

**Course Syllabus  
2021**

**ISEN 412 – Understanding Global Energy & Sustainability Markets (0.5 credit)**

**Northwestern University**

**Instructor:** [Fernando Ferreyra](#), Senior Vice President - Global Origination at SOURCE Global

**Possible Guest Lecturers:**

[Badar Khan](#), National Grid

[Nicole Weygandt](#), Spacewell

[Scott Dillon](#), Schneider Electric, ESS

[Andrew Reaney](#), British Gas

[Kevin Self](#), Schneider Electric

**Office Hours:** By appointment

**Classroom:** TBD

**Class Timing:** Spring Quarter 2022

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**Course Synopsis:** This course will provide an overview of global energy markets and will highlight differences vs. the US from an economic and a regulatory standpoint. Students will explore a breadth of issues ranging from the impact of international accords to the methods of market-based regulation of non-renewable fuels. The course will specifically analyze China and Western Europe as interesting cases of changing energy markets and will explore the nature of their markets from a regulatory and demand-based perspective. Students will look at the role of sustainability in energy and will evaluate the fast-developing global energy markets and the interconnected nature of global energy worldwide.

**Course Goals:**

- **Interpreting Global Trends:** Through this course students will develop the capability to read present energy market data and extrapolate trends from it. This will be applied in the final project and practiced throughout the course.
- **Global Conventional Fuel Markets:** There will be a review of the global role for commodities such as oil, coal and LNG. The course will cover their roles in developing markets and the regulations surrounding them.
- **International Other Energy Markets:** The evolution of the global power market will be discussed – particularly as it is changing beyond traditional fuels such as coal and gas. For example, students will learn about nuclear energy markets, which have very different regulatory and economic structures than conventional fuels. In addition, the class will cover the growth of and outlook for renewable power.
- **Introduction to Leading International Regulatory Methods:** Students will discuss market regulatory methods such as emission caps and tradable permits. Content will also include external forms of regulation such as international accords and tariffs. Through case studies and



the final project, students will gain a greater understanding of the effectiveness of these techniques in the market.

### Grading/Assessment:

Grading will be based on the following rubric:

Component	Weight	Details	Due
Effort and Attendance	10%	Effort will be graded through attendance and meaningful class participation. This is a 5-week course and students are expected to attend all sessions prepared in advance	-
In Class Debates (x2)	30%	<p>Students will participate in a series of in class team debates. Debate topics will be announced in the first class and teams will be randomly assigned by the instructor. The format of the in-class debate will be as follows:</p> <ul style="list-style-type: none"> <li>• Team position statement (10 minutes / each team)</li> <li>• Rebuttal preparation (10 min)</li> <li>• Rebuttal (5 minutes/each team)</li> <li>• Discussion (10 minutes)</li> </ul> <p>Teamwork will be critical for the debate and teams are expected to assign 2-3 students to present the position statement, and an alternate 2-3 students to provide the rebuttal. All team members are expected to participate in the in-class discussion.</p> <p>In addition to the in-class debate, students are expected to complete an individual write-up (1-3 pages) of the debate. The write up should address the following questions:</p> <ul style="list-style-type: none"> <li>• What was your group's position in the debate?</li> <li>• Did you agree with this position? Why / why not?</li> <li>• Did your position change during or after the debate? Why / why not?</li> <li>• What is your current opinion on the topic? Explain why it has / has not changed.</li> </ul> <p>Debate topics will be designed to reinforce course material and allow for robust discussion. Topics are likely to span economics, policy and technology.</p>	Week #2,4
Quiz	20%	In-class quiz on material covered in lecture and readings	Week #3
Final Paper	40%	Final paper will require a 5-8 page write up of the outlook in that market. What can energy consumers and suppliers expect in the future? Which industries will lead the way in	Week #5



		<p>these regions? Given their particular natural resource and political situations, what is the potential for renewables in these regions? Students will have a list of countries to review. Sample countries that might be on the list include:</p> <ol style="list-style-type: none"> <li>1. Nigeria</li> <li>2. India</li> <li>3. China</li> <li>4. Germany</li> <li>5. Brazil</li> <li>6. Mexico</li> <li>7. Egypt</li> <li>8. Russia</li> </ol>	
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### Grading Policy:

- Grades will be assigned based on all the work you have completed during the semester following the traditional practice of A=90-100, B=80-89, C=70-79, D=60-69, F<60.

