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GIM – Energy, Development, and Climate Change: Ghana and Morocco
Syllabus

Winter Term 2019

Monday, 6:30 – 9:30 PM

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GIM Program Objectives

The GIM Program enables Kellogg students to:

- Gain an understanding of the economic, political, social, and cultural characteristics of a country or region outside the United States.
- Learn about key business trends, industries, and sectors in a country or region outside the United States.
- Conduct international business research on a topic of interest.
- Further develop teamwork and leadership skills.

Course Description and Objectives

Course Objectives

This course will give students an opportunity to explore the following questions:

- How can developing nations expand access to electricity for all segments of their economies?
- What is the relationship between economic development and energy access?
- What role should renewable resources and energy storage technologies play in expanding energy access?
- How should international efforts to mitigate global climate change be factored into the decisions of developing nations?
- What financial and commercial models are being used to increase energy access in developing economies?
- What is the relationship between government policy and energy access in developing economies?
- What tools can help us understand the economics, investment needs, and political ramifications of these intertwined issues?

Topic Description

Electricity is a critical element of industrialized life—perhaps the most critical. Without it, nothing else works. Water, sanitation, food, healthcare, education, entertainment: without power these activities grind to a halt.

There are roughly 1.5 billion global citizens who have no electricity at all. There are another couple of billion whose access is inadequate. There is a strong relationship between energy

usage and economic well-being. Reliable, cost-effective electricity is widely seen as a necessary precursor to economic development.

In the OECD—the coalition of 36, mainly Western, developed economies—per capita electricity consumption is around 8,000 kilowatt-hours (kWh) per year. By contrast. in North Africa, this figure is closer to 1,600 kWh per year. And in sub-Saharan Africa, the average is a mere 500 kWh/year. These stark differences are mirrored by similar gaps in per capita GDP and income. By 2050, the world is expected to need about twice the total energy we now consume. Almost all this growth is expected to take place in developing economies, and for this development to occur, electricity supply will need to be vastly expanded. In the past couple of decades, the economy of China has roared ahead. Chinese GDP and income per capita have grown, along with a vast expansion of energy supply, much of it in the form of electric power. Many developing nations aspire to follow the Chinese path.

A different drama is playing out in the developed world, but one that has implications for developing economies.

Electricity markets in the developed world are in the midst of a transformation that began in the late 1970s. At that time, nations and states began to change the ways in which electricity markets are structured and regulated, with the goal of increasing competition and reducing monopoly. Technology has evolved, and the development and deployment of new supply-side technologies (including renewables) is also a main driver of transformation. Innovations on the demand-side, such as energy efficiency, demand management, energy storage, and "smart" technologies, are also key agents of change. Finally. environmental regulations have altered the landscape, and efforts to reduce man-made greenhouse gas emissions have moved to center stage in the global political theater.

The most aggressive deployment of renewable energy has occurred in the developed world, best exemplified by Germany and several US states, including California and Texas. In the same vein, the most aggressive policies aimed at reducing emissions linked to climate change have also emanated from the developed West. There is often an explicit link assumed between these initiatives. Renewable energy is assumed to equal climate mitigation. There is also an assumption that international economic development must occur in a way that does not adversely affect global climate. In fact, there are advocates would argue that energy options for developing nations should be restricted to wind, solar and storage.

There is tension between the behavior and policy objectives of the wealthy west and the poorer, developing world; one of the key objectives of this course will be to better understand the dimensions of this tension.
We will visit two African countries to better understand the electricity-development-climate nexus.

Morocco, the westernmost country in North Africa is mainly reliant on fossil-fuel for electricity production, most of which is imported. However, Morocco has significant potential for both

solar and wind, and has established ambitious renewable energy objectives. Per capita electricity consumption is around 900 kWh per year.

