International Oil and Gas Trade" in Selected Topics on Contemporary Energy Law, ITAM/Editorial Porrúa (2009)*
 - Current review of PEMEX draft upstream contract (2011) and public comments filed to CRE on Mexico's natural gas framework as part of open comments process, <http://www.cre.gob.mx/boletines/lista.html> (2001)
 - Research initiated in 1997 on energy finance mechanisms for emerging markets, with focus on rural electrification and proposed pilot project for electricity in Mexico (1999)
 - Independent review of Mexico's electricity sector and proposed reforms (1999)
 - Independent review of policies for upstream oil and gas (1999)
 - *LPG Markets in Mexico: Analysis, Issues, and Cross-National Comparisons* with implications for natural gas development (1997)
 - *"The Economics of Natural Gas in Mexico – Revisited," commissioned by The Energy Journal for a special edition, North American Energy After Free Trade (1993)*
 - *Regional Demand for Natural Gas: The Case of the Northeast Region of Mexico (1992)*
- Private roundtable and executive seminars on natural gas regulatory policy in Mexico at the request of the U.S. Department of Energy, on behalf of Mexico's Comisión Reguladora de Energía, with federal, state and provincial regulators and energy ministry officials from the U.S., Canada, Mexico (May 1995).
 - Expert for industry hosted seminar on upstream reforms, Mexican Senate Energy Commission, Houston, August 2013.
 - Industry seminar on upstream reforms and oil and gas commercialization, then Undersecretary for Hydrocarbons Enrique Ochoa, SENER, Mexico City, July 2013.
 - U.S. Department of Interior/SENER workshop on shale gas, Mexico City, February 2013.
 - Hosted two workshops on shale gas and cross-border gas pipelines on behalf of U.S. Department of State and SENER, Houston, August 2012.
 - Participated in private workshop on energy scenarios for Mexico, Shell Mexico, Cuernavaca (2003)
 - Executive seminar on developments in Mexico, at ITESM (1996)
 - U.S. Department of Energy Mission to Mexico, (then Deputy Secretary Bill White). (1995)
 - Executive seminar on developments in Mexico, in Houston (1995)
 - Private workshop, Natural Gas Trade Across the Border in Houston, (1991)

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- Major conferences and workshops:
 - Shale gas conference, SENER, Mexico City, November 2012.
 - ITAM Energy Week. Week-long energy forum series hosted at ITAM as part of the UT-ITAM partnership sponsored by USAID/HED (September 2010)
 - Leadership workshop for Mexico's new Comisión Nacional de Hidrocarburos (CNH) (2009)
 - UT-Mexico week. UT-ITAM energy forum and lunch hosted at ITAM as part of week-long series of events at various universities and campuses (2008)
 - *Energy Development for Mexico: A Workshop of Ideas*, hosted by ITAM with CEE, Thompson & Knight, Red Mexicana de Energía and Chevron (2007)
 - Organized Secure Partnership for Prosperity (US DOE, SENER, NR-Can) workshop on deepwater oil and gas with Baker Institute for Public Policy at Rice University and Florida International University, Houston (2006)
 - Co-moderator for U.S.-Mexico bilateral workshop (U.S. DOE-SENER) on cross-border gas and power, San Antonio (2002)
 - CRE Tenth Anniversary conference, Veracruz (2005)
 - Chaired and helped organize, with ITESM, a panel on energy and economic development as part of an international conference energy and technology development for the Government of the State of Tamaulipas (2004)
 - IberoAmerican Energy Regulators Conference, hosted by CRE, Oaxaca (2003)
 - Hosted North American Energy Working Group, Natural Resources-Canada/US DOE/SENER, University of Houston (2003)
 - First Energy Law Conference, ITAM, Mexico (2002)
 - Asociación Mexicana de Economía Energética (AMEE) conference, CIDE, Mexico, (2001)
 - *North American Energy Roundtable: Natural Gas and Electricity Integration*, in Houston. Vision conference to launch *North American Energy Integration* (1996)
 - Conference on *North American Natural Gas Markets and Policy Issues*, co-sponsored with ITESM and the Canadian Energy Research Institute, in Houston. First public statements of Mexico's evolving natural gas strategy (1992)
- Training programs and lecture series in Mexico and US.
 - Thirty-three participants attended the *New Era* program since 2001, representing CRE, Comisión Federal de Electricidad and PEMEX, and other organizations.
 - Conducted seminars on natural gas supply and marketing arrangements for Comisión Federal de Electricidad, in Mexico (2004)
 - *Current Trends in International Law: Effects of Energy Sector Globalization*, lecture series, Pemex Gerencia Juridica (2001)
 - *Regulación Energetica en Norteamerica*, for Pemex Gerencia Juridica (1997)
- Support of the Border Energy Forum led by Texas General Land Office (1994-ongoing), including *Border Energy Brochure* addressing border energy issues for the U.S.-Mexico Border Energy Forum XII, Santa Fe, Mexico, October 13-15, 2005.