### Course Readings:

- [World Energy Outlook 2019](#)
- [Energy consumption in China: past trends and future directions \(Crompton, Wu\)](#)
- [Carbon Crossroads: Can Germany Revive Its Stalled Energy Transition?](#)
- [Renewable energy policy in Germany: pioneering and exemplary regulations](#)
- [Requiem for Kyoto: An Economic Analysis of the Kyoto Protocol](#)
- [Renewable electricity in Sweden: an analysis of policy and regulations](#)
- [Coal combustion and its pollution control in China](#)
- [Clean coal technology development in China](#)

Many articles from the scholarly journal *Energy Policy* may be of value here.

## CLASS OUTLINE

Weekly Topic	Description
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<p><b>1: Introduction to Global Markets: Broad Economic Trends</b></p>	<ul style="list-style-type: none"> <li>● Global markets and current trends. Students will read the executive summary of the International Energy Agency’s World Energy Outlook (2019). They will trace international trends in energy markets, noting the pace of the rise of renewable energy.</li> <li>● Students will also focus on the sources of data—how are such analyses performed and how can market trends in general be traced?</li> <li>● Course logistics and grading will also be explained.</li> </ul>
<p><b>2: Policy of Energy Consumption: International and National Frameworks</b></p>	<ul style="list-style-type: none"> <li>● Two-pronged focus: international accords and examples of national regulatory policy.</li> <li>● International accords may include, but are not limited to, focus on the current Paris agreement, and looking back on the impacts of the Kyoto Protocol. Discussion may include issues of accountability, regulation and measurement.</li> <li>● National policy may include varied market regulations such as tariffs, tradable emission caps etc.</li> <li>● Policy will be viewed from a lens of both renewables and non-renewables. Nuclear energy will also be included as a contentious topic in the sphere of regulation and policy.</li> <li>● A week is not enough time to cover the many issues of policy and regulation. These issues will be further explored in weeks 3 and 4 through a specific country-based approach.</li> </ul> <p><b>DEBATE #1</b></p>
<p><b>3: China: Growing Energy Demands</b></p>	<ul style="list-style-type: none"> <li>● Expansion of coal power in China: what are its environmental impacts and where is the coal being sourced from?</li> <li>● Renewable Energy in China: <a href="#">is it picking up at the speed it needs to?</a> What are the issues with transmission and government policy that are slowing down implementation?</li> <li>● What internal and external regulatory policy can be used to incentivize the transition?</li> <li>● What forms of energy will China demand in the coming decades? How is the supply-side of the global energy market prepared to meet this demand? How will China’s aimed transition from a manufacturing economy to a tertiary sector skill-based economy affect these transitions?</li> <li>● China and global accountability: what is the role of international accords and climate agreements in incentivizing the transition to sustainable fuel?</li> <li>● What are some of the ethical issues associated with pushing developing countries (in the Eastern hemisphere + Global South) to transition towards more expensive forms of energy?</li> </ul> <p><b>QUIZ</b></p>



<p><b>4: Germany and Western Europe: Renewable Energy and Regulation</b></p>	<ul style="list-style-type: none"> <li>• Understanding Germany’s massive renewable energy transition from a regulatory and economic standpoint.</li> <li>• What policy frameworks allowed an economy of such scale to implement such a rapid transition?</li> <li>• What has the impact been on employment and the conventional energy market?</li> <li>• What are the lessons learned from the German case? Inside the country and for markets outside of Germany?</li> <li>• Discuss the role of sustainability in Western Europe and beyond in energy.</li> </ul> <p><b>DEBATE #2</b></p> <p><b>Students will confirm their final paper topics with their instructor.</b></p>
<p><b>5: What is next in international energy markets?</b></p>	<ul style="list-style-type: none"> <li>• Discussion of global forward outlook</li> <li>• Review of countries that might most greatly impact world energy markets</li> <li>• Key case studies to watch</li> </ul> <p><b>FINAL PAPERS DUE</b></p>