Course Syllabus  
VERSION 2.1

ISEN 412 Global Energy Markets & Sustainability (0.5 credit)

Northwestern University

Instructors:  
Fernando Ferreyra, Senior Vice President, Origination, NBT  
Faculty advisor is Kimberly Marion Suiseeya

Office Hours: By appointment

Class Room:  TBD  
Class Timing: Winter Quarter 2021; 3 hours of classroom instruction per week for 5 weeks

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 Germany 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 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. 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:

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<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Details</th>
<th>Due</th>
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</thead>
<tbody>
<tr>
<td>Effort and Attendance</td>
<td>10%</td>
<td>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.</td>
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| In Class Debates (x2)      | 30%    | 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:  
  - Team position statement (10 minutes / each team)  
  - Rebuttal preparation (10 min)  
  - Rebuttal (5 minutes/each team)  
  - Discussion (10 minutes)  
  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.  
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:  
  - What was your group’s position in the debate?  
  - Did you agree with this position? Why / why not?  
  - Did your position change during or after the debate? Why / why not?  
  - What is your current opinion on the topic? Explain why it has / has not changed.  
Debate topics will be designed to reinforce course material and allow for robust discussion. Topics are likely to span economics, policy and technology. | 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 these regions? Given their particular natural resource and political situations, what is the potential for renewables in | Week #5      |
these regions? Students will have a list of countries to review. Sample countries that might be on the list include:

1. South Africa
2. Nigeria
3. India
4. China
5. Japan
6. Germany
7. Greece
8. Brazil
9. Colombia
10. Australia

**Course Readings:**

- World Energy Outlook 2020 – Executive Summary
- Requiem for Kyoto: An Economic Analysis of the Kyoto Protocol
- Paris Agreement Assessment – 2016 Ecologic Institute
- China: Country Analysis Executive Summary (EIA: US Energy Information Administration)
- Current direction for renewable energy in China (Oxford Institute – June 2020)
- Research on low-carbon energy transformation of China necessary to achieve the Paris agreement goals: a global perspective
- India: Country Analysis Executive Summary (EIA: US Energy Information Administration)
- 2019 European Union Green Energy Deal
- Why Europe must lead a global green recovery (Yale 360 – June 2020)
- Germany’s energy transition at a crossroad – McKinsey & Company Nov 2019
<table>
<thead>
<tr>
<th>Weekly Topic</th>
<th>Description</th>
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● Students will also focus on the sources of data—how are such analyses performed and how can market trends in general be traced?  
● Course logistics and grading will also be explained.                                                                                                                                           |
● 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.  
● National policy may include varied market regulations such as tariffs, tradable emission caps etc.  
● Policy will be viewed from a lens of both renewables and non-renewables.  
● 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. |
| 3: China and India: Growing Energy Demands      | ● Renewable Energy in China: is it picking up at the speed it needs to? What are the issues with transmission and government policy that are slowing down implementation?  
● What internal and external regulatory policy can be used to incentivize the transition?  
● What forms of energy will China and India 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?  
● China and global accountability: what is the role of international accords and climate agreements in incentivizing the transition to sustainable fuel? |
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?

QUIZ

4: Germany and Western Europe: Renewable Energy and Regulation

- Understanding Germany’s massive renewable energy transition from a regulatory and economic standpoint.
- What policy frameworks allowed an economy of such scale to implement such a rapid transition?
- What has the impact been on employment and the conventional energy market?
- What are the lessons learned from the German case? Inside the country and for markets outside of Germany?
- Discuss the role of sustainability in Western Europe and beyond in energy.

DEBATE #2
Students will confirm their final paper topics with their instructor.

5: What is next in international energy markets?

- Discussion of global forward outlook
- Review of countries that might most greatly impact world energy markets
- Key case studies to watch

FINAL PAPERS DUE

Grading/Assessment
All questions and problems regarding grades must be presented in writing within one week after the test, homework, or project has been returned. The grading scale is fixed, please do not wait until the end of the quarter if you are concerned about the direction of your grade. Grades will be assigned based on all the work you have completed during the semester using the following scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
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<tbody>
<tr>
<td>A</td>
<td>93.333 to 100</td>
</tr>
<tr>
<td>A-</td>
<td>90.000 to 93.333</td>
</tr>
<tr>
<td>B+</td>
<td>86.666 to 90.000</td>
</tr>
<tr>
<td>B</td>
<td>83.333 to 86.666</td>
</tr>
<tr>
<td>B-</td>
<td>80.000 to 83.333</td>
</tr>
<tr>
<td>C+</td>
<td>76.666 to 80.000</td>
</tr>
<tr>
<td>C</td>
<td>73.333 to 76.666</td>
</tr>
<tr>
<td>C-</td>
<td>70.000 to 73.333</td>
</tr>
<tr>
<td>D+</td>
<td>66.666 to 70.000</td>
</tr>
<tr>
<td>D</td>
<td>63.333 to 66.666</td>
</tr>
<tr>
<td>D-</td>
<td>60.000 to 63.333</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 60.000</td>
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Statement on Winter 2021 COVID-19 Classroom Requirements
Students, faculty, and staff must comply with University expectations regarding appropriate classroom behavior, including those outlined below and in the COVID-19 Code of Conduct. With respect to classroom procedures, this includes:
Students, faculty, and staff are required to wear a face covering in all public and shared environments on campus, including during class sessions when others are present.
  - Disposable face masks will be available at identified building entrances in all campus buildings.
  - Clear face coverings may be worn to improve ability to read lips; if an accommodation is needed, please contact Accessible NU (students) or Office of Equity (faculty).
  - Face shields are no longer allowed as an alternative to a face mask, per guidance from the CDC and Northwestern Medicine. This includes instructional spaces regardless of social distancing.