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	<ul style="list-style-type: none"> ➤ Research & Education Grants <ul style="list-style-type: none"> ○ Awarded Higher Education for Development TIES-Mexico grant with ITAM (2007-2010, see above) http://www.beg.utexas.edu/energyecon/IDA/TIES/index.php ○ Awarded grant from UH Shell Interdisciplinary Scholars Program for North American Energy Integration (1996) with focus on potential Mexico entry into an already seamless U.S.-Canadian cross-border energy investment and trade regime. Included extensive data collection and analysis, interviews with key government and business representatives in Mexico, and use of scenario analysis techniques to reach overall findings and conclusions. <u>Major conclusions from the study were validated</u> and continue to be reinforced in subsequent decisions and policy actions in Mexico. ○ Awarded second grant from UH Shell Interdisciplinary Scholars Program for <i>Best Practices in Energy Sector Reform</i>, which includes continued development of our Mexico research content (1998)
Brazil and Argentina	<p><i>Ziff Energy Upstream Cost Index (2001)</i></p> <p>The CEE developed a method for the normalization of costs data between costs incurred by exploration and production companies operating outside of the U.S. and Canada (Brazil and Argentina) and those operating within the boundaries of these two North American countries.</p>
Trinidad & Tobago	<p><i>Benchmarking Petroleum Company of Trinidad & Tobago (2009), PetroTrin</i></p> <p>Thorough assessment of PetroTrin operating and financial metrics using CEE's national oil company commercial frameworks approach.</p> <p><i>Review of U.S. Oil and Gas Market Conditions, Methanol Holding Company of Trinidad & Tobago, Ltd. (MHTL, 2013)</i></p> <p>An assessment of U.S. and North American natural gas supply and demand drivers affecting MHTL's strategic business interests. Specific analysis and comparisons of outlooks on industrial demand focused on petrochemical uses of methane and natural gas liquids.</p>

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EUROPE/EURASIA	
Russia, Caspian Region and NIS	<p><i>Research in Energy Sector Reform in Russia, Caspian Region and NIS (1997-ongoing), USAID and other</i></p> <p>During 1997-98, the CEE was a member of the U.S. Agency for International Development/Hagler Bailly Consulting (now TetraTech) consortium for the NIS, including Central Asia Republics (CAR) and the Caspian region. The consortium provided technical support and in-country training for energy sector reform in oil and gas upstream operations and pipeline transportation. CEE involvement extended to the governments and national energy companies in the republics of Kazakhstan, Uzbekistan, Turkmenistan, Georgia and Ukraine. The CEE is continuing to develop research publications from our consortium learnings.</p> <p>Key products include:</p> <ul style="list-style-type: none"> ➤ Participants from Georgia and Turkmenistan have attended the <i>New Era</i> program since its launch in 2001. ➤ <i>The Politics and Economics of Caspian Oil Export Pipelines</i> ("Caspian Oil Export Choices Clouded by Geopolitics, Project Economics," <i>Oil & Gas Journal</i>, May 3, 1999). ➤ <i>Economics of the Trans-Caspian Gas Pipeline</i> (<i>Oil & Gas Journal</i>, November 1999). ➤ Periodic forums with Eurasia Group on NIS energy and geopolitical issues (1998 and 1999). ➤ Review of worldwide natural gas regimes for Ukraine (<i>Worldwide Transitions: Energy Sector Reform and Market Development</i>, published in the American Bar Association's <i>Natural Resources and Environment</i>, 1998). ➤ <i>Energy in the FSU</i>, in collaboration with St. Antony's College, Oxford University (March 1998). ➤ Development of training courses for in-country delivery in CAR (1997-1998) ➤ White papers on natural gas transportation restructuring and market development for Ukraine (1998). ➤ Review of offshore environment and safety regulations from sample regions for Caspian regime development (1997). ➤ <i>The Russian Oil and Gas Industry in Transition</i> (1997). ➤ Houston Journal of International Law symposia on the Russian Petroleum Legislation Project, UH Law Center (1993). ➤ Hosted to U.S. Department of Commerce SABIT delegations from key Russian and NIS corporate and government organizations.
Turkey	<p><i>Capacity Building for Energy Market Regulatory Authority of Turkey, EMRA (2004)</i></p> <p>CEE developed and implemented a customized 14-week program on energy economics, policy and regulation, and investment across the energy value chains for 17 Assistant Energy Experts from EMRA. CEE continues to mentor participants. and lectured to EMRA delegations attending other programs at the Michigan State University Institute</p>