Ghana, located in West Africa on the Atlantic coast, struggles with electric supply reliability and is attempting to improve this situation. About half of Ghana's electricity supply comes from fossil sources, with the balance coming from renewables, most of it hydroelectricity. Ghana has also established renewable energy targets but has goals for improving rural energy access and overall supply reliability, as well. Per capita electricity consumption in Ghana is around 320 kWh per year.

Course Expectations/Guidelines

Students are expected to complete all reading assignments, attend all lectures, and engage with speakers and classmates. This should be a collaborative learning experience, and one in which all participants responsibly carry out their responsibilities.

During lectures and discussions, this will be a screen-free course. Laptops, tablets, and cell phones are not permitted during these activities. A portion of each class period will be allocated to group work, during which time electronics are permitted (for class related work!).

Attendance Policy

Due to the nature of the GIM program, attendance for all GIM classes is mandatory, as is participation in the two-week field experience. Attendance on the first day of class is also mandatory. If a student misses more than one class throughout the term, one letter grade will be deducted from his or her final grade. The faculty member may make exceptions in cases of extreme circumstances.

In-Country Academics

Students are reminded that GIM is first and foremost an academic program. 15% of your overall grade will be based on your participation in the plenary meetings and engagement in other activities as assessed by the in-country advisor. In order to achieve a high grade, students are expected to not only attend all plenary meetings, but to be actively engaged during the meetings and other learning opportunities in country.

Role of the In-Country Advisor

Throughout your GIM trip, your in-country advisor, Arlene Johnson, (Chief of Staff, office of the Dean), will accompany the class. The in-country advisor is responsible for the integrity and quality of the in-country experience. Among other logistical roles during the trip, she will be

assessing each student's level of participation during the plenary meetings and will be assigning 15% of the students' overall grade.

Kellogg Honor Code

The students of the Kellogg School of Management regard honesty and integrity as qualities essential to the practice and profession of management. The purpose of the Kellogg Honor Code is to promote these qualities so that each student can fully develop his or her individual potential. Upon admission, each student makes an agreement with his or her fellow students to abide by the Kellogg Honor Code. Students who violate the Kellogg Honor Code violate this agreement and must accept the sanction(s) imposed by the Kellogg community.

The Kellogg Honor Code is administered by students and is based on the concept of self-government. The efficacy of such a student-administered honor code is dependent upon a high degree of dedication to the ideals of honesty, integrity, and equal opportunity reflected by the code. The Kellogg Honor Code requires that each student act with integrity in all Kellogg activities and that each student hold his or her peers to the same standard. In agreeing to abide by the code, Kellogg students also agree to report suspected violations. By not tolerating lapses in honesty and integrity, the Kellogg community affirms the importance of these values.

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Course Materials

Required List

Books to purchase:

Course Schedule and Assignments [subject to change]

Week 1	**Monday, January 7, 6:30 PM – 9:30 PM**
Lecture	"Context: many perspectives, many answers"
Focus	• Overview of the electricity-development-climate nexus
Guest Lecturer	• None
Advisor	Trip overview, to-dos
Class Activities	• Course overview, expectations • Introductions • Project team assignments and discussion of project objectives
Reading	Lovins, *Energy Strategy: The Road Not Taken?,* Foreign Affairs, October 1976. Florman, *Small Is Dubious*, Harper's, August 1977.

Week 2	**Monday, January 14, 6:30 PM – 9:30 PM**
Lecture	Screening of documentary "Juice"
Focus	• "Juice" explores the role that electricity plays in the modern world
Guest Lecturer	Robert Bryce, Author and Producer
Advisor	
Class Activity	• Discussion with Robert Bryce • Discussion of Lovins and Florman
Reading	Jacobson and Delucchi, *A Path to Sustainable Energy by 2030*, Scientific American, November 2009. Sepulveda, Jenkins, et. al., *The role of firm low-carbon resources in deep decarbonization of power generation,* Joule, October 17, 2018.
Assignment	• Cost effectiveness analysis

No class January 21 (Martin Luther King Day)