Students, faculty, and staff are expected to observe the rules of social distancing, which require that you are no closer than six feet from other individuals.

No food is allowed inside classrooms. Drinks are permitted, but please keep your face covering on and use a straw.

Chairs and tables in classrooms are set to maintain a six-foot distance between individuals. Do not move chairs from their place in the room.

There will be assigned seating in every class. Instructors may be asked to provide seating information to aid in contact tracing if a student tests positive for COVID-19.

Class dismissals will start with the seat/row closest to the exit door and be managed by the instructor so as to minimize congestion near the exit.

Students and faculty will allow those occupying rooms to fully exit before they enter the room.

Faculty, students, staff and visitors are expected to use the daily symptom check web app for daily health monitoring on days they come to campus.

As noted below, ALL graduate students must receive a negative test during Wildcat Wellness and before starting in-person classes on January 19. Throughout the semester we expect MSES students to be tested weekly or bi-weekly. Please abide by the email reminders you receive from the testing center.

The University will again hold a Wildcat Wellness period from Jan 4 through January 17. During this time ALL graduate students must be tested for COVID-19 and ALL classes will be held remotely.

In the event that a student fails to comply with the COVID-19 Code of Conduct or other University expectations related to COVID-19, the instructor may ask the student to leave the class. The instructor is asked to report the incident to the Office of Community Standards for additional follow-up.

It is also the policy of the MSES Program that all lectures will be recorded and offered in a synchronous, hybrid format. In Winter Quarter 2021 this means that students are expected to attend class in-person on Mondays and Tuesdays and that class will be held completely remote on Wednesdays and Thursdays. On in-person days there will always be a synchronous Zoom option for any students that feel ill or are uncomfortable coming to class. If the professor needs to alter this schedule, they will aim to announce the changes at least 24 hours in advance.

**Class Recording**
This class or portions of this class will be recorded by the instructor for educational purpose and available to the class during the quarter. Your instructor will communicate how you can access the
Unauthorized student recording of classroom or other academic activities (including advising sessions or office hours) is prohibited. Unauthorized recording is unethical and may also be a violation of University policy and state law. Students requesting the use of assistive technology as an accommodation should contact AccessibleNU. Unauthorized use of classroom recordings – including distributing or posting them – is also prohibited. Under the University’s Copyright Policy, faculty own the copyright to instructional materials – including those resources created specifically for the purposes of instruction, such as syllabi, lectures and lecture notes, and presentations. Students cannot copy, reproduce, display, or distribute these materials. Students who engage in unauthorized recording, unauthorized use of a recording, or unauthorized distribution of instructional materials will be referred to the appropriate University office for follow-up.

Expectations for Class Participation
Being prepared for class is about more than just showing up, it’s also about making sure you’ve completed the readings, homework, etc. so that you are able to make thoughtful contributions during class. Sitting silently and/or being unprepared can damage your participation grade. When in a virtual class, we expect students to keep their camera and mute on as much as possible. When in the classroom, we expect students to keep their phones off and put away.

Academic Integrity
Academic integrity is taken very seriously at Northwestern. Students are responsible for reading and understanding Northwestern’s Academic Integrity policies. All suspected violations will be reported to the McCormick College of Engineering’s Dean’s Office. These include cheating, plagiarism, fabrication, unfair advantage, unauthorized collaboration, and aiding and abetting of academic dishonesty. Students found in violation of academic integrity may receive a zero on the assignment or a failing grade for the course and may be suspended or permanently expelled from the University. See Academic Integrity: A Basic Guide for more information.

Accessibility Statement
Northwestern University is committed to providing the most accessible learning environment as possible for students with disabilities. Should you anticipate or experience disability-related barriers in the academic setting, please contact AccessibleNU to move forward with the university’s established accommodation process (e: accessiblenu@northwestern.edu; p: 847-467-5530). If you already have established accommodations with AccessibleNU, please let me know as soon as possible, preferably within the first two weeks of the term, so we can work together to implement your disability accommodations. Disability information, including academic accommodations, is confidential under the Family Educational Rights and Privacy Act.

Illness and Medical Leave of Absence
Review the University’s policy on missing academic work due to illness. Your instructor cannot waive an assignment missed due to illness unless the illness can be verified (e.g., by University Health Services or other licensed health professionals).

**Discrimination and Sexual Harassment**
Northwestern’s Policies on Discrimination, Harassment, and Sexual Harassment apply to all members of the University community, including students, staff, faculty, and third parties. Any student, staff, faculty member, or third party who believes that they have been discriminated against or harassed on the basis of their race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, pregnancy, parental status, marital status, age, disability, citizenship, veteran status, genetic information or any other classification protected by law, should contact the Office of Equity at (847) 467-6571. Additional information about the University’s discrimination and harassment policies, including the campus resources available to assist individuals with discrimination or harassment concerns, is available online on the Office of Equity Website. Students, staff, and faculty who report harassment, discrimination, or sexual misconduct are also protected under the University’s Policy on Non-Retaliation.

**Sexual Misconduct and Reporting**
Northwestern University is committed to fostering an environment where students are safe and free from sexual misconduct. Confidential resources are available to those who have experienced sexual misconduct. Faculty and instructors are not confidential resources and are required to report incidents of sexual misconduct, whether discussed in your assignments or in person, to the Office of Equity, which can provide information about resources and options. We encourage students who have experienced sexual misconduct to talk with someone to get support. For more information, including how to request interim protective measures and academic accommodations or file a complaint, see the Get Help page.

**Other Resources**
Students can find useful resources for safety and security, academic support, and mental and physical health and well-being at the NUhelp website.