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	for Public Utilities for several years.
Turkey	<p><i>Research on Energy Sector Restructuring in Turkey (1998-ongoing)</i></p> <p>In 1998, the CEE established an active involvement in energy sector restructuring in Turkey with regional extensions (Black Sea/Caucasus geographic market, Caspian Basin oil and gas resource supply and transit issues).</p> <p>Key products include:</p> <ul style="list-style-type: none"> ➤ Co-authored book, <i>Reforming Turkish Energy Markets: Political Economy, Regulation and Competition in the Search for Energy Policy</i>: New York, Springer (2012). ➤ <i>Power Marketization in Turkey</i> (1998). Private discussion groups on energy sector reform issues, Istanbul and Ankara (July 1998). Review of the proposed Electricity Law and a study on restructuring the natural gas sector in Turkey at the request of a Turkish business organization (1998). ➤ Publication of articles on electricity sector restructuring in <i>Dünya</i>, the daily financial newspaper in Turkey (1998). ➤ Co-sponsorship of a half-day roundtable with the Eurasia Group and Energy Intelligence Group on energy demand in Turkey and potential oil and gas export pipelines from the Caspian region, in Houston (December 1998). ➤ Outside review of “Legal Battleground in Turkey’s Power Privatization War” for publication in <i>Utilities Law Review</i> (1998). Article on energy demand and power privatization efforts in Turkey for <i>Power Economics</i> magazine (1999). ➤ Background research initiated for a white paper on the Black Sea region with special emphasis on littoral countries Bulgaria, Romania, Ukraine and Georgia, to include structure and regulation of natural gas and electricity markets in the region and potential for an integrated regional market. ➤ Delegates from Turkey attended <i>New Era</i> program.
Republic of Georgia	<p><i>Capacity and Institutional Building in Georgia (2001)</i></p> <ul style="list-style-type: none"> ➤ Host to visiting scholar from Georgian parliamentary energy committee (IREX support). ➤ Extended international visitor exchange for Georgia with the U.S. Energy Association and U.S. Agency for International Development, July 9-August 16, 2001. Delegates audited UH courses in accounting, finance and law and receive coaching and special instruction based on components from the CEE’s international program, <i>New Era in Oil, Gas and Power Value Creation</i>.
Western Europe	<p><i>Research on Gas and Power in Western Europe (1995-ongoing)</i></p> <p>The CEE has an active interest in Western Europe gas and power liberalization and convergence, in particular parallels with North American approaches. Key products include:</p> <ul style="list-style-type: none"> ➤ Collaboration with Oxford Institute for Energy Studies-Natural Gas Programme (MOU) and Windsor Energy Group consultations. ➤ <i>Gas and Power Marketization in the EU</i> (1998).

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| | <ul style="list-style-type: none">➤ <i>Governing the Electricity and Gas Sectors: Disparate Realities and Converging Trends in Europe and North American (1998).</i>➤ Invitational roundtable in collaboration with Energy and Environmental Programme, Royal Institute of International Affairs, London (September 1998). |
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NOTE: CEE research has been published in numerous external journals and publications including The Energy Journal; Oil & Gas Journal; Electricity Journal; Oil & Gas Investor. CEE personnel are widely quoted by major news sources such as Wall Street Journal, MarketPlace, National Public Radio and local affiliates, New York Times, Houston Chronicle and many other international, national and regional news outlets. Inquire with CEE for details.