Week 3	**Monday, January 28, 6:30 PM – 9:30 PM**
Lecture	"Electricity 101: Physics, Economics, Market Structure and Policy"
Focus	• Basic electric system physics • Basic system economics • Historic and current market structures • Why renewables? - economic and policy drivers • Overview of current Ghana and Morocco electricity situation
Guest Lecturer	None
Advisor	
Class Activity	• Presentation/discussion of cost effectiveness analysis
Reading	Kumi, *The Electricity Situation in Ghana: Challenges and Opportunities*, CGD Policy Paper 109, September 2017. International Energy Agency, *Morocco 2014: Energy Policies Beyond IEA Countries*, 2014. (Executive Summary)
Assignment	• Topic proposal due

Week 4	**Monday, February 4, 6:30 PM – 9:30 PM**
Lecture	"To have, to have a little, to have none: the challenge of global energy access"
Focus	• What technologies do we need for increased global energy access? • What will electricity systems look like in developing economies? • What are commercial challenges to developing energy projects in developing economies? • How do we balance development needs with environmental objectives?
Guest Lecturers	Kirsty Gogan, Energy for Humanity Eric Ingersoll, Managing Partner, Lucid Catlyst
Advisor	
Class Activity	
Reading	Rhodium Group, *Out of the Dark: The Climate Implications of Global Electrification,* December, 2015.

	Sengupta, *The World Needs to Quit Coal: Why is it so Hard?*, New York Times, November 24, 2018.
Assignment	• Future demand scenarios analysis for Ghana/Morocco

Week 5	**Monday, February 11, 6:30 PM – 9:30 PM**
Lecture	"Doing Business in Africa"
Focus	•
Guest Lecturer	Grant Harris, CEO Harris Africa Partners (invited)
Advisor	
Class Activity	• Presentation/discussion on future Demand Scenarios
Reading	TBA
Assignment	•

Week 6	**Monday, February 18, 6:30 PM – 9:30 PM**
Lecture	• "Climate Math: What does deep decarbonization look like?"
Focus	• What does current best science tell us about how deeply carbon must be reduced to stabilize climate? • What does this science imply for the role of renewables and other resources in achieving global targets? • What does Paris mean for achieving these goals?
Guest Lecturer	• Armond Cohen, Executive Director, Clean Air Task Force
Advisor	
Reading	Loftus, et. al., *A critical review of global decarbonization scenarios: what do they tell us about feasibility?*, WIREs Climate Change, 2015.
Activity	TBA

No class February 25

Week 7	**Monday, March 4, 6:30 PM – 9:30 PM**
Lecture	• "Distributed Energy Systems and Microgrids"
Focus	•
Guest Lecturer	• TBA
Advisor	
Class Activity	•

Reading	•

Week 8	**Monday, March 11, 6:30 PM – 9:30 PM**
Lecture	•
Focus	• Pre-departure preparation
Guest Lecturer	None
Advisor	
Class Activity	•
Reading	•

March 20-29	**In-Country Field Research**

Final Class	**?**
Lecture	•
Focus	• Final Project Presentations
Guest Lecturer	•

Assessment

	Option B
GIM Project	**70%**
Background Research	10%
In-Country Research Plan	10%
In-Class Presentation	10%
Final Report	25%
Peer Evaluation	15%
Other Assignments (Optional)	
Participation	**30%**
In-Class Participation (attendance, discussion, engagement)	15%
In-Country Participation (plenary meetings; determined by GIM advisor)	15%

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GIM Project

The core of the GIM class is a group project. Groups of 4 to 6 students will select an international business, economic or management issue to study in depth. The students begin background research on their topic during the winter term, incorporating perspectives from

class readings and speakers, and spend considerable time in-country speaking with resident experts, gathering local data, and testing their hypotheses and recommendations in the field. In

general, the project should aim to meet the letter and spirit of both "think and do." That is, it should be based on original research that contribute to an intellectual body of work but also strive to have certain practical applications pertaining to global energy markets.

*Students must conduct interviews for their projects in **every** city they visit throughout the trip.*

Research Topics

Student teams typically develop their own research project, though they refine their topics with the help and advice of their faculty member. Good GIM projects are generally built around interesting, clear, and relatively narrow business questions, e.g. "Coffee in Southeast Asia: Development of an Expansion Strategy for Peet's Coffee and Tea" or "Creating a Market Entry Strategy for the Indian Homecare Medical Device Industry." Weak GIM projects often have lengthy and unfocused industry descriptions, e.g., "An Overview of the Brazilian Beverage Industry," or "Challenges and Opportunities in Japanese Real Estate."

Project Report Structure

Results of the research must be presented in a report of approximately 20-25 pages in length before exhibits. Students, in consultation with their instructor, may choose from the following report formats:

- Traditional analytical research paper – A research question is described; competing answers to the question are discussed; evidence collected on the trip is used to argue for or against the alternative answers.

- Industry analysis – A particular industry is surveyed in order to examine a narrowly focused, well-defined topic pertaining to the competitive dynamics of the industry. An example is to pick a sector with potential growth and market opportunities in China

(preferably a relatively untapped emerging segment), come up with different models for US investment into, or market entry strategies for, that sector.

- Business recommendation report – A consulting report recommending specific strategic, operational and organizational actions to solving a clearly defined business issue (e.g. strategies for overcoming cold-chain logistics and distribution challenges in China.). Another variation is to potentially take a thematic approach:

    - *Theme:* Reverse capital flows from China to the United States

Context: Chinese direct investment in the United States is expected to increase dramatically over next decade, as Chinese companies seek

    - new markets and establish global brands.
    - *Project idea:* Design marketing strategies to elevate Chinese brands that most US consumers have never heard of.

- Business or industry case study – A case for eventual classroom use developed with a clear underlying business question in mind. It will be a deep-dive into a sector or a specific Chinese company to identify market opportunities, industry trends, and lessons for investors and practitioners on how to succeed and/or fail in the China market (lessons from failure is just as important as success). Teams pursuing this option are encouraged to work with Case Publishing before and after the trip to ensure a high quality product that may eventually be used in the classroom.

Far from exhaustive, these are merely meant to generate ideas. Unconventional and out-of-the-box ideas need to be cleared by the instructor. But all project proposals need to adhere to a simple principle: they must be realistically executable, given the time and capacity constraints of the course and limited resources.

Project Deliverables

- **Research Project Proposal** – Each project group will submit a 2-page description of their proposed research topic, including:

    - A description of the specific and narrowly-focused research question(s) to be addressed
    - Description of the topic's importance, timeliness, economic, or social significance
    - Identification of possible in-country visits with companies, governmental agencies, NGOs, etc.

- **Background Research Review** – Before departing for the in-country portion of the class,

each project team must submit a review examining secondary information relevant to its research topic. This review may serve as a first draft of the background section of the final project report.

- **In-Country Plan** – This is a detailed matrix of five or more investigative research meetings arranged in country. The best plans will include day/time/location of meeting; name/description of organization; name/title/bio of interviewee; agenda and interview guide for each meeting.

- **In-Class Presentation** – During the final class, each project group will make a presentation in class summarizing their research findings. The purpose of this deliverable is to allow faculty members and students to learn about and provide

  feedback on the project groups' final findings. It is suggested that each team be given 15 minutes to present and 5 minutes for audience questions and suggestions.

- **Written Report** – The final report, generally 20-25 pages long before exhibits and appendices prepared according to one of the formats discussed above. In addition to turning in their papers to their instructors, students should submit an electronic copy to the Global Programs Office on the agreed upon date.

- **Peer Evaluation** – Each member within the project group will assess every other member's contributions to the project, including their own, with a confidential peer review form that takes into account each member's intellectual contribution, initiative and organization, workload contribution and overall contribution.